Combined labour necessary for the future progress of medicine : an address to the British Medical Association delivered at Chester, Aug. 8, 1866 / by John Hughes Bennett, M.D.

COMBINED LABOUR

NECESSARY FOR THE FUTURE

PROGRESS OF MEDICINE

AN ADDRESS

TO THE BRITISH MEDICAL ASSOCIATION

DELIVERED AT CHESTER, AUG. 8, 1866

BY

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EDINBURGH
ADAM AND CHARLES BLACK
1866

GENTLEMEN,—

In discoursing before such an audience as I have now the honour to address, on the science and art of medicine, nothing would be more gratifying for me than to dwell on the unquestionable benefits which mankind has derived from the practice of the healing art—to praise and hold up for imitation the great men whose genius and labours have assisted its progress—to describe the improvements which have been made in recent times—to expatiate upon some doctrine which, at the present moment, strongly excites attention—or to repel the covert sneers or open attacks which have been made upon its dignity, honour, or utility. Able addresses of this kind, however, have been so frequently brought before you; the names of Harvey, Hunter, Jenner, and Bell, have done such good service; graphic illustration, sound reasoning, and vivid eloquence have been so well and forcibly employed on these topics, that I trust you will forgive me if, on this occasion, I venture to regard the future rather than the past; and while admitting that much has been done, contend that more remains to be accomplished. I propose, then, to inquire, from the present aspect of medicine, theoretical and practical, how we can best assist its onward progress, and establish more firmly its claim to scientific eminence and public confidence.

And here allow me to observe that my position as a teacher of Physiology in the University of Edinburgh obliges me to review annually the incessant labours of the histologists, naturalists, chemists, physicists, physiologists, and pathologists, who are seeking to determine the laws which regulate vitality in all

its phases. From such a survey, it is now manifest that the theory of medicine during the last twenty-five years has been completely changed, that most of the principles which governed its practice as an art are no longer applicable, and that during this period our science has advanced with such astonishing rapidity as to have imposed upon those who kept pace with its progress a task of no ordinary difficulty and labour.

On the other hand, as a physician in active practice, and as a professor of Clinical Medicine engaged in teaching the art at the bedside, I am surprised at the indifference with which this great advancement in the science is regarded by the majority of medical men. I see an army of practitioners scattered over the country, without organisation or central government, engaged in efforts to cure disease and alleviate suffering. In this they are mainly guided by a knowledge, partly traditional, partly acquired by themselves, called experience, which is not only often opposed to the exact observations and careful inquiries of modern times, but is too frequently most contradictory in itself. The greatest differences consequently prevail among intelligent medical men as to the best methods of treating many important diseases ; theory and practice—advanced science and past authority—scepticism and blind faith—often being arrayed against each other.

What, then, seems to me desirable in the actual condition of medicine is to bring the scientific and practical departments of the profession into harmony with one another, and to produce such co-operation among practitioners that their methods of treatment should assume more of a fixed and uniform character. To assist us in arriving at this end, I propose shortly to describe what seems to me the actual stand-point or condition of medicine, both as a science and as an art ; and, in doing so, point out how one necessarily influences the other. I shall then consider how far, by greater union among its cultivators than has hitherto prevailed, professional advancement may be best secured.

1. It must be admitted that the descriptive anatomy of the human body is perfect—a fact in itself of the highest importance in the consideration of medicine as a science. It is in determining its ultimate structure, by means of magnifying instruments, that the greatest progress has been made in recent times; and it is now determined that vital phenomena are essentially dependent on the minutest particles of which every tissue consists. The organs and textures, in fact, are but aggregations of fine molecules, an acquaintance with the properties of each of which can alone lead us to a knowledge of the whole. All attempts to restrict vital action to a cell, to a nucleus, or to any particular element of structure, appears to me to be opposed by an overwhelming series of facts; the truth being, that growth, contractility, and spontaneous movement are as capable of being demonstrated in a molecular vibrio one twenty-thousandth of an inch in diameter, as in the largest cell or muscular fibre. Neither is vital action confined to a so-called molecular or germinal mass, but it may exist in perfectly hyaline intercellular substance, as in cartilage, where those changes primarily occur that transform it into bone. It follows that those views whereby, according to some, organic matter is always evolved from within, while, according to others, it is always superimposed from without, are too exclusive, nature sometimes acting in one way and sometimes in another,—here within, and there external to cells.

So far, then, as our present magnifying instruments will allow us to judge, the ultimate structure of a living body is composed of molecules. These possess independent physical and vital properties, which enable them to unite and arrange themselves so as to produce higher forms. In this way nuclei, cells, fibres, tubes, and membranes are produced, the union of which in their turn constitute the various tissues and organs of the body. Not unfrequently the breaking down of one substance is the necessary step to the production of another; so that, either directly or in

solution, the hystolytic or disintegrative molecules of one period may become the histogenetic or formative molecules of another. This theory of organisation not only reconciles the conflicting views of those who still found their notions of development upon the powers of a cell, of a nucleus, or of intercellular substance, but seems to me consistent with all the known facts yet discovered in the organic world.

As an illustration of this process, we can trace with tolerable accuracy the structural history of food as it passes into, through, and out of the body. Thus, an organic mass—say a piece of bread or a beef-steak—first undergoes the hystolytic process of disintegration, partly by the mechanical action of the teeth, stomach, and intestines, and partly by the solvent action of the salivary, gastric, and other juices, until it is reduced to a molecular pulp called chyme. From this pulp a fluid is prepared, which, passing through the villi, enters the chyle-ducts, and in the lymph-glands and thoracic duct, by a histogenetic or formative action produces the blood corpuscles. These become coloured in the lungs, circulate for a time, and in their turn undergo hystolytic solution, and thereby serve to elaborate the liquor sanguinis. This viscous fluid, drawn out through the capillaries, supplies the various tissues, molecule by molecule, with the histogenetic or constant formative material which keeps up their substance. Such substance having served its purpose is constantly undergoing a hystolytic or disintegrative process—is again reduced to a finely molecular fluid, and once more joins the liquor sanguinis of the blood. From this it is finally removed through various channels by the process of secretion and excretion, which in their turn only present still further evidence of this law of molecular organisation. Thus the bread or beef-steak, having entered the frame, may be shown structurally to have undergone successive histogenetic and hystolytic changes ; enjoyed, as it were, life for a time, and ultimately been discarded as inert or dead matter. Compositions and decompositions, however, are not only structural but chemical, and to these we must next pay attention.

2*d*. The great impulse communicated to animal chemistry in recent times dates from the labours of those who, by careful analysis, have followed the chemical transformations which plants and animals undergo during their development, growth, and decay. These have shown the relations which exist between the atmosphere, the soil, and the plant—what the latter takes from the two former, and what it gives to the animal who feeds upon it. In the same manner that plants can only grow in those soils which contain the substances necessary to form their tissues, so animals can only be nourished upon those compounds which contain the chemical elements they themselves require. All this being ascertained, what next interests us is the relation which exists between the supply of food and waste of the tissues during their exercise.

Viewed chemically, food may be regarded as a mixture of albumen, fat, and mineral matter, all of which pervade the economy, although the first is most abundant in the fibrous tissues, the second in the adipose and gland tissues, and the third in the bones and teeth. These substances, prepared by the molecular disintegrative process formerly alluded to, are but little changed chemically before passing into the tissues. But in leaving them in order to be excreted, remarkable chemical combinations and decompositions occur, whereby they produce different compounds, such as carbonic acid, water, urea, numerous organic salts, and so on. The nature of these chemical actions within the body is not yet fully understood ; so that, although we know the composition of the ingesta and egesta, how the one is transformed into the other by the animal is not so clear.

The view put forth by Liebig—namely, that food should be regarded as nitrogenous and non-nitrogenous—the former being sanguigenous or flesh-forming, and the latter respiratory or heat-giving—has long appeared to me erroneous on histological grounds. Every tissue requires both principles. Even chemists themselves have shown by experiment that the idea of the tissues being oxidised during action, and yielding a proportionate

degree of refuse like a steam-engine, is not correct. Recently Messrs. Fick and Wislicenus of Zurich went to the summit of the Faulhorn, one of the Swiss alpine peaks, an ascent which occupied eight hours. During this period, as well as for eighteen hours previously, and for six hours subsequently, they only ate hydro-carbonaceous food, yet a chemical analysis of all the renal secretion passed showed that during and shortly after the ascent the urea excreted was only slightly increased. These facts are irreconcilable with the prevailing chemical theory, for had muscular exertion increased the oxidation of albuminous material, urea should have been largely augmented, but it was not so ; muscular energy in this experiment having been carried on, without fatigue, at the expense of the carbonaceous substance of the tissue.

Indeed, numerous observations now being prosecuted prove that much has to be accomplished before the chemistry of food becomes the physiology of food, and before the slice of bread or beef-steak can be traced in its progress through the body with the same exactitude chemically as it has been structurally. Even when this is accomplished, we shall have much to learn which chemistry cannot teach us, for, as has been pithily observed, although in the laboratory a pound of flesh is enormously superior in nutritive power to a pound of cabbage, yet, to a rabbit the cabbage is the superior food, whilst to a dog the cabbage is no food at all.* It follows that though chemistry can teach us much, nutrition, like all other vital processes, can only be rightly studied by the physiologist.

3. The researches of naturalists, it is now admitted, have thrown much light on the laws of germination and reproduction, and have demonstrated to us the nature of several obscure diseases. The observations of Bassi as to the cause of death in certain epidemics affecting the silkworm led to the discovery of the vegetable parasites causing Favus, Pityriasis, Mentagra, and

* Lewis, p. 115.

other diseases of man; while the observations of Sars, Von Siebold, Steenstrup, and others, have determined the laws which govern the production of animal parasites. These in turn are related to several interesting facts and generalisations, all of which have tended to augment our knowledge of the animal economy. Need I allude to the doctrine of alternate generation by Steenstrup, of parthenogenesis by Owen, of the origin of tape-worm by Von Siebold, of the economy of the hive by Dzierzon, of pisciculture by Coste, of the formation of the coral reefs and islands of Florida by Agassiz, and the origin of species by Darwin—all of them noble examples of physiological generalisation, several of which have already found important practical applications, while not a few have been of direct service to medicine.

4. A study of natural philosophy has led in recent times perhaps more than that of any other branch of science, to an elucidation of the functions of living beings. What are physical and what are vital actions has long been a subject of discussion. The attraction which the sun exerts upon the earth, that which the earth has upon the magnetic needle, and that which one chemical substance has for another, though differing entirely in their nature, are called physical; but the attraction which the intercellular substance of cartilage exerts upon the lime salts dissolved in the blood, or that by which any other tissue selects and draws from the liquor sanguinis what enters into its substance, is called vital. Again, the conduction of electricity along a wire is physical; the conduction of nervous influence along a nerve is vital. We know nothing of the nature of any of these actions, which constitute ultimate facts in science; but inasmuch as they are not identical, we call those which occur in living beings vital. Some of these are altogether peculiar,—such as growth in particular directions, muscular contractility, nervous excitability, and mental acts. We observe, however, in a living being, that these properties are more or less dependent upon, mixed up

with, and give direction to, physical properties. It is the determination of what is due to the one class of phenomena and what to the other, as well as their mutual relations, that has for some time engaged the attention of what is called the physical school of physiology.

And here it must be confessed that just in proportion as the physical have been made to encroach upon what were supposed to be vital actions, our knowledge has advanced. It has now been proved that much of what was mysterious must be considered due to gravity, imbibition, endosmose, or to chemical, electrical, and mechanical operations. Now, as the laws regulating these physical forces are better known to us than such as govern the vital ones, not only in this way can we comprehend them better, but when required to modify them by art, we are enabled to do so with more effect. We cannot, therefore, too strenuously urge forward all that physical research can do for us, although still conscious that while in this way we may learn much, physics will not, any more than chemistry, ever wholly clear up the mysteries which surround the great fact of life.

It is curious, however, to observe that while chemistry has succeeded in manufacturing in the laboratory many of the excretory products of the body—such as urea, taudine, allantoin, formic, oxalic, lactic, butyric, and other organic acids; so the histologist, by the mechanical union of oil, albumen, and mineral matter, has succeeded in forming artificial molecules, nuclei, cells, membranes, and concretions, very similar to what we find in the animal. True, in both cases we must take the proximate principles, which can only be formed by nature ; but, these given, we learn much of the structural mode of formation and of the chemical decompositions occurring in the animal from what physical experiment has taught us.

Of the numerous ingenious instruments now invented which have enabled us to determine with rigorous exactitude the time, area, and intensity of phenomena in the living body, whether applied to the velocity of the circulation, force of the pulse, pro-

duction of electrical currents, rapidity of the nerve force, altered curves of the crystalline lens, and many other most important facts, I have no time to speak. I have requested my assistant, Dr. Rutherford, to bring with him to this meeting the very ingenious myographion of Du Bois Reymond, with which he will show, what may prove interesting to many present, how the rapidity of the nerve-current can be accurately determined. The inspection of such an instrument, an idea of its construction, and the witnessing one of the experiments which have given such reputation to the name of Helmholtz, will do more than any feeble description of mine, to convince you of the great talents and ingenuity of those who now prosecute our science in this direction.

5. Experiments upon the lower animals, I need scarcely say, have added largely to our knowledge of the vital functions. On the propriety of this kind of research I agree with what was stated by Dr. Sharpey in the able address which he read to this association in 1862—viz. that "when we consider the countless myriads of the brute creation that are daily slaughtered for man's sustenance, or are left to perish from hunger or the severity of season, or fall a prey to their natural enemies, to say nothing of the multitudes killed for sport, surely it is not too much to claim that an infinitesimal share of this vast sacrifice be applied towards the extension of human knowledge and the alleviation of human suffering." It is unnecessary, however, to dwell upon the brilliant results which have been derived from this method of investigation. I would only point out, that a reluctance to engage in it when necessary has vitiated the most important conclusions, of which we have an excellent example in the ideas formed by Sir Charles Bell as to the functions of the anterior and posterior columns of the spinal cord. Having cut the anterior and posterior roots of the spinal nerves in a living animal, and shown that thereby voluntary motion and sensation connected with the parts which received nerves from them were paralysed, he supposed that the columns of the cord were continuations of

these roots, and that section of them would also destroy motion and sensation. But when Brown-Sequard cut across the posterior columns in a living animal, which he did with a knife made for the purpose, it was found that so far from sensation being prevented, pressure on the leg of the animal gave rise to increased pain. The cause of this is now thoroughly understood from the admirable histological researches of Mr. Lockhart Clarke, who has demonstrated, among numerous important facts, for which science is his debtor, that the nerve-tubes of the spinal roots, instead of turning up towards the brain, as had been generally supposed, pass directly inwards to the grey matter, and are there so distributed that no single section of those columns can destroy their power of conducting influences to the brain. Indeed experimental and histological research have been so well combined in recent times as to throw a flood of light over the functions of the nervous system. In proof of this I need only refer to the labours of Bernard as to the influence of the vaso-motor nerves over animal heat.

6. Lastly, the pathologists, who seek to discover from an inspection of diseased organs after death the relations existing between morbid conditions and the symptoms or phenomena they occasion during life, have also added largely to the science of medicine. In the same manner that the healthy body has been explored to obtain a knowledge of its structure, so has the diseased body been scrutinised to ascertain the changes produced. As the descriptive anatomy of man is perfect, so is his morbid anatomy, and pathological is as far advanced as physiological histology. Indeed they may be said to constitute one science. If the organic chemistry of the healthy processes is imperfect, the pathological chemistry of the body is still more so, the latter necessarily being dependent on the former. Such, however, is the activity with which morbid phenomena have been investigated during the last quarter of a century, that in no department of the science, probably, has greater progress been effected.

The meanings of the old terms, inflammation, tubercle, cancer, and so on, are still discussed, but the morbid processes themselves are now well known. These consist of congestion of the blood-vessels, and, as a result of this, serous effusion, exudation of the liquor sanguinis, or extravasation of blood. Each of these products undergoes subsequent changes, whereby they are again absorbed into the circulation, either directly, as in the case of serous effusion ; or through cell-growth, as in the case of exudation ; or by disintegration, as in the case of internal hemorrhages. Not unfrequently morbid growths occur, which may originate from irritation of the existing textures, which they more or less resemble, or they may spring up in exudations giving rise to tubercle, pus, and cancer. The tissues also atrophy or degenerate, and in this last case may undergo the fatty, albuminous, pigmentary, or mineral transformations. Concretions of various kinds are deposited in cavities, and obstruct ducts, giving rise to formidable lesions. There may be animal and vegetable parasites. Lastly, the blood itself may undergo alterations from an excess or diminution of its structural or chemical constituents, or it may be contaminated by noxious poisons derived from without, or generated within the body.

A knowledge of these morbid states has now made great progress, and our general ideas of their nature have in consequence undergone a remarkable change. It has been shown that the same general laws which regulate growth and other vital functions in health, also influence them when so disordered as to constitute disease. The same theory of organisation which has changed our views of physiological processes, has had a similar influence on pathological ones. It is not so much the peccant humour or the vascular action of our forefathers to which we attribute structural effects, as it is to the altered chemical, electrical, or vital condition of the ultimate molecules of the tissues themselves. This being the organic cause of disease, our efforts are no longer engaged in the mere study of symptoms, and the grouping them together in accordance with artificial nosologies,

but in endeavouring to determine with accuracy the character of the lesion itself, and the precise texture and organ which is involved.

Only a limited idea, however, can be formed of the position of scientific medicine from viewing what has been accomplished by these six methods of investigation separately. It is their union, the assistance that one gives to the other, and the necessity which exists for knowing them all, that require attention in founding a proper basis for medical education. So long as it was supposed that diseases were groups of external symptoms, and that the removal or alleviation of these symptoms was the chief object to be attained, the rules of art flowing from past experience were easily acquired. But now that every practitioner strives to ascertain the nature and seat of the morbid change, not only must these be previously understood, but he must be capable of using all those means whereby they can be detected. A knowledge, therefore, of certain sciences, and of the laws which regulate their course, and their relations with one another, has now become imperative as an introduction to practice.

This mutual relation of the sciences has led to generalisations of the highest importance to our knowledge of vital action both in health and disease. Thus it having been shown by Grove that the various physical forces—such as heat, light, electricity, gravity, and chemical action—are all correlative, it soon became apparent not only that there was a similar relation between the vital forces—such as those governing growth, nutrition, contractility, and excitability—but also between these and the physical forces. It has farther been shown that just as matter is indestructible, only changing its condition, so there is a conservation of force which only alters its form. In the same manner that heat, light, electricity, gravity, and chemical action are capable of being perpetuated in an incessant round one to the other, so we must regard growth, contractility, sensibility, and even the exercise of the mind, as only varieties in form of that chemical

force generated in nutrition, as this in its turn is only an altered manifestation of some other force.

It is by studies in this direction and in this spirit that we shall do most to advance the science of medicine, in proof of which I would for a moment refer to the assistance which the sciences have given to one another in advancing our knowledge of disease, and its detection in the living body. How anatomy and physiology aid pathology, and how this in its turn confirms and extends physiology,—of this we have an excellent example in the discovery of leucocythemia, which has proved to us that the views of Hewson, which were so long neglected and held to be doubtful, as to the functions of the spleen and lymphatic glands, are correct, and that they do, as he maintained, form the corpuscles of the blood. Again, many alterations of texture, which morbid anatomy has made us acquainted with, would only have been suspected, but for the help which physical science has furnished in various ways, more especially by chemical tests and analyses, and numerous ingenious instruments. Need I refer to what we now accomplish by means of percussion and auscultation, and to the use of the microscope, speculum, laryngoscope, ophthalmoscope, sphygmograph, thermometer, etc.

The present stand-point of scientific medicine, therefore, may I think be summed up as follows :—

1st. That the descriptive anatomy of the human body is perfect, and has been thoroughly worked out.

2d. That the structural and general anatomy of the human body is very nearly so.

3d. That physiology, though greatly advanced, has yet much to teach us as to the functions of the human body, and is at this moment apparently waiting—(1.) for the organic chemists who are investigating the transformations which food undergoes in passing through the economy ; and (2.) for the physicists who, with newly-invented and delicate instruments, are investigating the vital functions with a care and exactitude only recently arrived at.

4th. That pathology has demonstrated to us the structural alterations produced by morbid states, but is still very deficient in a knowledge of the chemical alterations which they occasion. It must necessarily be dependent, however, on the progress of physiology, so that the laws which regulate many diseased processes have yet to be ascertained.

5th. That the diagnosis of diseases, owing to our combined knowledge of physiological and morbid states, and the cultivation of physical exploration in conjunction with observations of symptoms, is rapidly becoming more exact, and losing its conjectural character. What John Hunter effected for surgery by placing it upon a scientific basis, is now the object of the well-informed physician with regard to the practice of medicine.

PRESENT STATE OF THE ART OF MEDICINE.

I now turn to the practical side of medicine, by which is to be understood an available knowledge of all those means which contribute, directly or indirectly, to the cure of disease, prolongation of life, or alleviation of suffering.

The long discussions that formerly occurred as to whether the practitioner should be guided by dogmatism or empiricism, —theory or observation—deduction or induction—have lost their interest. There are more observers than reasoners, although it may be questioned whether a really perfect observation is not more rare than a sound theoretical conclusion. It is now recognised that science must prevail in the schools, practice at the bed-side ; and that the more we acquire of both, so much the clearer is it seen how good observation corrects and perfects theory, and how science improves and extends observation. Both have added largely to our resources. Thus it will be admitted that the doctrines of the circulation of the blood, of the independent functions of nerves, the reflex function of the spinal cord, cell-growth, and so on, have been directly serviceable in practice. It by no means follows, however, that great physiological dis-

coveries are immediately available in this way. The practical value of the discovery of Harvey was not recognised for several years after its publication, and the recently-established doctrines of the functions of the pancreas, of the lymphatic glands, and of the glycogenic functions of the liver, have not taught us as yet how better to regulate digestion, influence the formation of the blood, or cure diabetes. But that every physiological truth adds largely to our conceptions of the correct treatment of maladies, is a proposition I must not occupy your time with attempting to demonstrate.

On the other hand, many of those remedies which have been proved to be directly curative of disease—such as quinine, sulphur-ointment, lemon-juice, cod-liver oil, and so on—are entirely the result of empirical observation. With regard to these, it is our constant aim to determine the rationale of their influence. Up to this moment, notwithstanding, there is an uncertainty about the action of numerous powerful drugs in daily use, which is a constant reproach to us, and which we should make a strong effort to remove. It cannot be correctly said, in face of the researches and additions constantly made to our knowledge, that we have been altogether supine on this subject. But it is unquestionable that no vigorous attempt is being made, nor does any organisation, so far as I can perceive, hold out a prospect that any is likely to be made, of advancing our knowledge in this direction. In the excellent paper read at the annual meeting of the Association by Dr. Handfield Jones, in 1862, the conflicting opinions which prevail with regard to the action of some of our most valuable drugs, more especially of digitalis, opium, and quinine, were pointed out. The settlement of these differences is certainly within the reach of scientific investigation, and all that is required are capable workers to solve the difficulties they present. Numerous other agents, however, might be mentioned, the power of which is great, though as yet we know little of their effects. Among these is electricity, the operation of which upon the nerves and muscles has recently been studied

by the physical school to a great extent, without, as yet, furnishing us with any exact principles for its application. Duchenne and Remak, it is true, have made many valuable observations, but their views are much opposed to each other. The first considers that an interrupted current should be applied directly to the muscles, while the latter believes that a powerful continuous current sent along the nerves is most beneficial. This and many similar questions require to be solved by investigation.

There are few, however, I fear, who have clearly placed before themselves the great difficulty, labour, and sacrifice of time which therapeutical inquiries necessitate. Indeed, it may be questioned whether any one man, however talented, is capable of such investigation. The wisest among us is apt to be biased by accidental circumstances. A case, or series of cases, which have done well under a particular management ; the unexpected recovery of an apparently hopeless disease following the administration of a particular medicine ; or the fascination which lingers about some plausible theory, may all tend to mislead. The influence of one mind should be corrected by that of another ; and the best knowledge in all the departments of the science and art of medicine should be concentrated on the solution of the question proposed. A committee, therefore, would be requisite, which should combine the skill of the anatomical operator, the analytical power of the chemist, and the varied knowledge, theoretical and practical, of the histologist, physiologist, physicist, pathologist, and therapeutist, as well as of the physician whose knowledge of diagnosis is unimpeachable. It would be also advisable to temper the energy and sanguine character of youth with the caution and reasoning power of age. A physiological laboratory, with every necessary instrument, appliance, and chemical, together with a hospital, would be necessary adjuncts.

But when such a committee have completed their labours, published their report, and made their suggestions, even with the assistance of one or more hospital physicians, the co-operation of

a large number of practitioners becomes necessary to give it that general and varied trial which is necessary to test its value. No one practitioner, even with the assistance of a large hospital, can hope to examine and carefully record such a number of cases of any one disease as will render his trials of great value. Such, at the same time, is the want of union among medical practitioners, and so difficult is it to impress them with the advantage of working in concert to advance medicine, that several years may elapse before any investigation is finally completed and receives the authoritative sanction of numbers.

And here I would observe that there is only one way in which, as it seems to me, any particular treatment can ever become, for the future, really authoritative and entitled to the confidence of the profession at large. It is, that the facts connected with it should be carefully observed, and the results so recorded that they may be easily compared with similar results obtained by other methods. For this purpose the age, sex, general vigour of the body, and other facts necessary to be known, under the circumstances, should accompany any general statement as to the good effects of the remedy or treatment, so that all may judge of its value for themselves. This would be the crowning proof of its utility, for it need scarcely be pointed out that even the general adoption of a remedy and a particular practice, or a universal belief in its efficacy, is no guarantee that it is really the best that can be followed. Of this, the practice of bleeding and an antiphlogistic treatment for acute inflammations, and that of a six-weeks' course of mercury for the removal of syphilis, both of which prevailed about thirty years ago, offer illustrations.

It is a fact which cannot be disputed, that the mortality of a strictly antiphlogistic practice in acute pneumonia was one death in three cases, and that simply by leaving off a lowering treatment the mortality was diminished to one in seven. In the same manner it has been satisfactorily proved that a general non-mercurial treatment of syphilis cures the disease on an average in two-

thirds of the time, and with only one-half the number of secondary cases. Whether there are any cases of pneumonia that still demand blood-letting, or some cases of syphilis that still require mercury, is a question not yet decided, but there can be no doubt that we owe to statistical research the important results to which I have referred. Tabulated facts and numbers therefore, which correctly estimate the amount of benefit obtained, are what is necessary, instead of vague generalisations, mere opinion, and too often unfounded assumptions. To this end co-operation among members of the profession is necessary, but the difficulty of attaining it may be estimated by the result of a trial in this direction which was commenced by the Association in 1862.

At the annual meeting of that year in London a committee was appointed, who recommended that various subjects should be proposed for investigation by this association. Certain members of that committee each agreed to prepare a schedule, to be circulated with the journal, to receive the returns and report on or publish the results. Accordingly, four such schedules were so circulated, and you may feel curious to know the effect of this appeal to upwards of 2000 medical practitioners.

Eighteen schedules were returned to Dr. Fleming of Birmingham, containing 100 cases in which tape-worm was treated by the male shield fern.

Twenty-one schedules have been returned to myself, containing 152 cases of acute pneumonia, mostly treated on the restorative plan.

Nine schedules were returned to Dr. Harley, containing 23 cases of jaundice, treated by benzoic acid, mercurials, and podophyllin.

Three schedules were returned to Dr. Handfield Jones, containing 3 cases of non-syphilitic psoriasis treated in various ways.

The only report published is that by Dr. Fleming, who informs us, that the cases returned to him "establish beyond doubt the great efficacy of the oil of the male shield fern in tapeworm,

and its superiority to the other known remedies of this disease. Further," he says, " our report points very decidedly to the most efficient mode of exhibiting the drug; and the whole inquiry has, as I have reason to know, rendered excellent service to therapeutics by making the virtues of the oil of male fern more widely known and employed throughout the profession."*

It will therefore be seen that this report of Dr. Fleming has been of great advantage, and so far fully justifies the proposal of the association. 100 cases also, where the problem is so simple as the expulsion of a worm, may perhaps be regarded as data amply sufficient to establish the therapeutic virtue of the remedy. Where, however, the problem to be solved is more complex, as in the three other cases, it must be admitted that the returns are by no means sufficient, and that this effort to obtain extensive data for determining the best treatment of acute pneumonia, jaundice, and psoriasis, has as yet been unsuccessful.

Notwithstanding, I still entertain the hope, that through this great association of medical men something may be done to settle doubtful modes of treatment. If instead of 21 schedules, for example, as to the treatment of pneumonia, yielding 152 cases, it were possible to get 200 schedules with 1500 cases, I think all the vexed questions concerning the treatment of that disease might be permanently solved. Even this only supposes that one-twelfth of our number should fill up a schedule with such cases of the disease as they may encounter for twelve months.

For any scientific investigation, funds must be raised to remunerate the talent and toil which an extended and useful inquiry will necessarily involve. With such aid, properly applied, we have good evidence that much may be done. The recent Government Report on the Cattle Plague, for instance, points out how the co-operation of various individuals may be so directed as to exhaust a medical inquiry. The annual sanitary reports of Mr. Simon, conducted on a similar plan, exhibit a series of investigations which are invalu-

* *Brit. Med. Journ.* January 15, 1864, p. 26.

able to the medical man. A like series of reports on diseases, or as to the actions of remedies on the healthy or certain morbid states of the economy, there can be no question, would not only greatly tend to the advancement of medicine, but would gradually exert an authority which would be generally respected. When, also, we regard the advanced condition in which we find the science of medicine, there can now be little fear that such inquiries would conduce to the exclusive systems of treatment, into which some men were formerly led.

It was in every way worthy of the position held by Professor Acland of Oxford that he should have proposed to the Medical Council that a sum of £250, to test the properties of drugs, be granted out of the contributions levied from the profession. But notwithstanding it constitutes one of the duties of that council to publish from time to time a pharmacopœia, the application was refused on the ground that it constituted no part of its business to make such investigations. Exactly the same thing may be said by the government, by the corporations, by scientific societies, and indeed by each medical practitioner. In this way, we arrive at the familiar paradox, "That what is everyone's business is nobody's business."

From all the consideration that I can give this subject, the present stand-point of practical medicine appears to be—

1st, That the empirical method of treating disease has reached its utmost limits, and that little further improvement is to be anticipated from it..

2d, That the great advance which has taken place in the science of medicine has led, and is leading, to various modifications in the rules of medical practice, which only lately were in general use.

3d, That these modifications principally consist in putting more confidence in the powers of nature, having recourse more frequently to the assistance of diet and other hygienic influences, and in employing more sparingly blood-letting and other so-called heroic remedies.

4th, That the value of many remedies in certain diseases is unquestionable, and that their judicious employment confers invaluable benefits upon mankind, but the utility of others is disputed or little known, and with regard to these a careful investigation is imperatively required.

5th, That scientific researches constitute the means to which we must look for the future progress of medicine, but that experience has demonstrated the impossibility of carrying them out satisfactorily without funds to remunerate the investigators.

6th, That all applications of scientific treatment require the co-operation of medical men at large, and that no trustworthy results are likely to meet with general confidence in future, unless founded on extensive data, and formularised by a correct statistic.

FUTURE PROGRESS ONLY TO BE SECURED BY COMBINED LABOUR.

From the foregoing survey of what appears to me to be the actual condition of the science and the art of medicine two considerations are suggested,—1*st*, That the greatest development and encouragement should be given to all those methods of investigation, the united results of which constitute what may be called medical knowledge; and 2*d*, That the determination of how far this knowledge is useful, when practically applied to the cure or relief of diseases, demands the more cordial union and co-operation of the profession at large.

I would only observe, on the first head, that if, as we have endeavoured to show, science ought to be made the foundation of medicine, then so far from clinging to a past authority, we ought boldly to re-investigate everything that does not repose upon an exact and solid basis. Hitherto more weight has been given to expressions of opinion or of belief than to what can be proved or demonstrated. Hence the opposing views of even eminent authorities on the plainest procedures, not only as exhibited in their diagnosis and treatment of disease, but

in their evidence on all litigated questions. Should we not make an effort to settle these differences? But past authority is here wholly incapable, for such is its inherently conflicting character that no one can suppose it to be available for solving any existing difficulty whatever. What, then, is required is fresh research and correct reasoning, and every one acquainted with the resources we possess must feel persuaded that if combined and put into operation they are amply sufficient for the purpose. Indeed I trust it will be apparent from what has been previously said that the different branches of medical science are now so advanced as to be capable of solving difficulties which formerly they could not. All that seems requisite is, that their cultivators should unite to obtain the end in view.

Some maintain that our profession ought to be a learned one, and the Medical Council have recently resolved that while a knowledge of Greek shall in future be imperative on students, an acquaintance with natural philosophy and logic shall be altogether optional. It is with the greatest deference I venture to think that such a decision has not been made with a full comprehension of the tendencies of our science, or of its future requirements. It may be doubted also whether the habits of mind acquired by cultivating a literary taste and an appreciation of the classic authors, is such as will best fit the intellect for grappling with those difficulties which the severe study of vital action in health and disease involves. To this end mathematics, logic, and physics are absolutely essential.

With regard to the second head, I would remark that the British Medical Association numbers among its members many who are eminently well qualified to unite, both in scientific investigation and in practical observations. Will they do nothing in their collective capacity to solve satisfactorily one doubtful point as to the action of a medicine or the treatment of a disease? At this moment we are called upon to cope with a formidable epidemic, the numerous individual observations that have been made concerning which still leave us in doubt whether it be or be not

infectious, what is its pathology, and whether it is better treated by laxatives or astringents. What a noble spectacle would it present if the 2000 members of our association would only now agree during the ensuing year to direct their energies to an investigation into the nature and treatment of Asiatic cholera! Might not a central committee be appointed, which, operating through the many branches scattered over the country, would secure chemical, histological, and pathological research, combined with accurate, uniform, and extended observation? Would any of us grudge a small contribution that might serve to remunerate the labours, talent, and consumption of time involved in such an inquiry?

Whatever you resolve on, gentlemen, to me it is certain, that we have arrived at that epoch in the history of medicine which demands that truth in science and truth in art should no longer be kept asunder; that the traditions of old and less enlightened times should give way to the advancing spirit of inquiry that characterises the age we live in; and that the separate, and, because separate, too frequently opposing efforts of individuals should merge into the catholic endeavour of solving by union and mutual help, those questions which it has been demonstrated have baffled solitary research. The whole scope and tendency of the modern science and art of medicine indicate that future progress can alone be secured by combined labour; and I can conceive no more worthy, as there is no more appropriate, object for the consideration of this Association, than the manner and methods by which this great work could, through its agency, be prosecuted and accomplished.