

Address.

AN EPOCH IN MEDICINE IN AN AGE OF DELUSION.¹

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Quis deus hanc, musæ, quis nobis extudit artem?
Unde nova ingressus hominum experientia cepit?

MR. PRESIDENT AND FELLOWS OF THE MASSACHUSETTS MEDICAL SOCIETY.—He is to be accounted most happy who can find the fitting word to speak before this Society to-day, for we have reached, as I conceive, the grandest epoch in the history of medicine; an epoch in which Massachusetts physicians have borne a conspicuous part.

A review of the history of medicine in modern times calls to mind an exclamation of that famous Scotchman, John Hunter: "Of a' things upon the face of the airth a definition is the most carsed." He was addressing his students, it is said, at St. George's Hospital in the city of London more than a century ago. His sane, downright, Scotch spirit was in revolt against a supremacy of words in our science over all the facts of experience and observation.

Nevertheless, it seems a proper and a cheerful thing to offer a definition at the beginning of an address.

Let me, therefore, say, that by the science and art of medicine is meant the science and art of healing the sick. But this definition, as usually construed, deserves all the condemnation which John Hunter bestowed upon its kind; and I shall ask you to taste a "bitters" of the very wormwood and quassia of error and self-deception, but so sweetened and tinctured with pleasant condiments, I hope, as to send you to our annual dinner with sharpened appetites and stomachs in good humor.

We would fain believe that credulity and ignorance played upon by dishonesty and deception make up the sum of quackery. This is a mistake.

It is a familiar fact in the history of medicine that in all ages, as well in times of greatest enlightenment and civilization as in those of darkness and barbarism, have been found men accounted wise, with full faith in the healing virtues of charms and amulets, of the magic of a king's touch, of sympathetic powders or salves that were rubbed upon the weapon, of panaceas such as tar-water, of Perkin's tractors, etc. And in this our day, when we look with pride upon the wonderful advances which our profession has made in the century now closing, we see all about us men of wisdom and influence—trusted financiers, great inventors, philosophers, scientists, preachers—who in their time of sickness do not hesitate to use proprietary or secret remedies of which they know nothing, to consult ignorant charlatans and quacks, or perhaps apply to Spiritualism or Christian Science; and even instructed physicians, who declare a belief in the specific virtues of the attenuation of echoes of the explosion of alchemy,² or like miraculous products of a pharmacy of words.

So appalling seems the mystery of life and death, so strange and inexplicable the phenomena of health

and disease, that it is no wonder that superstition has hovered over them and taken these things to its peculiar care. The subtle influence of the passions and emotions, the imagination and even of the will, over the nutrition of our bodies, has all the charm of magic and the supernatural.

Astrology, alchemy, medicine, appear closely associated through all the ages, working for the advantage of humanity;³ the first, studying the heavens to cast the horoscope of man and reveal his destiny; the second, compounding the elements to bring forth the philosopher's stone to give riches and eternal youth to man; the third, seeking for medicines of the earth to heal his diseases. Medicine has claimed to hold a more exalted position than the others as having dominion over life and death. Alas! not even the revelations of the microscope, "that telescope of the inner firmament," as Dr. Holmes has called it, have been able thus far to justify the claim. Astrology slunk away like a ghost before the dawn of astronomy. Alchemy was exploded, and we have chemistry. But medicine has long wandered groping, enveloped in the fogs and darkness of theories, or stumbling in the quagmires of systems.

All the so-called systems of medicines since the time of Hippocrates have been mere subtleties of the human mind, hypotheses, dogmas, words. These systems have taken a great variety of forms, which resolve themselves mainly under two classes, the material and the spiritual, matter and mind; and medical science may be typified as a huge snake going round and round through the cycle of the ages trying to seize its two tails of many hues, now one and now the other, or frequently both together, as in the spiritual theory and chemical practice of the pseudonym charlatan Bombastes Paracelsus, or in the attempt of Hoffman, of Leyden, to reconcile the material and the spiritual views, or of Cullen, in Scotland, with his "solidism" and "spirituality." Even up to the present time the unhappy snake seems to be trying to swallow himself, finds that he disagrees with himself, and only makes healthy growth in the accumulation of facts and observations. The perennial Goliath of theory has been slain over and over again by the one little stone of fact; the hydra-heads of system have been stricken off, one after another, by the Hercules, Common Sense.

The art of medicine, or of healing the sick, seems to be indissolubly associated in the minds of men with the use of drugs or physic of some sort. The physician is the dispenser of physic. There is a universal feeling that you must take something if you are sick. "You are ill, what are you taking?" is the inevitable question. Now, if we have not learned it by experience, we have been told often enough by our most learned teachers and practised professors, Bigelow, Holmes, Cotting, in this Society, as well as by others of great renown in England and Europe, that there is no such thing as a specific, and that diseases are not cured by drugs. This may not be absolutely true, but it points to a grave defect in our definition of medicine as the "art of healing the sick."

The very protoplasm of quackery, so to speak, exists in the faith in specifics, in systems based upon

¹ The annual discourse delivered at the Annual Meeting of the Massachusetts Medical Society, June 9, 1897.

² A very intelligent homeopath told the writer that the three-hundredth dilution of "natron muriaticum" was a specific for malarial fever.

³ "Astrology, alchemy, the once general belief in the healing effect of the royal touch, are only various exhibitions of one superstition, having for their essence the same little grain of truth, and for the outward expression different forms of error."—A Book about Doctors, by T. Cordy Jeaffreson.

the effect of drugs. The fallacy of the evidence, that is, the so-called "facts of experience and observation," is abundantly shown in the recommendations and certificates of quack medicines. It has been wittily said that to bring forward a hundred cases successfully under the use of some remedy or system "should have no more effect than showing so many fat people in proof of a good government."

In that musty thesaurus of worm-eaten quotations, "The Anatomy of Melancholy," are many passages from forgotten authors showing contempt for doctors and their drugs; "but," says the author, "I will urge these cavilling and contumelious arguments no further, lest some physician should mistake me and deny me physic when I am sick; for my part I am well persuaded of physic. I can distinguish the abuse from the use. I acknowledge it a most noble and divine science. 'The Lord hath created medicines of the earth and he that is wise will not abhor them,' saith Ecclesiasticus."

Now is not this attitude of mind of Robert Burton seen to be similar to that of many of the wisest of mankind, physicians or not?

But there is something still more to my purpose in this unique book. Burton enumerates some fifty or more drugs and simples in which he has faith, including a few which he deems indispensable to the armamentarium of the physician. To-day scarcely one of them is believed to have any special value, or is thought worthy of mention in our pharmacopœias. If the medicines approved by this sagacious, philosophic and erudite author have not borne the test of time, what grounds have we to expect that other and newer remedies may have a more enduring success?

So that we are led to ask, Why do we ever employ anything but simples or expectant remedies, or methods intended to increase the vigor of the body or to restore a disturbed equilibrium? Why do we ever give supposed specifics? First, because our patients wish, nay demand, that such remedies shall be tried; and, secondly, in obedience to fashion. For, as you well know, there is a fashion in drugs and modes of practice; and for the doctor to ignore the latest fashionable treatment, or decline to use it, is to run the risk of being thought ignorant, narrow-minded, or wanting in liberality, and thus to lose the respect of the community, and even, let me say it, of his *confrères*. It matters not at all that he has seen remedies and modes of treatment brought forward and advocated in our great societies with scarcely a word of dissent or disapprobation, declared to be almost specific, recommended by high authorities, supported by plausible theories, and yet, after a longer or shorter experience, abandoned as useless or uncertain, and now chiefly remembered as having been sometimes followed by dangerous or alarming symptoms, and even *fatal effects*. There are people in the world who would rather die under "the latest treatment" than get well unfashionably.

The recommendations of a new remedy amount to this: "I was ill, I took something, and now, thank God! I am well." But the success of the specific is always found to be in inverse ratio to the virulence of the epidemic.

If the connection of cause and effect were immediate and certain, the "post hoc propter hoc" as clear and evident, let us say, as a chemical reaction, the use of drugs could no longer be looked upon as empirical.

But, as Dr. David Cheever says in his admirable Boylston Prize Dissertation on "The Value and Fallacy of Statistics," — which I regard as a distinct dialectic contribution to medical science:

"The mere observation of simultaneous or consecutive occurrences, however great the number of cases, can lead to no definite results which may not be fallacious.

"Effects are ascribed to drugs which really flow from natural causes and are but the usual succession of the morbid phenomena; sequences are taken for consequences and all just conclusions confused."

The first great epoch in the history of medicine in modern times occurred, as I think, in the latter half of the seventeenth and the beginning of the eighteenth century. This may be said to have begun with the discovery of those important white corpuscles of the blood, and the perfecting of the lens of the microscope, by Leuwenhoek.

The other great names of this epoch are Sydenham, who gave us the present method, a rational empiricism; Boerhaave, at Leyden, who introduced the clinic and an eclectic practice; Haller and Morgagni, who taught the pre-eminent importance of the studies of physiology, pathology and anatomy; and others, such as Stahl and Hoffman, who also had clinics at Leyden, "whom human memory need not charge itself with."

Then it was that medicine, both in the schools and the practice, appeared for the first time before the modern world with something of the dignity of true science. Still the reasoning continued to be a fruitless induction, an attempt to explain the inexplicable and think the unthinkable, as was the case with Cullen and Brown. No one surpassed the stature of Herman Boerhaave who, in his farewell address to his pupils, declared "that man to be the first physician who knew how to wait for, and to second, the efforts of nature" — the true doctrine of the father of our art.

But at the close of the eighteenth came the greatest epoch-making single event in the whole history of medicine — vaccination.

I give this the first place among epochs in the history of our science, because then for the first time the fact appeared, that the noblest, the most beneficent, mission of medicine to mankind is in the saving of human life.

No one who will carefully review the frightful history of small-pox and dispassionately weigh the evidence, can hesitate to admit that, during the century of its employment, vaccination has been the indirect means of saving millions of human lives.

Excepting Jenner's own suggestion that this discovery might prove the clue to a new explanation and perhaps a new treatment of many diseases, no deductions of any value were made from it, and it was looked upon as a piece of fortunate empiricism. Jenner planted and died, but two generations and more were needed to ripen the fruit upon his tree.

In the very first years of the present century a new day dawned for the study of medicine when Xavier Bichat, by experiments upon animals, placed on an impregnable basis some most important facts of physiology and pathology, and introduced the subjects of histology and cell-biology. His too early death left the world upon the threshold of what have since proved in the hands of others, especially Virchow, to be most valuable discoveries. The monumental work of Rokitsky in morbid anatomy should not be overlooked.

But Charles Louis — assisted doubtless by the practice of physical diagnosis and the employment of the stethoscope of Lænnec — made an epoch in medicine by the introduction of a method of precision never attempted before. Genius has been defined as a capacity for taking pains. Louis abandoned a lucrative practice and consecrated seven years to exclusive clinical and anatomical, or pathological, study. He instituted, as it were, a tribunal, before which were brought all the various systems and modes of medical treatment then in vogue.

Nature herself was, so to speak, placed upon the stand and questioned, and her testimony was found to completely refute the often conflicting evidence, often ill-digested, partial or prejudiced, upon which was based the medical practice of the civilized world. The solidism and atony of Cullen, the sthenia and asthenia of Brown, as well as the gastro-enteric theory of Broussais, all had to give way before the precise inquiries of Louis, and his rigid application of the method of statistical enumeration conferred for the first time upon medicine the right to be truly called an inductive science.

Louis was what Carlyle delighted to speak of as "a most lucid, veracious man." He inspired his pupils with his own fervent, unselfish devotion to scientific accuracy and truth; and we were most fortunate in our medical school, and in this Society, in having three splendid examples of his teaching in Shattuck, Bowditch and Holmes.

Louis insisted, and *demonstrated by post-mortems*, that in many, if not in all, maladies, notably in the three great scourges of the civilized world, namely, phthisis, typhoid fever and yellow fever, the course of nature was shown by analysis of the statistics to be uncontrolled by remedies.

But what then becomes of our definition that medicine is the art of healing the sick, which we must admit to contain the chief title which we have to the confidence of our patients? Must we stand hesitating and inactive by the bedside of mortal disease because we have been shown the uselessness of all specific treatment heretofore employed?

Louis himself answers this question when he says, "We can only hope for a moderate success even by the best adapted treatment," but this "does not warrant the rejection of an empirical treatment, however absurd or ridiculous it may appear, since it is against an unknown cause⁴ that our therapeutical agents are employed."

That is the point, "an unknown cause." It hath been as the darkness around Ajax:

"Give me to see, and Ajax asks no more."

When I was a young man the inspiration of the spirit of Louis was fully alive and recognized in the profession here. Jacob Bigelow, Wendell Holmes, and Benjamin Cotting, reverting again to the teaching of the Father of Medicine, and pointing to the excellent motto of this Society, "*Natura duce*," wrote and spoke about the "self-limitation" of diseases, the value of the work of nature in disease, and especially the pre-eminent importance of the study of nature's processes when not interfered with by remedies. Something doubtless of the spirit of Louis was felt in the community. At least persons of intelligence and cult-

⁴ "It is obvious that we have present in all our formulae of vital phenomena, in health or disease, an *unknown element*, which no algebra or calculation can resolve." — *Boylston Prize Essay for 1860*, by David W. Cheever, M.D.

ure regarded the autopsy with favor, and the request for a post-mortem was seldom denied except by those of foreign origin. This mode of thought was fostered and encouraged by the zeal of many of the younger men of the profession, who rarely allowed an opportunity to pass without *making an autopsy*, and using every argument to persuade those who were reluctant.

Henry Ingersoll Bowditch was a worthy pupil of a grand master. With the ardent enthusiasm of his nature he brought the spirit of Louis to the investigation of the phenomena of disease; he fired his pupils with his own zeal, as much as he drew them to himself by his benevolence, his devotion to the right and to truth, his generous impulses, his noble, unselfish nature. His absolute faith in the teaching of Louis remained, as I believe, to the last.

John Bernard Swett Jackson, an apostle though not a pupil of Louis, was one to whom many besides myself feel that we owe a debt larger than that to any other man, teacher or friend. For absolute devotion of heart and soul and mind to the study of diseased anatomy, no man ever excelled him. As a macroscopic pathologist he had no equal in this country; as a teacher, his almost boyish eagerness in examining and explaining nature's aberrations, her morbid and abnormal phases, was an inspiration which the most cold-blooded could not resist. He delighted in showing the "characteristic morbid appearances," and in dilating upon the uncertainties of diagnosis. He insisted that symptoms were frequently present and presumed to indicate a disease which could not be found at the autopsy, while, on the other hand, disease might exist of which the pathognomonic symptoms had been absent during life. He never troubled himself or his pupils with theories, having as great contempt for them as Sydenham himself; while, as to the microscope in morbid anatomy, he held similar views to those of Cheselden — William Cheselden, who says in his preface, "The study of anatomy as it leads to the knowledge of nature and the art of healing, needs not many tedious descriptions nor minute dissections; what is most worth knowing is soonest learned and least the subject of disputes; while dividing and describing the parts, more than the knowledge of their use requires, perplexes the learner and makes the science dry and difficult." You will see in Wendell Holmes's address to the students in 1867, that he, an enthusiastic microscopist and a learned anatomist, held much the same views as those of Cheselden.

Calvin Ellis was another earnest, patient follower of Louis. He also belonged to the class of lucid, veracious men. The conscientious thoroughness of his work was the admiration of all who knew him. If genius be indeed a capacity for taking pains, here was a man who possessed that kind of genius. His earnestness in the study of the physical signs and of symptoms, his enthusiasm in the clinic, his faith in the confirmation of the autopsy, his absolute veracity in the registration, these made him respected as a teacher, trusted as a guide. In dying his chief regret, often expressed, was that his immense collection of notes and observations, written in shorthand, could not be made useful to the world. It is to be hoped that the man may yet be found who will draw from this treasury the wealth which it contains for the benefit of science and for the honor of our profession.

"That colossal system of self-deception which has been the disgrace of medicine" must be swept away,

and with untiring zeal and devotion these men and others like them, following in the path marked out by the great master Louis, strove to place medicine in the position of a true inductive science; a science which is "the topography of ignorance."

Thus was laid here in Boston, as it were, the foundation of a temple of medical science. But to further raise this structure there was needed a vast body of painstaking, accurate observers, loyal to the truth at whatever cost, each of whom should place his stone upon the pile.

Thus, and then only, could the present method, the method of Sydenham and Boerhaave, a rational empiricism, be said to stand upon a philosophic basis.

But what is a rational empiricism? Perhaps I cannot better describe it than in the words of Dr. Amos Twitchell, of Keene, N. H., who, in 1807, in a little country village, single-handed, tied the common carotid artery and thus saved his patient's life; and of whom Dr. Bowditch wrote that "he was perhaps the most original mind our profession has produced in New England." Indeed, Dr. Twitchell was a man like Ian Maclaren's Weelum McLure, one to satisfy the panegyrist and historian of Frederick the Great. When asked by one of his admiring pupils as to the cardinal principles of his practice, Dr. Twitchell is said to have replied, "If the patient is cold, I warm him; if he is hot, I cool him, if I can; this is the alpha and omega of my practice."

Such a method may have much to do with the art of healing the sick, but it has nothing whatever to say to the science of medicine. It is rational, but it is also empirical. It is the supreme philosophy of common-sense.

As time has gone on much of the enthusiasm for the method of the famous physician of La Pitié has died out. Almost all that has remained of the idea of Louis, that it was possible out of systematized knowledge to make a science of medicine,⁵ has been the numerical part, which has lost all quality of verity since it has come to depend chiefly upon the observed effects of remedies. The notion still obtains that in some way cure is effected by the art of medical pharmacy; medical experience being one thing, and human belief another. It seems to be ignored that the numerical method of Louis as a test of the value of any mode of practice, is *sterile* without the autopsy.

For obvious reasons the post-mortem has been neglected, at least among general practitioners, and it appears in consequence that the art of healing has sought to be divorced from the science of medicine; the "allegation of the libel" being "desertion and non-support." And what has been the result? Medicine and physicians have forfeited the prestige that once was theirs. Scant respect is paid to the title of "doctor," and the degree of M.D. confers no special distinction. The regular physician is allowed little influence in forming public opinion upon medical matters. There are many men in large practice who do not care to have autopsies, and never publish any valuable notes or observations. There are many medical graduates of our universities who do not seek to connect themselves with this, nor any other, society for the advance of their profession. The conscientious student of the *science* finds little honor or profit in the practice of the *art* of medicine. "The present system

⁵ "In mathematics, we have the fact that geometrical theorems grew out of empirical methods."—Herbert Spencer.

of medical expert testimony has degenerated into something which very much resembles a shameless and degrading farce." The councillors of this Society hold their meetings in a mean, dark, half-subterranean apartment in a narrow court of the city. And as to the progress of medical science, we have had an etiology which could not explain itself, a therapeutic largely dictated by fashion, and a statistic containing returns of "causes of death" which are a confession of ignorance, such as "heart failure," "dropsy," "asthma," "convulsions," and many more, which as you well know are most frequently merely symptoms of some undetected organic disease. Perhaps this is only one of the evils brought upon us by homeopathy, which, according to its inventor and founder, declares that diseases have *no material cause*, but consist in symptoms alone.

After all, what does it matter, since, as it seems, the decree of absolute divorce has been granted between the art and the science? It is not for us to cry "quackery!" upon any system, however absurd. The "tu quoque" confutes us.

More or less, in all ages and states of society, medicine has been the sport of fashion and the prey of delusion. In these days when all the world seems, as it were, to be singing the *ca-ira* in a French Revolution of thought and feeling, medical art has suffered in the general *débâcle*. The spirit of the age being the enjoyment of life and the accumulation of riches, the autopsy, which has only value for science, has become discredited, if not abhorred, by the community. It is a well-recognized fact that the hope of passing laws devised simply and solely for the advantage of medical science, or for protecting the community against the spread of epidemic disease, is a chimera, the opposition cry being "Interference with the liberty of choice," as though it were possible that there could be any choice in such matters.⁶ The search for specifics and panaceas has come to resemble that which went on, in the days of alchemy, for the philosopher's stone. It would seem at times as though men had been hypnotized by riveting the attention upon some shining fallacy of theory or practice. The adoption of specialties, while it has much to recommend it, inclines us to forget that the whole is always more important than any of its parts, and to put the infinitely little above the infinitely great. It is customary among physicians to prescribe in compliance with the prejudices of the time, rather than in accordance with the rational experience or observation of men.

Perhaps I cannot give a better illustration of my meaning here than by referring to the history of venesection. Nature herself in certain disorders indicates the advantage of the letting of blood. The practice has great antiquity to recommend it, having been employed by the "most learned and approved good masters" since, and very likely before, the time of Hippocrates; by Sydenham, Boerhaave, Louis, indeed by all the men who have marked the great advances in the art and science of medicine. At times discredited, again applauded, it has held its own and has outlived all systems and all theories.

In the early part of the present century the gastroenteric theory of Broussais, who was followed by Rush in this country, lead to the practice of indiscriminate

⁶ In Massachusetts the law does not protect the physician who hesitates to reveal the secrets of the sick chamber when called to give evidence upon the witness-stand.

and free use of the lancet; but Bouillaud, in France, with his bleeding *coup sur coup* in pneumonia, introduced a still worse method, so that Dr. Tully wrote, "the lancet is a weapon which annually slays more than the sword."

Those who were students in the Paris hospitals in the early fifties will remember the pewter porringer on a shelf at the head of every bed to receive the blood of a patient; and if you will examine that admirable work, "Le Guide du Medecin Practicien," of Valleix, Baillièrè, Paris, 1853, you will find under the head of treatment, "La Saignée" given the first place in nearly every disease in the five volumes. These were bad fashions.

But for more than forty years the practice of venesection has entirely gone out of use in our largest hospitals and among our most distinguished physicians. So much is this the case that the suggestion to "bleed" is met by doctors and patients with incredulous surprise, as though it were question of a capital operation in surgery. Every radical departure in treatment has been supported by some theory. The "change of type" theory, which grew, I believe, out of the Brunonian system, was brought forward to uphold the neglect of venesection. This theory was another of those vague speculations, chiefly dialectic, whose cloudy futilities have from time immemorial obscured the pathway of medical science. It went into the dust-heap long ago, but the practice of bleeding, theory or no theory, has been discredited.

In that most excellent work, "The Principles and Practice of Medicine," by William Osler, New York, 1894, we read, "Pneumonia is one of the diseases in which a timely venesection may save life." And speaking of "Emphysema," he says, "On more than one occasion I have saved the lives of persons in this condition by venesection." And under "Chronic Valvular Disease," "This is the occasion in which a timely venesection may save the patient's life." Also, at page 1019, Osler states that the life of Dr. Weir Mitchell, when a young man was saved by free bleeding in sun-stroke. I can recall in no modern work on "Theory and Practice" or "Therapeutics," a similar statement in regard to the effect of any drug.

I would say to you in the emphatic language of Rufus Choate, "Gentlemen, there is not one jot, not one tittle, not a scintilla of evidence which can impeach the testimony of this witness." In the cases cited by Osler the course of nature tends inevitably and swiftly to death. The effect of the remedy appears as indisputable as that of chemical reaction. For what purpose are we physicians if not to save human life, if it be in our power to do so! Are we to stand by and see our patients dying—as it were drowning, and we refuse to throw the rope which we hold in our hands—in obedience to the dictation of a heartless, senseless fashion!

(To be continued.)

THE NEW WOMAN AND THE WHEEL. — A writer in a St. Louis contemporary says that the bicycle "is equally if not more beneficial to young girls with scanty, delayed or irregular menstruation, who are developing into manhood, than any other deviation from the normal that the female sex is afflicted with." The opponents of the wheel contend that this is just the trouble, that girl riders develop into manhood.—*Medical Record*.

Original Articles.

STANDARDS OF FORM AND COLOR-VISION IN RAILWAY SERVICE.¹

BY CHARLES H. WILLIAMS, M.D., BOSTON.

By normal vision is meant such acuteness of perception of form by the eye that it can recognize letters or symbols which subtend a visual angle of five minutes, and whose breadth is throughout equal to one-fifth of their height. This standard was established years ago by Prof. H. Snellen, of Holland, who found by a large number of experiments that the average healthy eye could easily read such letters. Many eyes, especially those of young people, have a greater acuteness of sight than this, but, on the whole, it fairly represents the average vision of a healthy emmetropic eye, and has been accepted both in Europe and in this country as the standard in general use.

The letters of Snellen's test-types, to be read at a distance of twenty feet, should be three-eighths of an inch² in height, and if the person under examination reads them with each eye separately at that distance without glasses, the other eye being covered by a card held firmly against the nose, we call his vision normal, or $\frac{20}{20}$, in each eye. If he is obliged to approach to ten feet from the letters in order to read them we call the vision one-half of normal, or $\frac{10}{20}$. In practice letters of different sizes are printed on the test-cards and over each line is printed the distance at which it can be seen and read at the standard angle of five minutes, that is by a person having normal acuteness of vision. If we find that at twenty feet the smallest letters which can be easily read are on the forty-foot line the vision will be $\frac{20}{40}$, or one-half. The acuteness of sight is measured by Snellen's formula $V = \frac{d}{D}$, in which V stands for the vision; d , the distance at which the test-types are recognized; D , the distance at which they can be seen by the normal eye under the standard angle of five minutes.

In ordinary disease, or in errors of refraction, we use these test-types to measure the progress of the case, or the best results from glasses; but in certain forms of employment, as in the railway service, in which keen vision is required, they are used to decide whether a person is qualified for the work he will have to do, and in these cases the question at once arises as to what acuteness of vision should be required for such work. A single standard will not answer. A greater acuteness of sight will be necessary on the head end of a train than would suffice for switchmen. Again, when a man applies for work in connection with the operation of railway trains he should be required to have a greater acuteness of vision than the amount which will suffice to allow him to continue the work with which he has become thoroughly familiar after years of service. Thus we should have two standards, the higher for entrance to the service, and the lower, which would be within the safety line, and would be sufficient to allow a continuation of employment.

The principal hardships to employes in vision-tests has come, not from enforcing a high standard for en-

¹ Read before the Boston Society for Medical Improvement, February 8, 1897.

² The measurements in this paper are given in inches instead of in the metrical form, as the former are in general use among the railroads.

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BY ZABDIEL BOYLSTON ADAMS, M.D., FRAMINGHAM, MASS.
(Concluded from No. 23, p. 561.)

It is humiliating! It is exasperating, to see how, in these times in which we live, fashion has become almost omnipotent in the realm of science and of ideas, and that it assumes to itself the same control over philosophic thought which it may properly claim to hold over the cut of our clothing, the decoration of our houses, or the manners of good society. In face of the impertinent interference of this tyrant in matters with which it has no concern, we seem to find but one comfort: We are living in an age of delusion which must pass away and give place to wiser counsels. I believe it to be a delusion which has crept into our universities in some measure, and also into the community at large, that the college is not a place exclusively designed to form the habit of scholarship, that young men enter it not alone nor principally to strive for high ideals, not to find the riches of literature, nor to encourage a love of knowledge for itself—in short, not more to train the intellect, than to train the muscles, to become proficient in various sports, or to excel in contests of strength or skill in gymnastics. I believe it to be a delusion to maintain that experimental biology (upon the lower animals) is cruel, and has never given to mankind any valuable knowledge; or that the phenomena of disease and health are controlled by psychical, or mental, influences entirely. I believe these things to be delusions, as it is a delusion to suppose that the unlimited coinage of a debased currency will bring about the prosperity of a nation.

The truth of the matter is this: The age of machinery and of cheap production has made it easy for all to supply the wants of food, clothing and shelter. We are paying the penalty of those who live in times of general prosperity and ease. The discovery of ether has robbed surgery of nearly all its horrors; while Christian charity and benevolence have increased the number and capacity of our free hospitals and provided for the poor, until no one needs to fear poverty or suffering. The creature forgets his creator. Industry, thrift and economy, have almost disappeared in the land. Irreligion, luxury and extravagance prevail in all classes of society. We are oppressed by the tyranny of "the common-schooled millions who have been taught to read but not to discriminate." There is a contempt for authority, almost no respect being paid to age, tradition or office. The faculty of independent judgment is weakened, "the acquiescent temper being cheaper than thinking," and popular success is made the criterion of merit. The virile power of the imagination is lost when we hear men sneer at chivalry and patriotism.

There may be something of the Anglo-Saxon love of fair play—the desire to side with the under dog—in all this. Nature's plan of evolution by the survival of the fittest is unjust and cruel to the weak. We must feel for whatever is low or depraved in humanity. Criminals should be looked upon and treated as the moral scrofulæ, the unfortunate, deformed children of men; and our sympathy should be given to them, and

¹ The annual discourse delivered at the Annual Meeting of the Massachusetts Medical Society, June 9, 1897.

not wasted on their uninteresting victims. The wise must not control the foolish any more than the rich the poor. In politics mediocrity comes to the top, bringing with it the dregs of communism. In art vulgarity is glorified, and is given the halo of veracity in contempt of all that is sincere and noble. Men and women live a hot-house life, and propagate and encourage the abnormal growths, the moral and intellectual "sports" of our nature.⁷

Indeed, we may say that society seems to be dancing *La Carmagnole*, while common-sense and good taste are "sneezing into the basket." Why should we have a cult of such dubious things as "the music of the future," the repulsive freaks of Japanese sculpture, dialectic poetry coarse and profane, or the drama and novels of "realism" which paint

"Coarse lusts of habitudo,
Prurient yet passionless, cold studied lowliness
Depraving nature's frailty to an art!"

Fashion demands that we have new altars and new science. The worship of God as ordinarily understood being unfashionable, the very instinct of reverence apparently gone out of us, we have Theosophy or Rationalism; and in medicine we have "Christian Science" presented to us in a dish of the very froth of Bishop Berkeley's metaphysics, stirred into "clotted nonsense," and garnished with mottoes of Scripture and flowers of poetry. This has its churches and its gospel. It is a religion which with much justice claims to itself the soul of homeopathy; it is a science of medicine which, as some one has said, "deals with people's insides from the point of view of men who have no stomachs."⁸

Are there any who will say this picture is overdrawn, or that nearly the same state of things has existed before? Pardon me! This is not merely a case of the follies of an age confounding its wisdom. The vagaries of human thought have little to do with it. We may discard all that pertains to the supernatural as well as all the ferments of popular discontent, but the discoveries of modern science are simply incredible. The advance of surgery under asepsis excites the wonder of the world. Nothing now seems impossible. "The thing that could n't has occurred." We feel as if invention had ceased to respect the mechanical paradox. The Ferris wheel and the ubiquitous bicycle are examples of this. Look at the seeming miracles of electricity! It has "put a girdle round about the earth in forty minutes"; it has, as it were, annihilated time and space. Listen at the telephone and phonograph! Examine the kinetoscope and skiagraph! See the bright light that burns without oxygen! See yonder loaded car drawn along our streets by no other apparent agency than a little wheel rolling upon a wire! The *fin-de-siècle* is to soar with the birds and to harness the lightning of the clouds! Are we not indeed encompassed by illusion more than ever before in the world's history?

Doubtless there have been physicians who have felt disheartened at the humiliation of our noble profession in this age of delusion. They may well have cried to God:

⁷ "The marriage vows are looked upon as grotesque, and it is considered ridiculous that little children should stretch out their arms to embrace a father and a mother."—The Great Physician, by François Coppée.

⁸ "It is instructive to reflect that the Paris which made Mesmer its idol was not far distant from the Paris of the reign of terror." A Book about Doctors.

"We look to thee; thy truth is still the light
Which guides the nations groping on their way,
Stumbling and falling in disastrous night,
Yet hoping ever for the perfect day."

There is yet another definition of our science, namely, that it is the theory of diseases and of their treatment. But among all the theories how to know the true one is the question. The only solid basis for a theory must be found in the facts of physiology and pathology. But beyond the pale of pathology there exists a *something* which cannot be accounted for, and must be reckoned with. No! what medicine has sorely needed has not been dialectics nor definitions, not theories nor systems, not even a greater mass of accumulated observations, classified, analyzed, made the basis of a true inductive science. Two things have been eternally wanting: first, the discovery of an efficient cause; second, the saving of human life and the cure of diseases through that discovery.

The evolution of the soul of a science is a slow process. Ages of time and many minds are necessary. The science of medicine has been a body without a soul.

When Newton saw the apple fall, and recognized and developed by an admirable deduction the great principle of gravitation, he gave to astronomy the soul that was wanting to a body of incongruous knowledge largely tainted with astrological superstition.

"Nature and nature's law, lay hid in night;
God said, 'Let Newton be,' and all was light."

When Lavoisier weighed the oxygen of the air he made the balance the ruling instrument of his science, and proved that all chemical action is only substitution. Thus was alchemy exploded and a soul given to chemistry, which then for the first time threw off the thralldom of magic, and took its appointed place as a noble and divine science.

In like manner when Louis Pasteur, perceiving that the essential element of fermentation was a living organism, disproved the doctrine of autogenesis, and by a bold deduction declared that all infectious diseases were caused by germs, he did for medicine what Newton did for astronomy and Lavoisier for chemistry. He emancipated it from empiricism, and gave to a body of unexplained and inexplicable phenomena which constituted the art of healing, the soul that was wanting to make a science of medicine. He had discovered an efficient cause.

The plan of my discourse leaves me no room to speak the eulogy of Louis Pasteur. The subject is a grand one. I confine myself to my topic, which is "An Epoch in Medicine in an Age of Delusion."

Let us briefly review the history.

Since the earliest dawn of civilization, and among savage and barbarous peoples, there has always existed the belief in some malign influence, some evil spirit or devil, which entered into the body, or dwelt in the body, and was the cause of sickness. All the theories and systems of medicine have recognized the existence of this "infection," sometimes supposed to be material, sometimes wholly or partly spiritual. The Egyptians, Greeks, or Romans, did nothing to advance our knowledge on this subject. The idea of minute animal or vegetable organisms as the cause of disease is not new; ⁹ but, since the revival of learning in Europe, the nearest approach to the true explana-

⁹ Vide Medical Notes and Reflexions, by Sir Henry Holland, chap. xxxi, third London edition.

tion was found in the doctrine of ferments. Until 1839, fermentation, however, was believed to be a *chemical* process.

The first halting step in this grand discovery was made when, in the early part of the last century, Lady Mary Wortley Montague brought the practice of inoculation from the East and Richard Mead inoculated the royal princesses of England with the small-pox; and, as far as this country is concerned, when Zabdiel Boylston and Cotton Mather introduced the practice in this State of Massachusetts. From two points of view this is now seen to be important. It was the first attempt, ignorantly and empirically made it is true, to create an immunity to disease by the artificial introduction of disease germs, or their products, into the human body. And secondly, when Jenner, in 1796, brought forward vaccination, the practice of inoculation with the small-pox virus was in vogue in England and readily accepted. Thus Jenner, veracious man that he was, was enabled to apply the *experimentum crucis* of small-pox inoculation to all those (or to many of those) upon whom he had tried his new process; and others followed his example. Doubtless "but for this fact, and this means of testing its efficacy, the practice of vaccination to prevent small-pox would not have found such ready and thorough acceptance by the world." This should never be forgotten. It is apt to be ignored by physicians, as well as others, who, trusting to the inadequate knowledge and experience of the present age in regard to small-pox, do not hesitate to question the value to the world of the practice of vaccination. The crucial test can no longer be applied, at least in civilized countries, but it is impossible to impeach the testimony of Edward Jenner in England, or of Benjamin Waterhouse in Massachusetts.

The next step, the discovery of Jenner, seems to have been only a happy inspiration which had a base no more solid than an observation of milk-maids.¹⁰ Here, again, we find a value not at first perceived. The facts disclosed by the practice of vaccination doubtless suggested the question of the true nature of susceptibility and immunity. The examination of this question led to another bold deduction by Pasteur, and brought about the discovery of the antitoxins.

In 1836, Dr. Oliver Wendell Holmes in a memoir on "The Contagiousness of Puerperal Fever," pointed out that infection could be carried on the hands or on the person of the physician from one patient to another.¹¹

In 1839, Schwann first clearly demonstrated the essential relation of the yeast plant to the process of fermentation, and Schönlein in the same year discovered the parasitic origin of favus.

Still these discoveries produced no valuable results to science, and it remained for Pasteur, in 1860, to conceive the idea that the acute infectious diseases were caused by the growth of microscopic parasites; a bold deduction which experimental biology has since proved to be correct. There now remained only the important question of the practical application of this discovery in saving human life and in curing human diseases.

The next step, and by no means the least important

¹⁰ There is evidence to show that vaccination, or something like it, was practised before the time of Jenner, but the modern civilized world owes its introduction as a reliable method of preventing the spread of small-pox to Jenner alone.

¹¹ This was disputed by some of the highest authorities in this country.

one, was the introduction of antiseptic surgery in England by Lister.

Looking back as far as we may in the history of surgery we find that there was a *something* which nobody could explain, that caused surgical fever, and made the fatality of wounds and of surgical operations. That wise old surgeon, Ambroise Paré, declared that it was "miasms in the air which made wounds infect." Percival Pott, who had Wm. Cheselden for a pupil, is said to have employed a pretty fair antiseptic dressing; and others have used a variety of methods to prevent the access of air to wounds. But John Hunter declared that "we do not know, and probably never shall know, the cause of the fatality after wounds and operations." Simpson, of Edinburgh, in 1846, wrote, "It is only by employing the numerical or statistical method of examination that a perfect degree of accuracy of judgment can be possibly attained in such matters." So eminent a surgeon as the late Dr. Henry J. Bigelow told me, in 1866, that he had failed in every case of ovariectomy he had tried, and should never attempt those operations again; "but you, as others have done, will succeed," said he. The wonderful insight of that remarkable man was perhaps never better displayed than in this remark. It meant that there was "a something" which we did not know which made these operations fatal, and that "something" was to be found in the person of the operator.

Lister was not the first to suggest the notion of miasms in the air; nor of something in the hands or person of the surgeon, or in the instruments, or dressings which were used; Lister did not invent the antiseptics which he employed; least of all did he discover the fact that surgical fever, sepsis, or necrotic processes in the tissues, are caused by microbes. Yet, "as the originator of a system of wound treatment, his name will go down to posterity as having rendered incalculable service to humanity." His method has been essentially modified in nearly every particular, but "the great principle upon which it is founded will endure so long as a system of surgery exists."

It is to the investigations of Pasteur, Koch, and other bacteriologists, that we owe all that was new in Lister's method. These men proved by cultures, by vivisections and inoculations practised upon the lower animals, that sepsis, or surgical fever, the bugbear of John Hunter and of all surgeons up to that time, is caused by the growth of a microbe, a streptococcus, or staphylococcus, found upon the skin and mucous membranes of surgeon and patient, and also in air and water, which infects the wound during operation, or finds its way into the wound through the dressings; that these microbes exhale an odor resembling sour paste, that they do not require the presence of oxygen for their growth, that they are killed by a temperature above 150° of Fahrenheit, and also by contact with various substances now known as "antiseptics."

On the occasion of the "Fiftieth Anniversary of the First Public Demonstration of Surgical Anesthesia," Dr. McBurney said, "Bacteriology has penetrated with its brilliant light a darkness which our predecessors believed would last forever." And again he speaks of the wonderful discovery of aseptic treatment of wounds, "through whose agency countless thousands of human lives have been preserved."

And on the same occasion, Dr. Cheever said, "Hand-in-hand, equal benefactors, anesthesia and asepsis march calm and triumphant."

Yes! the saving of thousands upon thousands of lives, and "The future of surgery without limit," these are the gifts of asepsis to our science. We can say as Warren said of ether, "This is no humbug."

There now remained only the question of applying these discoveries to the cure of diseases.

Following out the suggestion of Jenner's discovery, many attempts have been made, chiefly upon cattle and sheep, to create an immunity to disease by inoculations, "but it is especially to the experimental researches of Pasteur that we are indebted for the development of practical methods." Pasteur made the discovery that susceptible animals, inoculated, or, as he said, *vaccinated*, with attenuated cultures of microbes, become immune to those microbes; that by a graduated series of inoculations a susceptible animal becomes fitted to receive without injury a pure culture of a virulent microbe, the effect being cumulative. The practical application of all this was made later in anthrax and hydrophobia, and it was shown that an animal can be made immune to the infection of these diseases, even when the poison has been carried into the body before beginning the protective inoculations; many experimenters working upon these discoveries. The next step was to find that this power resided in the blood-serum of animals which had been made artificially immune, and that this serum, filtered, sterilized, and thus rendered perfectly harmless, was not only protective, like vaccine, but in some cases also curative. Out of these facts came the invention of serum-therapy, with which you are all more or less familiar. These facts, of the highest importance to mankind, were demonstrated by vivisection and other experiments upon the brute creation, and they could be proved in no other way.

Thus it was that the discovery of the efficient cause was brought to the point of curing human diseases.

In spite of the convincing character of the evidence afforded by the facts of antiseptic surgery, there will be those who, persisting in the delusions of medical pharmacy, will question the value of Pasteur's discoveries, as was the case with inoculation in 1720, with vaccination in 1796, and *with ether* in 1846. The antitoxin treatment is only in its infancy, but of its ultimate victory over the minds of men there is no room to doubt. It is certainly unphilosophical, unreasonable, irrational, to contend that facts of this nature, which have been proved upon the lower animals, do not apply to man.

The invasion of the microbe into the body of pathology has raised many interesting questions. That of the true nature of racial, or family, or individual, susceptibility and immunity to certain diseases, remains, and probably ever will remain, unsolved.¹² We may expect to find that the antitoxins will not succeed in every case, for this is true of vaccination, and is suggested in the history of epidemics; but the cases of insuccess will be individual and exceptional. That the remedy will be found to apply to the great bulk of mankind may be safely asserted.

To repeat Dr. Warren's words again, "Gentlemen, this is no humbug."

Sternberg enumerates several hundred microbes which have been already obtained by bacteriologists and grown in cultures. Not all of these are found in man; but among them are the germs of nearly all the

¹² The personal equation can never be entirely eliminated from the problems of the physician.

most frequent and fatal maladies to which human beings are subject. Tuberculosis (consumption), cholera, the plague, typhus, typhoid and yellow fever, erysipelas, diphtheria, croupous pneumonia, meningitis, endocarditis, influenza, infantile diarrhea, besides the rare, but fatal diseases, anthrax, tetanus and hydrophobia, are among those found to be due to germs. The treatment by antitoxins has not been successfully applied in most of these, and the fact must be emphasized that much, we may almost say *everything*, is yet to be learned concerning the practical application of Pasteur's and Koch's discoveries.¹³

It is unbecoming in one who like myself is not a bacteriologist, nor even a microscopist, to enter upon the discussion of this intricate subject. The trend of biological opinion seems to be towards a vital, rather than a chemical or structural, explanation of immunity to disease. The vital properties of the proteids, of nuclein, globulin, etc., are beyond our chemistry, their molecular structure beyond the powers of the microscope, and it may be that too exclusive reliance has been placed upon the sense of sight in questions of germ pathogeny.¹⁴ We can set no bounds to the enlargement of our mental horizon by the revelations of physical science. Human ingenuity will doubtless find ways to enlarge the powers of our other senses. That which has been called "the sixth sense," and which has been nearly civilized out of existence in man, may, in ways not yet revealed, be made to assist in the examination of phenomena which are, like instinct itself, vital and functional rather than chemical or structural, and "other beneficent discoveries in the future may lead up to unimagined possibilities."¹⁵

There are perhaps enthusiasts who will exclaim that all this will revolutionize medical practice. I do not share in this feeling. It has been discovered that the specific action of quinine in malaria is due to the power of this drug to destroy the corpuscles of Laveran in the blood of the patient. It needs no seer to tell us that, as there are many surgical antiseptics, so there must be many remedies whose acknowledged therapeutic value will be found to lie in their power to destroy or expel pathogenic microbes, or to so immunize our bodies as to render these parasites inert and harmless in the fluids and tissues.

Dr. Roswell Park, of Buffalo, has indicated certain

¹³ One needs only to study the chapters on Pathogenic Bacteria in Sternberg's superb Text-Book of Bacteriology, to become aware of the fact that, indeed, we have no more than entered upon the investigation of this intricate subject, and must perhaps await the coming of another Pasteur to bring to fruition the wonderful discovery of the antitoxin treatment.

¹⁴ "The polymorphism of microbes finds analogy among the fungi, in which the 'pro-embryo' of Hofmeister often appears under many forms, 'always unlike the parent,' and the various orders of cryptogams are seen to present remarkable differences in this respect."—Gray's Botanical Text Book, fourth edition, p. 341.

¹⁵ There are many interesting and suggestive analogies, or seeming analogies, between horticulture and medicine. The bacteriologist Toussaint—who was probably the first to show the practicality of conferring immunity upon animals by protective inoculations—discovered the fact that the bacillus of anthrax does not form spores in the body of an infected animal, but multiplies only by binary division of the mycelium. Thus when this microbe grows in a susceptible animal—as it were in a favorable soil where it flourishes most abundantly—it spreads by fission (increasing as fungi frequently do by multiplication of their vegetative cells, or as plants often do by offshoots or divisions of their roots and branches), and not by producing spores, which are the culmination of its vegetation, just as flowers (or embryos of the flowers) are the final product of the life of flowering plants. Now it is a fact familiar to the florist that many plants if grown in rich soil and thriving vigorously, run to wood, or leaf, or root, but do not flower. Again it is interesting to note that certain fungi which cause vegetable blight have a heterococcal development (for example, pear-leaf blight, the spores of which are the product of an apparently different fungus found upon the juniper), and that we have here an analogy to the supposed origin of vaccinia in "the grease" of the horse,—in which Jenner believed. These analogies may perhaps throw light on the origin of epidemic diseases, and explain the periods of interval or disappearance.

conditions of the system which tend to impair or destroy immunity or the power to resist microbial infection, and, therefore, may increase the liability to disease from this cause. These are toxemia and anemia, the presence of foreign bodies, paralysis of nerve influence, obstruction to circulation, to secretion or to excretion, hemorrhages, freezing, degeneration, etc.

It is also thought that resistance is diminished in parts where retrograde metamorphosis is going on, and that this explains the frequency of appendicitis, and of germ infection in the lymphoid tissues about the pharynx. Whatever tends to impair the natural vitality (such as neglect of hygiene and sanitation, crowding, privations and excesses, various poisons, exhaustion, the depressing passions, etc., and certain climatic, telluric or electric influences) encourages the growth of those microbes which are found within the human body, and which under favorable conditions may take on the character of virulence. The clinical symptoms of disease, then, are the signs of the struggle of nature to rid itself by the ordinary physiological processes of a parasitic pest, either by destroying it or neutralizing it. Thus we find ourselves again on the old Hippocratic ground. The first physician will be he "who knows how to wait for and to second the efforts of nature," as Herman Boerhaave declared nearly two centuries ago.

The prolonging of life is a boon only on the condition of relief from suffering; the field of symptomatic treatment is always open to the physician, and the grateful work is his of smoothing the pathway which all must tread to ineluctable death.

The department of the public health affords a natural field for the bacteriologist. But I do not propose to dwell upon this branch of the subject.

The value of serum inoculation as an aid to diagnosis has been shown by the employment of tuberculin in cattle. It seems to be now admitted on all hands that the rise of temperature which follows its use in diseased cows, is an established fact, and is a certain indication of the presence of tubercle in these animals. Other ways suggest themselves in which the antitoxin serum can be made useful in diagnosis and prognosis in man, and some have already been tried.

The work of Dr. Ferrán in Spain and of Haffkine in India, with anti-cholera vaccine, marks the first great step since Jenner's time in the direction of stamping out other epidemic diseases, as has been done with the small-pox.

Experiments in the Children's Hospital in this city by Dr. F. Gordon Morrill in the use of diphtheria antitoxin as a prophylactic, or an immunizing agent, have had encouraging success. But perhaps little can be accomplished in this way except in times of virulent epidemics. The inoculations seem to give a temporary increase of the power of resistance, but do not confer a vital immunity; and this is in accordance with the observation of other experimenters.

There may be diseases which are not due to microbes. Whether these are many or few, they cannot be included among those most dreaded and fatal. A development of virulent bacteria is almost invariably accompanied by a rise of temperature and other clinical signs of fever and inflammation; whenever there is contagion or infection, we must infer the existence of a germ.

But there is a class of disorders to which Sydenham

applied the name of "hysterical diseases." They furnish perhaps the major part of the daily practice of physicians. As the name implies they belong principally to women, but as man is born of woman he inherits her diseases.

It may be doubted if these disorders depend upon the growth of the parasites. They are peculiar to man, and have not been produced or studied in the lower animals. Hard-handed and primitive-living peoples are little liable to them. They are apparently weeds, or by-products, of the garden of civilization and refinement, anomalies, "sports" forced under steam culture, as it were; or they may be the inheritance of the unnatural selection of the unfitest, and such patients are prone to become victims of every form of medical delusion.

Generations may pass before the fruit will be fully ripe upon the tree which Pastour has planted, but I believe the time will come when no instructed physician will talk of "healing the sick" by any other methods than those which shall grow out of these discoveries; and that he who continues to believe in so-called specifics, or who holds that the art of medical pharmacy is superior to all knowledge of the causes of disease, to the revelations of bacteriology, or the facts of germ-pathogeny — and ignores these things, must stand "marking time" in the ignoble army of charlatans and quacks.

Experimental biology and the bacteriological laboratory have become an integral part of our medical schools; for here is no theory and no delusion. The analogy between the phenomena of disease in the lower animals and those in man, will be found to be complete. The student is working not with words, but with facts of experiment and observation.

Let me recall to your minds the part which Massachusetts physicians have taken in these discoveries. Zabdiel Boylston, of Brookline, inoculated his only son and suffered social ostracism, in the cause of small-pox immunity. Benjamin Waterhouse, of Cambridge, introduced vaccination into this country, and proved its efficacy by small-pox inoculation in this vicinity. Oliver Wendell Holmes first pointed out the fact of personal infection. Here anesthesia was first practised, without which antiseptic surgery would be well-nigh impossible. Reference has already been made to various dialectic contributions by Fellows of this Society, pointing to these discoveries. These things are part of our history. To-day we find a hearty acclaim accorded by the profession here to the serum treatment, so that we may say with pride that, even in this age of delusion, this Society of Massachusetts physicians stands at the fore-front of scientific progress.

Gentlemen, we can but imagine the feelings of such men as Herman Boerhaave, Edward Jenner, Charles Louis, James Jackson, and others long dead, could they have seen their science brought through the slough of despond, and led to the gates of truth and light.

Without reservation we may now exclaim in the words of Bowditch, "The profession of medicine is man's noblest work, and the physician is God's vice-regent upon earth."

NOTE. — The course of the argument in this paper has called for a rehearsal — which must needs appear "stale, flat, and unprofitable" — of trite facts in the history of medicine, which otherwise should not be presented before the Massachusetts Medical Society without apology.

Original Articles.

RELATION OF NEURASTHENIC SYMPTOMS TO THE GENERAL NUTRITION.¹

BY ROBERT T. EDES, M.D.

THE opportunity offered by having under observation for periods often covering several months, a considerable number of patients with symptoms chiefly of the depressive type and for the most part not connected with known organic disease, has induced me to compare their progress with certain theories, or, perhaps I should rather say, feelings or assumptions, not always definitely stated but as it were "in the air"; to the general effect that these symptoms are largely or wholly dependent on insufficient or unsuitable nutrition, as displayed either by a certain amount of emaciation or anemia, or upon autogenetic toxic influences.

These impressions have in their support the highly important fact that no plan of treatment which affords a prospect of anything like enduring success can afford to leave them wholly out of sight.

So far as body weight, which of course depends on the harmonious working of more than one function, is concerned, by far the greater number of my cases seem to fully confirm the popular view. In the great majority a steady gain in body weight went hand-in-hand with improvement in nervous symptoms; sleep was better, general depression and nervous restlessness and local pain were less, and the brain increased its capacity for normal action without exhaustion. Little need be said about these. The results are what we expect and fortunately usually find.

Some special groups, however, may be selected which are partly confirmatory and partly incompatible with these ideas, which go to show that although the two processes of improved general nutrition and returning nervous strength do go so nearly hand in hand, they are not one and the same, and it is not always easy to say which leads. The first group consists of a certain number of cases, fortunately not large in proportion, which confirm the rule upon the other side, and go to show that a persistent refusal to take on flesh, notwithstanding rest and careful feeding with its adjuncts, is of decidedly unfavorable prognosis as regards speedy recovery, even when no other organic change can be discovered.

Miss D., age twenty-two, tall, with a delicate rosy complexion, lost weight from 148 to 125 pounds during eleven months, interrupted during one month by a slight gain. She had persistent backache and headache and frequent gastric disturbance. Since leaving the asylum she has had several severe turns of gastric disturbance originating at the time of menstruation but much outlasting it. Menstrual pain and backache have been somewhat better since the uterus was curetted, and her family recognize a decided improvement in the two years that have elapsed since her discharge.

Miss D., age thirty-eight, had tumors (supposed to be malignant, but after removal found tubercular), removed from one breast and axilla. A year later she entered the asylum, chiefly on account of general weakness and headache. She was of a singularly cheerful and hopeful disposition, but lost weight steadily though slowly from 113 to 104. There have been

¹ Read to the Association of American Physicians, Washington, D. C., May 6, 1897.