

The Boston Medical and Surgical Journal

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Massachusetts Medical Society.

ANNUAL DISCOURSE.

NOTE.—At an adjourned meeting of the Massachusetts Medical Society held Oct. 8, 1860, it was

Resolved, "That The Massachusetts Medical Society hereby declares that it does not consider itself as having endorsed or censured the opinions in former published Annual Discourses, nor will it hold itself responsible for any opinions or sentiments advanced in any future similar discourses."

Resolved, "That the Committee on Publications be directed to print a statement to that effect at the commencement of each Annual Discourse which may hereafter be published."

SOME PERPLEXITIES IN MODERN MEDICINE.*

BY EVERETT A. BATES, M.D., SPRINGFIELD, MASS.

It is proper and appropriate that, we, members of the Massachusetts Medical Society, should upon occasions like this turn our thoughts to some subject whose consideration may illumine our path or encourage us if appalled by the magnitude of professional detail.

More than a hundred addresses have been delivered since it became the custom of the Massachusetts Medical Society to choose from its members an orator for its annual discourse.

These discourses have embodied subjects pertinent to the time, as the wave of medical progress tossed into view some new thought from out the depths of unknown problems; and each orator has given his best efforts, and has been stimulated to this effort by the example of each individual among a long list of physicians eminent

* The Annual Discourse delivered before The Massachusetts Medical Society at Boston, June 9, 1915.

in teaching, devoted to their work, and serious minded in their duty.

These splendid examples I cannot hope to emulate nor can I expect even a modest approach to their successes; but I deeply appreciate the honor you have given me, and my desire is to prove a not unworthy representative of my brethren of the Connecticut valley.

In the vast library of medical literature of today it would seem that no phase of scientific investigation as applied to medical progress is left untouched; this great volume of knowledge is a startling testimonial of the restless activity of minds working along a multitude of different radiants toward a common goal or centre. It is a mass of material that contains an abundance of folly and error as well as an abundance of worth; and its final analysis and the summation of facts that have stood the test of dispute and counter dispute constitutes our present day knowledge of medical sciences and has provided the basis of its application to the prevention and relief of diseases. We have not been alone in our far wanderings, haltings and uncertainties; for every progressive thought, as mirrored in the picture of scientific accuracy as we see it today, is the wonderful composite of a myriad of sittings and exposures; and the thought of the future portrays a strenuous individualism in the contemplation of which the mind wearies.

The history of medicine itself is the history of a workshop in which different working units have patiently and with painful effort constructed a system which we call today the Science of Medicine and Surgery.

That which was gross and invisible in the hu-

man body naturally first claimed the attention, and gave to anatomy its right to be considered the fundamental and original medical science; the possibilities that it gave for exact knowledge more especially when the microscope revealed the minute structure, from the embryo to maturity, has enhanced its value to the student in his thought of that which is best adapted to the practical side of his coming vocation; to be a prosector in a medical school twenty-five years ago was the acme of his ambitious elementary years; and the field of surgery must ever prove of tempting glamor. Naturally the function of a part went with its structure so that physiology followed hand in hand with anatomy its tedious course of progress, getting only now and then through the centuries the impulse of the master mind of a Galen and Harvey, but finally emerging as an intricate and bewildering science, and one which, intensely essential in its elementary values, is, through its advances in the past decade in the chemistry of digestion, nutrition and metabolism, quite beyond the absorbing capacity of the busy physician of an earlier training.

Pathology, the beginning of the science upon which the practice of medicine is, or should be, based, must necessarily arise when the early investigators of the human body began to find in their dissection certain variations from the organs as commonly noted; but not till fifty-five years ago did the great Virchow proclaim his cellular pathology, demonstrating that all bodies are made up of cells, and that each cell has a unity and purpose of its own,—thus, through the nature of normal function, showing the way to physiologic and pathologic experimentation. Finally, the microscope in the hands of a Pasteur and a Koch gave bacteriology to the world, the last and youngest of all the medical sciences, and completed the link in a chain of discoveries that are slowly solving the mysteries of life and that which makes for better living, better work, better rewards,—the healthy human body; for the ultimate perfection of the human race is the dream of the soaring fancies. And out of the limitless researches into these correlated sciences has come practical medicine as we see it today; an achievement of which we are justly proud, and upon which we love to dwell in words of praise; its scope is boundless, for by it we would preserve the normal through the prevention and control of all agencies that are destructive to it,—impressing legislative and federal control when necessary to better accomplish the result, we would discover by painstaking inquiry or by an elaboration of technical methods the earliest departure from this individual normal, and so provide in return an extension of its economic value; we would attempt to restore partially or wholly the person accidentally the victim of infection and trauma, or to reconstruct an anatomical or remove a pathological variation. In truth there is no region which the fancy does not penetrate in the ambitious flight of the vo-

taries of our profession, comprising a large number of experimentalists, teachers, writers, specialists, along with workers in the broad field of medicine and in its relation to the social status. A contemplation of the amount of knowledge that even a moderate acquaintance with these systematized masses of medical learning must entail upon the future student and practitioner is startling, for it intimates a degree of technical procedure and exactness that will not become any less impressive as the decades pass; and it implies that the solution of the problem of the office or the bedside or the hospital will be undertaken with an increasing scientific accuracy and precision and that it will require an ever renewed relationship on the part of the clinician with the medical scientist and his newest discoveries. The standard must constantly, although rather slowly to some of our impatient educators, advance, and the standard bearers must partake more and more of this advance in knowledge among the leaders. It is a self-evident conclusion. The chasm of ignorance thus quickly bridged in a comparatively few years is discerned by this rapid review of the history of medical growth.

Before the discovery of the great principles which lie at the bottom of our present day enlightenment, which we call scientific medicine, there existed for centuries a turmoil of contentions—a Babel of conjecture—theories varying from dogmatism to skepticism, until “confusion grew the worse confounded;” from these questionable methods, opinions and practices, many minds finally sought refuge in the simple thought of experience based upon observation as the only rational course in practice. Although empiricism was founded on speculation, Bacon, its ardent advocate in the seventeenth century, would seem to have given it the right to be considered the forerunner of our present scientific aims, when he said, “*vera scire est per causas scire*,”—to know truly, is to know through cause; and yet up to a half century ago so little had been gained by this early scientific thought that there existed only warring “schools” and “isms,” affording the defenders of each much material for discussion, but no rational, enduring and exact procedure governing health and disease.

Germany seemed first to learn the lesson that arose from the natural evolution of the medical sciences and became a power in the medical world by her painstaking application to clinical medicine, of her exact and detailed methods of investigation. It is the same impetus that has recently startled the world. A critic has said, “It is the evolution that means the survival of the fittest and the destruction of the unfit: and it places sympathy with the weak virtues as a weakness itself.” It is the philosophy of Nietzsche that “might is the ultimate proof of right.” “Get everything you have the strength to get.” To quote Charles Francis Adams, “It is the absolute negation of everything in the past which

has tended to the elevation of mankind." It is a return to the primeval law of the strongest; it has raised that much-used and misused word "efficiency" to the center of the color standard and to it everything else is subordinated.

There would seem to be a parallelism in this militaristic philosophy when applied to any conflict which reduces its methods to an exact science, and interprets its duty in terms of modern thought as one bereft of romance or any other human elements that might detract from scientific efficiency. We know there can be no finality in our work, but it is self-evident that by clinging too closely to the present day thought of scientific accuracy, the medical profession will have lost the splendid worth of cultivated or even random observation, so valuable a part of the equipment of our predecessors. Nothing really revolutionary ever occurs, and progress is more often by slow development.

Over medication in medicine received its first blow when from simple observation it was seen that many diseases ran a definite course, self limiting in time, irrespective of treatment; later, bacteriology so clearly defined the cyclic life of certain infectious organisms and the self destruction of others at the hands of nature's protecting and assisting processes, that the old faith in the cure of disease by some drastic method gave way finally to a period of therapeutic skepticism and little if any medication. Not that these days of waning confidence in drugs are the proof of their lost efficiency; no such conclusion can sanely be reached; but fortunately most of the old zeal and confidence in the utility of drugs has been brought to a safer and more practical ground, based on the more scientific reasoning of experimental pathology and pharmacology. Many of us have not forgotten the axiom of a wise clinician and practitioner,— "Never use a drug unless you are sure it is indicated, and if you do use it, use it fearlessly, to the relief of the symptom for which it is given, or to the physiological action of the drug." Such a procedure is wisely rational and implies a method based upon avoidance of medication without reasonable evidence in its favor; and requires in addition an exact knowledge of drug action, in order that a harmful result may be recognized as promptly as a beneficial one.

Long continued usage, however, has given a sanction to medication that cannot be completely overcome by the known fallacy of *post hoc ergo propter hoc*; and the exactness of our present-day science does not readily dispel what may be accounted intolerant empiricism. The iniquitous practice of bleeding may upon occasions today be condoned; the successful use of Peruvian bark was an established fact several hundred years before science had discovered the reason. Long employed customs won in many instances the right to permanent recognition, where nothing but tradition, based on ancient experience, could satisfy the claim. To walk abroad after

nightfall was to invite yellow fever; to smoke in its presence was a "charm" to your immunity,— truths nearly as self evident two centuries ago as now. So that although causation may now be the only true key to the therapeutic solution of a problem, it may still be a not altogether foolish conservatism that leads the well balanced mind to return *si opus sit* to some traditional thought or practice; for the absence of a scientific reason might cause inaction in treatment to the detriment of the patient; and while a credulous following of methods and the practice of the instructors with whom the student came in contact during the days of his medical education is to be deprecated as having its limitation, it may be stated that the true attitude must be,— respect for the past, and the ideas of our predecessors, even though greatly limited and modified. "There were great men before Agamemnon."

The disillusionment that has so completely changed the thought in medication is also apparent in the surgical field. Modern surgery has been made possible by the discovery of agents that removed the two great terrors that held it in leash,—conscious pain and sepsis. The natural result of the release of such early restrictions was evidenced in the swing of the pendulum to the extreme of its arc, and scientific ardor took the place of judgment; the earlier operations of necessity or expediency becoming less popular than what may be called the operations of chance. Asepsis permitted a rashness which displaced the consideration of the right of a given human entity to the benefit of a doubt, and made the exploration of almost every heretofore uninvaded area in the body, and the removal or rearrangement of its contents a successful possibility; modern surgery thus by its brilliancy invited a boldness which led away from the sound principles of conservatism. But however far the comet may turn from the sun in its long orbit, there must be a return; and the thoughtful surgeons of today have called the attention of the medical profession to the abuses that enthusiasm, often unfortunately accompanied with insufficient training or natural talent, has begotten. The reasonable and logical result has been the organization of a college of surgery, through which ultimately may be brought about the standardization of the surgeon and the dream of a rational surgery; for it is to be assumed that surgery is passing through a stage not wholly dissimilar to the stage of over-medication in medicine.

Although the abuses incident to the treatment of medical diseases were but slowly recognized, absolute empiricism finally giving way to a rationalism secured only through the tedious building up of a scientific medical structure,— and although the elaboration of surgical technic made possible surgical procedures not wholly consistent with the natural limitations of every useful applied science,—there is a similarity in the excesses in these two branches, medicine and

surgery, that over-enthusiasm may create, which should lead to a further questioning of methods that charm and captivate, and at the same time may confuse.

The success of medical or surgical treatment requires an accuracy which must be based upon thoroughness of diagnosis. This is the first essential, and it may also be considered the leading perplexity. To the fundamentals, anatomy and physiology, have been added pathological anatomy and pathological physiology, naturally stimulating an elaboration of diagnostic methods, intricate as well as comprehensive. We would certainly wish to absorb and possess these essential aids to success, but there are human limitations; we are willing to admit mental lapses when we do not think—not to be classified as true examples of ignorance; we are conscious that our judgment is subject to the usual frailty of deductive reasoning based upon premises which have not arranged themselves with sufficient clearness of mental vision; we are not immune from the possibility of becoming narrowed to a line of thought, that tends to the grouping of problems of obviously different nature into the class of causes to which we have given serious and earnest attention; we would even plead a disinterestedness and a disinclination to assume a given responsibility, as impairing a clear conclusion. These cause errors, which, while not insuperable, may be condoned as chargeable to inherent weakness, unrealized or confessed. But our real perplexities must first arise with the conscientious attempt to form an opinion that shall be free at least from the charge of incomplete examination. At once the clinician is confronted with the necessity of deciding whether in the light of modern methods he is reaching a superficial conclusion or whether he may not be indulging in an over-elaboration entirely unwarranted.

It is to be assumed that certain fundamental principles in our search for the diagnosis are always necessary, involving the intelligent answering of such questions as may be pertinent to the case.

There can be no controversy upon this point; and the more detailed and accurate, the more valuable the wisdom of the opinion sought. But there may arise today certain doubts as to the completeness of an examination, if history, and the routine of inspection, auscultation, percussion, palpation, and urinalysis, alone are deemed sufficient: these were the methods which a quarter of a century ago were considered, if completely and carefully executed, as the acme of a technical alertness quite all-sufficient.

In our large hospitals the little laboratory in some inconspicuous room had not been replaced by the modern hall of research, with its corps of assistants, that occupies such a conspicuous place in modern hospital equipment, and makes available the many present day accessories to medical and surgical practice. Small wonder

that the contemplation of the rapid stride of medical progress in this single phase of better diagnostic helps and the multiplication of the methods now necessary to a thorough and complete examination, leaves the mind of the practitioner of twenty-five years in a maze of doubt and perplexity, and with a peculiar sense of unfitness for his daily problems.

It is easy to conceive that the stupendous requirements in this field of diagnosis alone are accountable in no small degree for the growth of specialism which it is stated now has an enrollment of thirty-four claiming distinction. The "isms" of the old days, representing the evolution in medical progress of many quarter century periods were not so numerous. This rapid division of labor and its apportionment in our midst among the discerning, who from special interest, from opportunity chosen or compelled, or from a desire to be relieved of the tedium of general practice, saw the hand writing on the wall, was clearly a necessity.

The same query of human limitations urged a solution of complete or incomplete mastery of the complexities of medical knowledge, and to which perplexity there could be but one answer, a division of the work. Although specialism was fully justified for this reason,—its modest beginnings being contented with a refined ability in diseases of some of the special senses,—there could not be foreseen the numerous subdivisions its scope would include; and while there is much that is good in the allotment to specialists of the difficulties that are obviously best treated by the hand, the eye, the ear,—with its brain skilled in the interpretation of their discoveries,—certain abuses must be admitted to have arisen, detrimental alike to practitioner and patient.

The rise and growth of specialism have been the result, not alone of its necessary existence, but also, as has been hinted, owing to the rapid advancement of medicine in diagnostic methods applicable through laboratory research, and through instruments of mechanical precision. The memory is easily recalled of charts whereon was summarized in orderly arrangement all that was needed to classify the particular renal defect that the unfortunate producer of the specimen at hand possessed; it was held possible thus to differentiate any one of a dozen important and different conditions irrespective of any other knowledge of the clinical problem. As often happens, the increasing minutiae of examinations, designed to have a purely helpful and practical application, actually deprive them of their first intrinsic value, and result in a detailed procedure, possible only to the specially skilled; the promise of new vantage is thus shorn of its usefulness in the complexity brought about by its illogical and exaggerated growth. Moreover, the simplification of diseased conditions that seemed to warrant several subdivisions, may so change the anatomic or the clinical grouping, that a large portion of the analysis is rejected as

unnecessary, since the lesion sought can often be determined by a few essential tests. When also, in addition, a widening intelligence discloses that the urgent problem in the clinical consideration of disease is the functional capacity of organs, the old perplexities, attendant upon the elaborate estimation of the finer pathological changes, are replaced by newer ones for determining functional efficiency.

The task is always the problem of applying necessary tests in as concentrated working form as possible.

The same criticism may be applied to hematology: that it has solved some problems, and gives the diagnosis in a few diseases is to be admitted; that routine examinations of the blood are comforting in their negative findings; and that hematology may give hints to conditions quite distinct from diseases of the blood itself, is well known; but a few simple tests have supplanted elaborate ones except in cases where a systematic search is required, and the great expectations of the earlier days in its rise as a laboratory method of the greatest importance have been disappointing, and added another to the list of diagnostic uncertainties.

Similar experiences have befallen our hopes in other methods, which seemed about to solve many of our vexatious problems. The introduction of the stomach tube for diagnostic purposes led to the firm belief that at last the field of gastric complaint would be cleared of its uncertainties; that it has given us much that is to be considered as a valuable addition to our medical knowledge none can deny; but that its use has resulted in any marked simplification of diagnostic difficulties can neither be affirmed. It is possible that too great a demand in the beginning was put upon this functional test in the expectation that it would reveal decisive characteristics. The process of unlearning has always been in evidence in all scientific advancement; the constant tearing down of the structure can alone give ultimate stability. Always there exists the intricate and manifold mutual relationship between diseases, causing often a confusing symptomatology, and a failure to find in elaborate laboratory methods the solution sought.

There is a certain refreshing charm in Fitz's clearness of vision when he says in his monograph—"The Diagnosis of Abdominal Disease": "An attempt to make a differential diagnosis of abdominal disease demands in the first instance an available knowledge of topographical anatomy—the knowledge which needs constantly to be refreshed and controlled by frequent attendance at post-mortem examinations, and repeated observation of surgical laparotomies."

It is not to be inferred that any rebellious thought is intended in mentioning certain fallacies commonly encountered in laboratory methods; these methods must constitute a part of the armamentarium by which the older ways of reaching a diagnosis are to be more and more

supplemented. Nothing but praise and admiration is due the patient investigators, who with the real spirit of discovery have toiled at what is often a disheartening task, laboriously searching every pathological condition causing a variation in the body's waste, in its chemistry, its fluids and secretions. They have led the way to vaccine experimentation through the theories of immunity, and they have made easy the knowledge of the presence of certain latent diseases that before could have been only vaguely and imperfectly suspected by the keenest analysis. But their stride is a difficult one to follow and may lead us in our enthusiasm,—to quote Reynolds in the *British Medical Journal*: "To forget that the old methods of examining a patient, conducted by the more or less unaided senses, including that very necessary sense, common sense, are just as much scientific methods as examination by the most elaborate chemical or physical method."

The whole of a man is not the sum of his parts, and the whole of the medical profession is not the sum of its specialties; neither is the knowledge of the sick body to be acquired by the totaling of its laboratory returns. The old standards and old distinctions, however inadequate they may have come to be, must not be dismissed in the desire to do the last new thing.

Workers in the field of Roentgen diagnosis are among the latest experts to appeal to the profession; the earlier assistance that Roentgenoscopy gave in the detection of foreign bodies, the pathological lesions of the body's bony framework and the shadow pictures of the chest, has taken on a new interest with its more elaborate work in connection with the internal administration of bismuth; first, by its demonstration of the presence of certain functional disturbances, notably those of motility and exaggerated sensitiveness; and later with the assumption of its ability to detect anatomic lesions themselves. But difficulties attend positive conclusions: the weight of the bismuth and the mental state induced by the examination are not negligible sources of error; and owing to the fact that lesions of the pelvic organs, alkaloid and other toxemias, and diseases of the nervous system, apart from those associated with the digestive tube or its adnexa may occasion an irregular behavior of the bismuth stream,—the positive diagnosis must often be attended with doubt, and at times a negative finding proves misleading. Those who zealously advocate the use of the x-ray examinations as an aid to diagnosis are frank to confess that in almost the whole of certain cases,—as, for example, duodenal ulcer,—the radiologist's work has been confirmatory, and a definite diagnosis reached by the older methods; and to the same pass has come the once infallible proof of syphilis, the Wassermann reaction. In gastric cancer similar uncertainty confronts us in the results obtained in the search for the early and important suspected cases.

While the confusion that exists in the minds of many as to the unquestionable value of Roentgen diagnosis may lead to a reasonable doubt, a wise skepticism should, in admitting its limitations, recognize its value as an adjunct to other methods in difficult cases, but not as an independent procedure.

The enthusiasm that each new diagnostic method arouses tempts the practitioner to lean too exclusively upon it, to the detriment of his hard-earned powers of deductive reasoning; credulity is his besetting weakness, and he too often accepts, without sufficient evidence or inquiry. But there is danger, too, that the thought of the absolute certainty of laboratory and mechanical methods may lead him to side-step, as it were, the responsibility that a diagnostic perplexity presents; the feeling of doubt may be easily fostered and he may decide to help himself out of his difficulties by the easier path of referring his patient to this or that expert; the eventual waning of his ability as an independent thinker must result. In these days, when the pace of scientific precision staggers the busy doctor with the helpless feeling of incompetency, the thought of one of the requirements of fitness should stand high in all perplexing moments, namely, self-confidence. The words of Emerson in his essay upon "Self Reliance" may very properly and fittingly be recalled: "A man should learn to detect and watch that gleam of light which flashes across his mind from within, more than the lustre of the firmament of bards and sages. Yet he dismisses without notice his thought because it is his... The power which resides in him is new in nature, and none but he knows what that is that he can do, nor does he know until he has tried." "A spur on the head is worth two on the heels." Whole-hearted, independent work contributes something to progress; and the doubts that must arise in a contemplation of the rapidly increasing number of new diagnostic details should not terrorize or stampede the practitioner to a belittling of his ability to select what may seem to him pertinent to the occasion. This ultra scientific century compels us to consider seriously whether all that is sneeringly called empirical must go down before this wave of scientific medical evolution; should this momentum of growth continue, its adaptation to the subject of medical training must result in a questionable efficiency, so vast and complex will its requirements have become; for a given scientific attainment of high degree in any one field of knowledge necessitates an obliteration of all other broader and comprehensive thinking; the specialist confines himself to one realm, and views with disdain or suspicion the older education as obsolete and of little practical utility; yet it would seem that an education based on a too narrow application of purely scientific methods must lead to a neglect of the underlying elements of medical success—*anatomy, physiology, pathology*—which must be admit-

tedly the tools for intellectual work. In addition, for the practitioner to attempt to acquire and apply accurately the great mass of detailed work resulting from laboratory and mechanical experimentations is futile, because, as has been seen, much of it becomes quickly obsolete as a working asset. Too great an emphasis cannot be put on what has been learned by experience. The practitioner should not permit the lack of acquaintance with newer diagnostic procedures to intensify the many perplexities of his vocation, but should employ a calm attitude of reasoning when to solve and when to refer. We need all the old originality and independence, controlled by an analytical sense of discreet inquiry through others and by laboratory helps.

The world has always demanded the full equivalent for value received, but never more so than today; and while we must be guided by the standard of the times, and the people with whom we are dealing,—the amplification of present-day methods, in reaching a conclusion through expensive eliminating routes, which lead the patient to an outlay of money quite unanticipated, should be carefully considered. Although the public has the right to demand what may be called modern refined methods of diagnosis, and to expect treatment based on scientific accuracy, it is not possible to apply at the home or in the office such painstaking scrutiny to all cases of doubtful diagnosis on account of the expense suggested. It is evident that surgery owes no small part of its success to the fact that within a double decade it has transferred its work entirely from the home to the hospital; where, with the facilities afforded by the latest modern equipment, seconded by the assistance of a house staff well qualified to utilize any of the more intricate and time-consuming aids to diagnosis, it has been able to reach conclusions more nearly correct and to secure proportionate results. And it is probable that the experienced, thoughtful man of medicine should more often follow the example of the surgeon, and secure for his patient at a reasonable hospital expense the refinements for diagnosis that selected cases may seem to require. In this way he will render a service more in keeping with the spirit of the times, and secure for himself an assistance which will enable him to bring a perplexing problem more often to a brilliant solution.

It may be undeniably true that incomplete examination and careless thought, due largely to lack of time, are the cause for the largest class of mistakes that arise in diagnosis; but Cabot's figures have shown that even when a conclusion is reached by the most careful clinical analysis, checked and aided by laboratory findings, which few practitioners can command, nearly one-half are erroneous; similar statistics in the future will undoubtedly show a marked improvement in the imperfections now present, but to many of us these acknowledged limitations may

prove a source of comfort, as well as an impetus to more determined endeavor.

The diagnostic perplexities in modern medicine that must more urgently and constantly assail us than ever before should enlist powerfully our sympathies with the great mass of medical men who occupy the first line of trenches, and receive first the impact of the attack; while the specialist and the expert are necessary to the particular detailed work of the campaign, it is the general practitioner that must bear as yet the brunt of the fight and make up the "line of steel," even as in modern military warfare.

Finney in his address upon the "Standardization of the Surgeon," says of the surgeon, "An error of judgment in diagnosis, or in execution, lack of familiarity with the latest approved methods of dealing with certain conditions, defects in technic, and many other considerations, some of them apparently minor, may decide, and frequently do, between a happy restoration to function or to health, and a life of invalidism; between life and death." The responsibilities that assail the practitioner are not one whit less, although he may not be as directly accountable for the operation where judgment and dexterity are all essential; and while the thought of his standardization may not take on the form of organization for the purpose of reforming his defects, more thought should be given him in offering opportunities whereby he may continue his education in the light of newer advances, and so amplify and direct the continued cultivation of his powers of observation. And there are signs that the physician of the future will demand an opportunity to partake with a livelier interest in the advantages that today accrue to the few who are in close touch with large medical centres.

The serious problem, for those who would in any way standardize the working efficiency of the great numbers of our profession and advance the high character of medicine, must be the problem of continued education after graduation. Books and periodicals are too voluminous for the busy man to digest; and the mind in the variety of its confusing thoughts is robbed of the symmetry of studious analysis; clinics are small and unfortunately benefit only the few that are favored with hospital appointments; our medical societies, associations and clubs provide a certain valuable interchange of thought, or receive didactic instruction from eminent medical gentleman who gladly give of their time and personal endeavor.

We must never lose sight of the fact that knowledge gained through the ear is more truly gained and more surely retained than what we learn from the eye.

But as yet our universities have not provided any plan whereby post-graduate instruction can be extended to any except those fortunately nearby; the Fellow living at a distance is neg-

lected; he cannot avail himself of the present instruction to graduates except under a stress of difficulties which are well known. In some way his opportunities for growth and service should be increased. Recently the Massachusetts Medical Society has joined in the publication of a journal which is to be its literary gift to its Fellows; and it is to be hoped that a near future may see this splendid society, ever serious and foremost in its efforts for medical advancement, formulate some plan whereby didactic exercises, offered in different localities, may stimulate its members to better work and provide a late knowledge of whatever may be scientifically conservative in medical practice. The way would seem to be already opening to the accomplishment of such an idealistic beneficence; for only recently it has become possible for our Fellows, for a most modest fee, to receive for individual analysis or group discussion the records of such clinical cases at the Massachusetts General Hospital as have a completed value from the pathological findings.

Today the thought of university work cannot confine itself to resident student life; the university should not be the place where the student has once studied and received once for all his education; too often the impulse given will retrogress, and suffer loss in its potential value unless continuously cultivated; the kind of study for which it has prepared him may well be enhanced by its fostering care; and in no department more to the public good than in that of medicine.

"Mental laziness" is an easily acquired habit for the tired busy practitioner, and some stimulus is needed to arouse him from his intellectual hebetude; success in practice mitigates too often the pride in exact thought and his ambition may even reach the stage of "getting by" with his professional duties, and declining to become interested in the definite problems that may present themselves. Modern medicine makes it more difficult for the young physician to succeed for several reasons, not among the least of which is the cultivation of laboratory refinements at the expense of the older methods requiring more careful logical reasoning; and having succeeded may make it easier for him to neglect his vantage ground, because of the rapidity of change which always characterizes any ultra-technical enthusiasm. "The race is not always to the swift." Until that time when the whole field of medicine shall be perfectly covered by science, it may be well in daily practice to retain a rational empiricism and at the same time prudently to refrain from attempting to be too scientific. Ovid wrote: "Medio tutissimus ibis."* The public looks for quick results; the busy man of affairs, whose motto is "deliver the goods"; the devotees of society or the latest fad of "advanced thought," have no time to spare in illness; laws or acts of compensation, which apply to certain employments,

* *Metamorphoses* II, 137.

make no appeal to them; and they demand that our services shall promptly overcome nature's defects and deficiencies, tolerating impatiently a conservative growth. It is a stimulus that men of science feel—it is a whip that tends to develop laboratory research apart from careful clinical coöperation; it results in a tendency to complete therapeutic skepticism and nihilism, and to the lessening of the appeal to the art of healing in favor of the science of the investigation of diseased processes.

We are not assuming that the problems and perplexities in modern medicine are essentially greater than our forefathers experienced; whenever a human problem has arisen, the past has given men who seriously faced the difficulty and secured results which seemed to serve the purpose as well at one time as at another; so that in our thought of progress, tending occasionally to become a trifle vainglorious, we need not indulge too extensively in pity for the ignorance of the old practitioner, who was a doctor, yet could not according to our conception glorify his title with the easily commercialized term "scientific." However, relatively our problems seem more difficult; numerically they obviously increase; but this increase is compensated by a division of the labor. The last century saw the medical thought more constantly directed to the care and cure of the diseased individual; now there is added the care of the public as a whole—preventive medicine in its many aspects, embracing that very important problem, the reduction of the number of those seriously ill at any one time; estimated by Prof. Irving Fisher of Yale as about 3,000,000 people in the United States, one-half of whom are suffering from preventable causes; for although mortality as a whole, and more especially in certain diseases, shows a decrease, there are those who maintain that morbidity has actually increased.

This view is certainly illustrated in the increase of acute diseases of the respiratory tract; whole communities are made miserable, and the feeble and non-resistant seriously menaced, by these endemic or epidemic outbursts of bacterial infection, spread by the tiny droplets of germ-laden moisture, sneeze or coughed from carriers in the presence of others. The number of enteric infections and the more serious of the contagious ones, scarlet fever and diphtheria, that the physician is called upon to attend is lessening, owing to the persistent fight of our public health boards in securing legislative insistence upon the elimination of dangerous sources of dissemination,—notably impure milk. But the problem of the control of these riotous infections of the air passages has secured as yet scant consideration; and the common "cold" continues its supposedly benign existence without "let or hindrance" by the public and with too little appreciation of its possible gravity by the profession.

With the thought of prevention and control,

more especially adapted to the preservation of life in its earlier decades, when susceptibility to bacterial invasion is most marked, has come the consideration of prolongation of life at a time when its economic value is enormous; already recognized by life insurance companies as an asset in their business methods of no little importance, there is a growing tendency among men of affairs to seek for possible defects in the physical economy, which if known and mitigated or remedied, may enable them to lengthen their lives; for it seems to be a fact that our vital organs wear out sooner than did those of our ancestors.

While this phase of practice may have been an incident occasionally in the work of physicians, its application along the broader lines of an exact knowledge of what constitutes normal physical conditions and a healthy state of organs, necessitates a critical survey and balancing of normal and negative findings, no less perplexing than the hunt for the suspected pathological state; and it implies a renewed cultivation of the judicial qualities in medical men that makes their advice and not their prescription so valuable in a community. We are coming to consider and care a great deal for the problems that pertain to the public as a class in standards of living and material well being; and always with the thought that future generations will receive a richer heritage of health than fell to ourselves, to say nothing of the preservation of the human race. Personal advantage and the isolation of the individual welfare must be dominant thoughts and ambitions, but a widening knowledge and experience bring a clearer understanding of responsibilities. The rack of hurrying medical progress need not torture us with its perplexities, if, while entertaining a wise regard for the newer teachings of science and a deep appreciation of men of attainment in their special field of knowledge, we cling more closely to the thought and wisdom born of experience.

We are constantly reminded that this is a wonderful age: its qualifying adjectives are many, and not the least impressive is the one, scientific; implying that all things claiming excellence and merit, must receive the stamp of the investigator in approval before they can be unhesitatingly used; everything is to be viewed in the light of the cold, impassive man of science; but there is danger of making standards too high for practical purposes—above the perceiving level of the public—beyond the absorbing power of the man who is expected to weigh and make application of this scientific evidence.

Perhaps when this generation has gone, the coming generation will demand less of that close trusted relationship between patient and physician which has given a unique charm to our professional life; the efficiency test may prevail to the obliteration of the necessary management of the whims and vagaries of the patient; his in-

telligence and passivity may permit the detailed routine of an exactly applied scientific performance, such as we now cannot, if we would, secure. Until that time comes, the word of sense and sympathy must not be supplanted by the last one upon which science has placed the stamp of approval; and during this rapid evolution of medical progress our duty is simple,—to attempt to think logically and sanely with such humble powers of observation as we may possess.

In the consideration of some of the doubts and perplexities that every conservative physician must entertain, there should be no morbid pessimism about the future; we do a double duty in each problem solved in making as individuals for the continued progress of medicine; yet there should not be a too great readiness to detect disease, lest we become incapable of receiving all the evidence, having our thought concentrated upon some new infallible method of our own or another which may seem to surmount old-time difficulties and give a sense of security and knowledge. While diagnosis is the most essential demand in our work, it should not make us careless of the growing cry for the cure of every condition or disease to which our bodies may be subjected; the important consideration of treatment may be neglected; we take the patient readily and gladly into partnership and discuss volubly the scientific aspect of his case, contentedly feeling that we have vindicated our conclusions beyond any questioning thought. This attitude of what is most essential is from our own view-point; the problem and the accuracy of its solution, while vital in the quest of perfect knowledge when possible and the necessary forerunner of intelligent treatment,—coöperation of the patient and the maintenance on his part of a lively sense of the result to be obtained, while comforting and stimulating to the physician, do not constitute the whole perplexity that confronts the patient; the refinements in methods are of less interest to the subject than their results. His appeal, and his trust in that appeal, should leave but one fixed purpose,—his mental or physical relief; and the downright heartiness of that endeavor requires a sagacity acquired in no one of the physician's many workshops of learning.

We are gradually acquiring through the natural development of the processes of medical growth a system for the scientific management of disease. The past is full of stimulating traditions; the present, filled with the grains of precious wisdom that have been extracted from the mountains of theory and conjecture; and we accept the truth that in the future what we now worship will be swept away in the melting-pot of scientific ardor. But in admitting our limitations, we affirm with greater confidence our optimisms. It is only when harassed and perplexed that men learn; "strength grows out of weakness." The ideal of medicine demands for its consummation, individual exertion and un-

tiring enthusiasm. Each contribution, whether of the laboratory,—from the special research man,—or of the great hospital and private clinics, from the more practical observers and teachers—successful practitioners of well-deserved repute,—or of the storehouse of experience, from the great class of silent, thinking medical men,—each factor is an atom, akin to the body of the tiny coral insect, in the building of the enduring structure of the "Goddess of Medicine."

The poet sings,—

"Grandeur of the perfect sphere
Thanks the atoms that cohere."

And of the cohering elements entering into the structure of medicine by no means the least valuable is the country practitioner, who, alone and remote from all enthusiasm and support, often surrounded by unsympathetic critics, goes ahead and does his work as he sees it.

It is easy to be a soldier when you have a soldier on every side of you; over-courage is born of the crowd; but the yeoman service is his who, enduring—

"Chance and victorious death,
Life and his doom obscure,"

learns the secrets of sickness from his lonely struggle with it.

To support, not suppress, this type of man should be our objective; to assist his patient observations of his patients' symptoms and story with rational laboratory research should be our ideal.

Original Articles.

THE RELATION OF BACTERIA TO THE ETIOLOGY OF SUMMER DIARRHEA IN YOUNG CHILDREN.*

BY ARTHUR I. KENDALL, M.D., CHICAGO.

[From the Department of Bacteriology, Northwestern University Medical School, and the Sarah Morris Memorial Hospital, Chicago.]

THE subject for discussion this evening is one that has stimulated much controversy, and the final solution of the problem is apparently remote. The object of this presentation is to point out certain features of the problem which have caused confusion in the past and to mention briefly certain unusual observations which may have led to erroneous conceptions of the part played by bacteria in the causation of acute diarrheas. To avoid ambiguity at the start, only those severe summer diarrheas will be considered in which the pronounced clinical symptoms are

* Presented before a meeting of Pediatricians of the Middle West, Oct. 29, 1914.