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## ANNUAL ORATION.

### THE ESSENTIAL OF THE ART OF MEDICINE.

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The closing years of the eighteenth century and the early years of the nineteenth century marked an epoch in medicine as transcendent for its welfare as the events of the past decade bespeak for the glory of the medicine of the future. In that epoch was witnessed the passing of the old; the dawn of the new. A long farewell was being said to schools of medicine and systems of pathology and false methods; a timorous but cordial welcome was extended to the beginnings of that which culminated in the realism of the nineteenth century. It is true, as echoes of the past, Brunonianism, Broussaisism, the Stimolo and Contrastimolo of Rasori, and subordinate "isms" furnished exercise for the expiring idealistic intellect, and seemed to condone for the pernicious therapeutics of the early periods of this century.

Although the reform period extended over the seventeenth and eighteenth centuries, the death agony of idealism began about the period we have indicated. It is true that Harvey and Willis and Glisson, and Malpighi, and Schwammerdam, in the seventeenth century supplemented the labors of the early anatomists and bid fair to found a science of medicine. In this earlier century, most important of all, arose the Baconian system of philosophy. Nevertheless the sway of the imagination and the rule of theory never seemed more powerful. Deductive philosophy seemed to be at its height. Instruments of precision had not been employed up to this time, and the collateral sciences were not sufficiently developed to invoke aid from them in the investigations of physiology and pathology. It is not to be wondered at that the indefinite data secured by observation restricted to the unaided eye, and to the touch, should lead them to indulge in elaborate classifications of disease and to refinements in symptomatology which now serve only to amuse and appal. Under these circumstances the Iatro-chemical, the Iatro-mechanical, the Mechanico-dynamic schools, the schools of Animism and Vitalism and Solidism waxed and waned, and out of them the Brunonian, Rasorian, Hahnemannian and other fallacious schools were born.

Along with pseudo-scientific systems, artificial classification reached its highest pitch in that of Sauvage. His system included ten classes of disease, each subdivided into several orders, and some as many as 295 genera and 2400 species of disease (Park). For Cullen, four classes with 149 genera were enough to encompass the field of pathology.

Time forbids entering into detail concerning the

theoretic and speculative modes of treatment which grew out of such specious pathology. Again there was a rise and fall. To Willis again (seventeenth century) credit must first be given for approaching the rational and scientific in therapeutics (Leech), as in physiology and anatomy. Sydenham displayed the most astute scientific habit of mind in urging simple observation and simple treatment, in fully recognizing the healing power of nature, and in removing the immediate cause of the disease. Observation and experience was the central idea of his method, a revival of Hippocratic methods, which to this day influence medical thought. It is interesting to know on the authority of Leech that, with the exception of emetics, purgatives, bitters and carminatives, very few of the drugs he and Willis employed had the powers they claimed for them, and most of them have lapsed into a deserved oblivion. Both these great men were moderate polypharmacists, as many as eighteen herbs only being used in one prescription. Their rivals and successors, however, far surpassed them in the number and character of the ingredients of the formulæ they employed. With the growth and decay of systems in the eighteenth century—the death agony lapsing into the nineteenth—flourished and declined, remedial measures debilitating or stimulating, alterative or evacuant, according to the specific view in vogue. Venesection followed shortly and lingered long; stimulation raged, polypharmacy grew apace and then, when results did not warrant practice, change in the type of disease was invoked (Allison and others) to fit fact to theory.

Theoretic systems came to an end with the promulgation of the systems of Brown, Broussais and Hahnemann. A universal skepticism arose; the expectant treatment in France, and in Germany "Nihilismus," were the refuge of scientific inquirers (Benett). Therapeutics, with the development of chemistry and the growth of physiology and pathology, became rational. But, further reference, with your permission, will be made to rational therapeutics later.

In the meantime it must not be forgotten that Stahl and his followers were among the earliest skeptics, denying the efficiency of medicine, even doubting the value of opium and cinchona. Let it be recorded here likewise, as an admonition to those who oppose and a hope for those who favor, that as early as 280 B. C., perhaps by others earlier, Erasistratus urged gymnastics, exercise, diet and baths, in preference to drugs, and that the echoes of his refrain never died out. Asclepiades discarded all violent remedies and relied on hygienic means alone. Moreover, from time immemorial climatic treatment was extolled. Coming to later days, among the not a few essays on climatic treatment, Rush's description of the advantages secured by long journeys on horseback for the treatment of consumption is as fascinating as the many writings of this almost myriad-minded man.

It is quite impossible to leave the deductive philosophers, the theorists, the speculators in the medicine of the eighteenth century, without an inquiry into the methods employed by them to secure data upon which the diagnosis of disease was based and therapeutics determined. "What a patient said and what the physician saw and felt was all a case of disease had to tell him," Mitchell eloquently states. Such was the limitation of the inquiry. Instruments of precision were not used, chemic analysis not made, while biologic studies were not dreamed of. It is true Paulus Ægineta had employed sounds and specula; Santorini counted the pulse and used the thermometer and balance; Boerhaave used the thermometer in the axilla, and the lens; Floyer and Haller marked seconds with the watch. Their use was forgotten or neglected. This is not to be wondered at when we recall the obtuse state of mental receptivity that allowed Avenbrugger, who invented percussion and described it so pithily and exhaustively in 1760, to wait until 1808 for Corvisart's recognition of its value.

Examination of a patient included, careful scrutiny of the exterior, the face and features, the eye, the protruded tongue, the state of the extremities in comparison with the trunk, the color of the skin; observation of the temperature and degree of moisture or dryness of the skin and the varying pulse revealed to the touch; a note of the decubitus, the movements of muscles and of the naked-eye characteristics of the urine, the vomitus and the feces. Changes the character of the voice, and delirium, stupor and other gross evidences of impaired cerebral action were described. The eye saw more than it sees today, mayhap, but it looked through the glass darkly; the touch was more sensitive, but not as sensible. Generally it was "observation gone minutely mad" (Mitchell.) Fifteen minutes would have been ample time to make a complete objective examination of the patient, unless the refinements of symptomatology, conjured by the imagination, furnished opportunity for the lapse of longer time. The accuracy of the diagnosis depended more upon the extent of the experience of the physician and his knowledge of medicine acquired by reading than upon precision in the method of obtaining facts upon which to base a diagnosis. Such diagnosis was often an intuition, as harmful then as now, and hence attained without it being possible to state the process of reasoning by which the end was secured. Think of it, that the number of the pulse and the respiration is rarely referred to in the writings of Rush and Cullen, and that Corvisart "On the Heart," says nothing of the frequency of the pulse, and Laënnec makes no mention of the breathing rate. In truth, actual diagnoses were not made, but instead, a symptom, such as jaundice, dropsy or fever was described. It is not to be wondered at, as previously indicated, to appease the patient and establish his own authority, theories of disease were uppermost in the physician's mind, and deductions from such theories utilized to establish diagnoses and formulate lines of treatment. Cullen stated that theory could not be separated from practice, hence it was unimportant which came first, and that, therefore theories could control observations.

If guessing the truth from ill-defined data is an intuition, and so-called "rule of thumb" methods an inspiration, it can then be said that the medicine of this period reached the acme of perfection of such methods of diagnoses; from this time its displacement by inductive methods began.

But medicine as a science was no higher nor lower than cognate departments of knowledge. Law, it is true, was a science then as in the days of Justinian. Theology was not removed from the deductive methods of reasoning, although there was reaction and quickening. Metaphysics, because dealing with the unknowable, was deductive, but physics and astronomy were casting off their swaddling clothes. The former had just run the gauntlet of deductive philosophy, after the brilliant deduction of Black, whereby the theory of latent heat was established, one of the very few deductions which afterward was proved directly and inductively to be true. Chemistry was a new-born in the sciences under the brilliant accouchement of Lavoisier; geology had grown through the labors of Buffon and Rouelle, but it was only welcomed to the circle of the sciences by the genius of Cuvier. Botany, groaning with the classification of Linnæus, was emerging into light by virtue of the brilliant generalizations of Goethe in vegetal physiology (the awakening of evolution) and of Desfontaines and Jussieu in structural physiology. Berzelius and Lisle were organizing mineralogy. Cuvier was associating anatomy with geology and laying the foundations of paleontology. The brilliant dictum of this great man that the "first question in science is always a question of method" resulted in sweeping away the artificial classifications in natural history as of Linnæus in botany, and in removing natural sciences from the hands of the observer into that of the experimenter. Buckle's remark, "the consequences of which has been the attainment of that precision and accuracy of detail which experiment alone can give and which is every way superior to such popular facts as observation supplies," none the less applies to natural history, then and now, than to a minor department of it, the science of medicine. Cuvier, he further remarks taught naturalists the true path of inquiry by accustoming them to a close and severe method, and by teaching them to despise vague descriptions. How well we should take this to heart in our present day labors—close and severe method.

The latter half of the eighteenth century also shows the industrial arts flourishing to a high degree, but carried on alone by "rule of thumb" methods and by experience. Brewing, cheese-making, milling, butter-making, tanning, metallurgy and other industrial arts were conducted without scientific method, and the art transmitted from father to son, from master to apprentice after years of trial and oft, from repeated failures, of tribulation. In spinning and weaving, in iron-making and other manufactures, great machines, instruments of precision in industrial arts, were bringing about changes which were destined to modify the social fabric of the world.

In fine it may be said, science ceased to be deductive, and was fast growing to be inductive and experimental. Medicine too was becoming inductive and realistic; its art scientific and rational.

For more than nine and ninety months the gestation of modern medicine was in progress during this century. Morgagni was laying the foundation of morbid anatomy, (1761) the "great" Haller had brought light out of darkness in establishing experimental science and laying the foundation of modern physiology, but to Hunter in the eighteenth, and Pinel and Bichat in the late eighteenth and early nineteenth century, we owe our foundations of medicine. Hunter could not put aside the deductive methods of reasoning entirely, but in pathology he employed both induc-

tive and deductive methods alike, as Buckle points out, attaining the truth more nearly with the former method. Certain it is that to Hunter we owe the development of *method* in pathological inquiry, observation and experiment being the handmaidens with which he gathered the innumerable data which make him the "equal of Aristotle, Harvey and Bichat and the superior of Haller and Cuvier." To Pinel we owe the substitution of analytic for synthetic methods and the origin of systematic diagnosis by the careful construction of symptoms, while to Bichat, the "Napoleon of Medicine," to whom is due the foundations of modern morphology, we as clinicians owe "the establishment of that large and sweeping innovation which opens up a new view of thought and creates fresh resources." He of all others overthrew speculative tendencies in medicine.

The progress during the present century, familiar to all, has been marked by the employment of inductive methods of reasoning in the departments of physiology, pathology and clinical medicine. By the results of such methods and the development of a scientific habit of thought, the science of medicine, which is that of physiology in its broadest sense, the physiology of health as well as the physiology of disease, including the effects of drugs, can well fill its minor place in the science of biology. The old cry of the uncertainty of medicine, the unscientific character of the art of medicine, can not be held up to us. No Montaigne can at this day hurl the shafts of ridicule and satire that stung to the quick and stimulated honest doubt in the sixteenth century. Well do we know, ourselves, our limitations as well as our power, and with becoming modesty do we uphold the claims of medicine as a science. If science is "knowledge gained by systematic observation, experiment and reasoning; knowledge, co-ordinated, arranged and systematized," well fortified is he with cynicism who has the hardihood to maintain the contrary.

To sketch the struggles by which this firm height has been attained would be to reiterate that which is familiar to you and to detain you far beyond the measure of your desserts. Its history would be the story of the labors of Bailie, Laënnec, Cruveilhier, Rokitansky, and others in forming the foundations of morbid anatomy, and of Virchow, Cohnheim, Koch, Lister, Pasteur and hosts of others in both continents, creating the science of morbid physiology. Its history would be an account of the application of scientific habits of thought in experiment, observation and analysis. It would show the dependence of it upon the major sciences, if they may be so termed, chemistry, physics and biology, whereby instruments of precision and methods of chemical, physical and biological research became essential in the practice of the art of medicine, in diagnosis and in therapeutics. It would show that we have attained precise knowledge of the origin, course, mode of recognition and control of many diseases; that we can predict the occurrence of their daily phenomena, as the astronomer predicts the appearance and course of a comet. From our knowledge of etiology we can create disease at will, but more triumphant of all achievements, the glory of the century, we can deliberately and positively, and hence scientifically, prevent disease. We have learned that diseases are events exhibiting disturbances of the processes of physiology; that involution, degeneration, decay and death are normal events, as are evolution, growth and birth. The great

postulates of Koch, the brilliant steps in inductive biology of Pasteur and of Lister leading to preventive measures, the scope of which is almost inconceivable, is akin to the conceptions of Newton and Dalton in physics.

Such advances were only attained by the master spirit of the naturalist. We are wont to forget that the use of instruments of precision, guided by the method and scientific habit of thought of the naturalist as physician brought us to this great height. Our debt to the naturalist must never be forgotten. The lesson we can the better learn from a closer analysis of the position of modern diagnosis and modern therapeutics in modern thought. It would be unjust however not to give credit to that scientific honest doubt and scientific receptivity of truth which is characteristic of the Anglo-Saxon intellect, by reason of which the philosophical structures of this era have been raised.

It must be remembered that the closing years of the nineteenth century are marked by the prevalence in all fields of mental activity of that habit of thought which has grown out of inductive philosophy. In whatsoever domain we make investigation we find that which may be called a scientific habit of thought prevails. In theology it has extended to such a degree as to alarm, without just grounds for such alarm, those who have the hardihood to cling to old habits attendant upon the deductive science. Here it now appears almost iconoclastic. It need not, on the one hand, be the occasion for fear; nor on the other, for the creation of antagonism. For experience has shown that the exposition of truth in this manner only the more firmly builds the temple which it is thought might be destroyed; while from many standpoints we know the utter futility of attempting to prevent the progress of knowledge thus attained. In history inductive philosophy has revolutionized methods, and wrought out a philosophy which harmonizes human action with organic law. In sociology, although as yet tentative, it is aiding in the solution of problems which will contribute to human happiness. Chemistry has verily grown to an exact science, and the exposition of the "Periodic Law" looks to greater exactitude in the science of pharmacology.

The conservation and correlation of forces in physics and the conception of evolution in biology are the triumphs of inductive philosophy and the glory of this great era.

*Diagnosis.*—The department of clinical medicine is an art as well as a science and includes diagnosis and therapeutics. I have elsewhere stated the limitations of the inquiry in diagnosis one hundred years ago. Then one-fourth, one-sixteenth of the time now employed sufficed to gather all data. It is not necessary to rehearse to you the expansion of the inquiry at this day. To establish any diagnosis perhaps days may be required. After securing subjective data, there are required the skill of the chemist to analyze secretions; of the physiologist to examine the blood and apply the physical instruments of precision so necessary to elucidate the facts derived from the visual apparatus, the nervous system, the circulation and the respiration; of the biologist, to study the life properties of the parasite that may be the ruthless invader of tissues. By these means, however, and by the use of auscultation and percussion; by the use of modern methods of direct vision with specula and lens and mirrors; or of indirect vision, with photograph

and Roentgen rays, or more precisely still by bringing the inaccessible to view by exploratory operation or exploratory puncture, precision in diagnosis has reached a degree over which exultation can only be calmed by awe at the possibilities of further expansion. It is seen that anesthetics and asepsis brought to us a timely aid in diagnosis—exploratory operation. To be more explicit and more emphatic, the accompanying table will more strongly display the scope and position of modern diagnosis.

DISEASES RECOGNIZED BY SCIENTIFIC METHODS—INSTRUMENTS OF PRECISION.

1. Malaria.
2. Leprosy.
3. Relapsing fever.
4. Dysentery (amebic, providing the ameba is recognized as the cause of disease).
5. Tuberculosis—bacteria and tuberculin.
6. Diphtheria.
7. Asiatic cholera.
8. Tetanus.
9. Actinomycosis.
10. Glanders—serum test Malein.
11. Cancer
12. Sarcoma } in certain localities.
13. Leukemia.
14. Various parasites, as filaria.

DIAGNOSIS RECOGNIZED BY SCIENTIFIC METHODS, WITH LIMITATIONS.

1. Typhoid fever (*may be certain*).
2. Various forms of pyogenic infection if in blood.
3. Various forms of meningitis from lumbar puncture.
4. Chlorosis.
5. Pernicious anemia.
6. Gonorrhea.
7. Effusions by exploratory incision.
8. Growths by exploratory operation.
9. Eye diseases.
10. Laryngeal diseases.
11. Ear diseases.

It is thus seen that whereas in 1800 only a few diseases could be positively recognized, now as many as fourteen in internal medicine alone can positively and beyond peradventure be diagnosed, while eleven more with limitations that the scientific mind can appreciate can be affirmed to exist. What more forcible statement can be made to show the position of the science of diagnosis. Still more enforced however, when we remember that in addition the list can be swollen tenfold, if we would include the groups of the diseases of special organs, as eye, ear, etc., and those of internal organs which can be recognized by a scientific consideration of an orderly procession of the facts. These are those first, of etiology brought out in the social history; second, of the history and course of previous diseases, and third, of the evolution of the disease under consideration, united to, fourth, the data derived by an objective examination of the patient when in addition diagnosis by exclusion is judiciously employed—a close and severe method in gathering data. Under the above circumstances, scurvy, myxedema, exophthalmic goiter, hemophilia, the inflammations or degenerations of most organs and many other affections are not be overlooked.

What a difference in comparison with the diagnoses of bygone days. In a given case of suspected malaria, five minutes examination of the blood settles the diagnosis and wipes out the necessity of all considerations of the manifold subjective symptoms of the disease, and the objective symptoms which often were questionable facts from imaginary postulates. A conception of diagnosis or the breadth of research necessary to establish

such diagnosis shows that time is gained to the patient, lost to the physician. It is not any wonder, therefore, that a general practitioner must have a corps of trained assistants or laboratories at his command. While the patient has gained in the precision and rapidity of a diagnosis, the gain of a community is much greater. The instant recognition of an epidemic forewarns and forearms. Instead of waiting for a large group of cases, and a series of autopsies, the biological diagnosis of one case settles all doubt.

It is thus seen that an essential in the art of diagnosis is skill in the use of instruments of precision and the application of a scientific habit of thought. It is further seen that with the incoming of scientific precision there is the outgoing of so-called art. Diagnosis by intuition, by careless "rule of thumb," methods, by an appeal to an experience which is incoordinated, unsystematized and unarranged, is as little trustworthy as the shifting sands of the Sahara.

Diagnosis has thus become in many directions scientific, precise and positive. It has minimized the value of experience and eliminated deductive reasoning as a factor in the art of medicine, which in consequence has grown more practical because more scientific, and less theoretic because more practical. In diagnosis the art of attaining the end has been replaced by the scientific method of securing this end—the large element of uncertainty based upon imperfectly gathered and unreliable data, replaced by the small element of possible error of method in securing positive data.

THERAPEUTICS.

Venesection, polypharmacy, treatment based on deductive generalizations, swayed medical practice a hundred years ago. The beginning transition to rational therapeutics has been outlined, and it is important to note that such change was the result of the projection of scientific habits of thought into the field of the therapist, and the appreciation by him of the facts and principles of biology. The first rude awakening took place when the therapist was asked to define what he was treating, to place on a scientific basis the knowledge of the nature of the disease against which he was exercising his power. He had to state with definiteness and precision, as far attainable as possible, the nature of the processes contending over the treatment of which the theorists gave birth to a jargon of medical literature as vast in its extent as in its indefiniteness, and by which the mental vision of the artisan was obscured. It was rational for him, in order to answer this question properly, to study the natural history of disease; to learn from the study of a large number of cases the origin, the progress, and the decline of diseases, and their effects upon the economy when death resulted. The promulgation of studies of this character was made more readily possible by the establishment of hospitals and dispensaries in the seventeenth and eighteenth centuries, by means of which the aggregations could be classified and compared. The practitioner, in the on-rush of duty, could not retain from month to month the recollection of a type of disease, for such comparison. The multiplicity of the cases, and the enlarged extent of the experience, the presentation in the ward perhaps of a dozen cases of a given type at one time, coupled with the habit of recording the history of cases, made the conduct of such studies possible. Out of this inquiry arose the Paris Pathological

School and the Vienna School of Medicine. Although none the more forceful, the labors of the former seem to dominate the medical thought of the first half of the century. The numerical method of Louis contributed vastly to our knowledge of the course of disease and the effects of remedies. The methods that he supported to such an extreme as to lead to their own injury, resulted in the production of essays in the natural history of the specific ailment, indicating that disease had an evolution and involution which, if undisturbed, tended to a natural cure. Thus, the self-limitation of many ailments was worked out. The essays of Bennett and Wilks and Gull and of Bigelow and Flint awakened a judicious skepticism. The application of the analytic methods of various forms of treatment brought about the same result. Expectancy became the rule of the hour. That disease was an expression of morbid physiology, the natural tendency of which was to self-restoration, became evident to all.

The accumulation of knowledge, and its array in mathematic language, led to the interjection of other sciences—that of mathematic philosophy, as involved in the theory of probabilities and of the science of statistics. Cold, formal mathematics gave little ground for theory to stand upon.

The analytic study of a large number of prescriptions by Martindale, and later by Patch, carried out for another purpose, disclosed the fact that, after all, a great deal of our boasted therapeutics as to the number of drugs employed, was brag and bluster. A study of Martindale's analyses shows that the total number of times the drugs, which were called for more than thirty times, were used was 31,664 in 12,000 prescriptions; but 8,588 of these were employed externally or as excipients. Thirteen drugs alone in various preparations were prescribed 10,054 times, nearly one-half of the entire number, excluding externals.

Of course, the great array of agents employed, the fact that many perished with the setting of the sun that had arisen on the day of their birth, was called attention to by many observers, and led to further doubt. Then skepticism came about in another way. The more incurable the disease the greater the number of drugs vaunted for its relief. Hence, upward of 90 were advised at one time for epilepsy; hosts for exophthalmic goiter and for other affections, uncontrollable in days gone by. In scanning the literature of the "drug-house" one can too often set down as worthless the drug that "cures" many diseases, or one can fix in his mind as incurable the disease that has a multitude of remedies recommended for its cure. The pretentious and formidable array of drugs that the manufacturers thrust at us daily is alike as uncomplimentary to our knowledge and common sense as it is an evidence of the infantile state of their therapeutics. I counted 554 Galenic drugs alone in a price-list, not having the time to calculate upon inorganic and other preparations. Such drug-firms cater surely to that period of the evolution of a doctor wittily epitomized by Radcliffe: "When young, he had 20 remedies for every disease; when old, 20 diseases for which he had no remedy." And thus it has come about that the individual judgment of the effects of treatment of individual cases, unless hedged in by limitations, is of very little value unless supported by laboratory experiments.

Calm, deliberative study on the lines established by the schools referred to, whereby the physiology and

the pathology of the disease were acquired, as well as knowledge of its course in new environments, led to the production of many essays on the limitations and the powers of drugs. Moreover, such studies led us to know the nature of the disease, the action of the drug in health and its action in disease. It seems most absurd that such processes of ratiocination did not occur long before the advent of physiologic therapeutics.

Then occurred to many, as they went along in practice, how small the number of drugs actually employed. Repeated papers have been published upon subjects that went to show how few drugs were actually employed, and how small the number upon which reliance could be placed. Moreover, drug-accounts and the requisition-blanks of hospitals and army and navy dispensaries showed what few drugs were actual necessities. A critical analysis of a modern work on therapeutics reveals the fact that the certainties are few. The number of drugs that are scientifically curative can be counted on the fingers of the two hands.

The criteria upon which to base statements of the value of drugs are those of experiment and observation. The number from which by experiment and reason we know produce a definite effect are limited, types of which are seen in opium, belladonna and alkalies.

Another group of observers, basing their criticism upon very patent scientific grounds, led us to understand that we could not judge of the action of a drug if it was administered in conjunction with other remedies. Hence, assaults on polypharmacy began. The most reasonable injunction that simplicity in therapeutics is essential prevails largely at the present time, but that the assaults must continue the following prescription, devised on the twenty-eighth day of May, in the year of our Lord 1898, by a writer of some prominence in therapeutics, witnesses—the drugs only are enumerated: sodium salicylate, potassium acetate, ammonium acetate, fluid extract of euphorbia, peppermint water, compound tincture of benzoin, compound tincture of capsicum, tincture of nux vomica, syrup of tolu. (I trust the recording angel will wipe out the sin of theft from a prescription-file). Here is another for an infant 9 months old, with nostrums from three other bottles, and the wonder was the child died. It contained quinin sulphate, protonuclein, pepsin, hydrochloric acid, arsenic chlorid, and one or two excipients.

The therapist may continue to smile blandly as he will, and continue to dogmatize. But when I am told that fluid extract of bugleweed controls pulmonary hemorrhage, I ask what is pulmonary hemorrhage, its physiology and pathology, and, with such knowledge, how far is its artificial control possible; secondly, whether pulmonary hemorrhage does not stop of its own accord; thirdly, whether rest, diet, etc., and above all, removal of the cause is not quite sufficient; and finally, whether "mental expectancy," or "confidence," does not bring about the imperturbability that secondarily brings rest? When these questions are answered, then it is time to decide upon the virtue of the remedy proposed. Unless we have a measure of such knowledge, and experimental knowledge of the powers of the drug, a scientific conscience will not allow us to use drugs in this manner.

It has then come to this, that the value of a system of therapeutics, or of a single remedy, can only be determined when, 1, the natural history of the disease is known; 2, the influence of other factors promotive



of the natural course of the disease, as rest, diet, etc., are eliminated; 3, when the so-called personal equation of the observer is set at naught; 4, when that peculiar influence of mind on body, the hypnotic effect of extraneous conditions, the results of mental expectancy, are eliminated. That the second, third and fourth liabilities to error can scarcely be controlled is almost self-evident. Hence, for the foundation of rational or scientific therapeutics, experiment must form a basis for conclusions. Such experiment, to be of value, must imply a knowledge of the disease or the essential in the disease to be combated. Until the discovery of toxins, we had no knowledge of the entity we are called upon to counteract in diphtheria. The therapeutics of this affection, prior to the discovery of the antitoxin, was promulgated from an appalling array of data subject to extraordinary liability to error because of the possibilities already indicated and because of the limitation of our knowledge. The vast labor attendant upon the collection of data from which to draw conclusions can hardly be appreciated, but the labor is not wasted. It is true the indications for management secured are subordinated to the one principle; they are none the less valuable. Through them we learned that certain lines of diet, fresh air and sunshine, limitation of the catarrhal process, and other indications were contributive to restoration to health. Our negative information was most valuable; above all, we learned what not to do. The amount of energy expended in such therapeutic warfare, commendatory for its profusion is startling, and were it not that an atom of good always results, one would wish its course could be turned into the lines of more precisely scientific inquiry.

At too wearisome a length have I trespassed upon your time and patience. A review of the rise of therapeutics to the dignity of science shows throughout, whether in combating the old or in bringing forth the new, the naturalist, the scientist in spirit if not in fact, is the controlling force. The physician as naturalist dissipated speculative therapy; by his habit of thought and mode of action he curbed excesses, destroyed fallacies, and erected new structures. Study the downfall of any system of therapeutics, and it will be seen the naturalist made the first incursion against its folly. Study the establishment of any truth and it will be seen that the scientist laid its foundations. As in diagnosis, so in therapeutics, all advancement, all gain has been made at the hands of the scientist.

Scientific doubt first prevailed; scientific action followed. So the art of therapeutics is being replaced by the science. To establish a diagnosis, therefore, and to conduct a judicious and productive therapeutics two things are required, the scientific habit of mind and a scientific method of inquiry, the essential in the art of medicine. The steps required in the elaboration of a diagnosis have been detailed. It has been seen that patient, elaborate, precise inquiry is necessary in diagnosis, involving the expenditure of considerable time and the use of instruments of precision to attain accuracy. The same spirit must prevail in the application of remedies. The carping critic may well say some diseases are cured by remedies the action of which can not be scientifically examined. True, some therapeutics is accidental, as the discovery of the utility of sodium salicylate in the treatment of rheumatism, but that does not lessen the necessity for all to be scientific.

The enthusiastic therapist may say your reasons

will lead to nihilism. It is not necessary to be nihilistic, and indeed I am far from it. I thoroughly believe in the action of drugs. I am sure that an effect is produced, however small, by the introduction of various substances into the system. It is not that protest is raised against the non-action of drugs, but more truly doubt of the necessity for securing action is put forth, as its possibilities for good or evil can not be estimated. It is not a question whether the drugs act or do not act; it is a question of the necessity to secure such action. Save in the control of certain symptoms, for which, as pain, we have a capable armamentarium, it is not necessary to invoke remedies except those directed to the removal or counteraction of a definite cause. If the cause is not established scientifically the remedy can not be applied scientifically. But the overzealous will urge, if no drugs are administered, we lose the one great power of therapeutics—the effect of mental impression and the good results of mental expectancy. Quite true, but does the necessity of this lie exist any more in medicine than, as Zola points out, in religion?

Can not a method more practical, less harmful, or even with less possibilities of harm, be employed? The desired end is to secure faith and confidence. What can be more productive of both these than the careful, patient, systematic and analytic examination of a patient? What more surely establishes confidence than the feeling of the patient that the physician knows his ailment; that he knows how long to let it go unaided, and when to interfere with its course? Confidence, thus begot, eliminates the necessity of administering many or often any drugs, and when with the patient inquiry there is conjoined an imperturbability of spirit of the physician that he can only attain from self-confidence, secured by knowledge precisely acquired, what an amount of solace and comfort is given! Witness for yourself the therapeutic effect of one half-hour's examination of a patient. Hence it is that I plead for a scientific habit of mind in medicine. Is it not proved again that essential to the art of medicine is the science of medicine?

But do not think if we are limited in the number of drugs that cure, we have not unlimited means to restore health. The achievement of the century is that we recognize disease, not as an affection of one organ alone but as a process in which all are perturbed or involved; that, in consequence thereof, we strive to restore that perversion of the physiology of the entire economy. Hence, principles of treatment are invoked, which includes remedies and means to stimulate or repress or replace secretions or excretions, to similarly influence excess of physiologic action, to allay pain and quiet perturbed nerves. Systems of rest or of exercise, the use of water internally and externally, of heat and cold, of judicious venesection, of dietetic methods, the effect of climate, are our potent therapeutic agents.

The ultimate aim of the art of medicine is to cure the patient. It is assumed as a business, not as a calling, as was beautifully expressed in days of old. It may occur to the fledgling in medicine that he is "called upon" to engage in the professional labor, but it will soon come to him, sometimes rudely, that he is engaged in a business. It is true he has nothing to trade with; he has skill for the service of humanity. But for such service he expects remuneration. He

should have ideals of duty, but they are not different from those that any business man should hold. We may talk, we should talk, we must talk about ethics, but so should every man of business. The sooner, therefore, we remove ourselves from the pedestal we would fain usurp, and put ourselves among men, to be controlled by the ethics of all men, the better for us. Just so soon will we come into the possibility of controlling those of our brothers who do assume this practical attitude. Time was when we vied for supremacy with the judge, the minister and the school-teacher. Now the banker, the engineer, the man of science, the scientific manufacturer and organizer, in every sphere rivals us in standing in the community. That higher ethical principles and a nobler conception of duty, a firmer grasp of truth, a more inspiring stimulus to action, a sure effacement of self and selfishness can accrue from the cultivation of science, need not be maintained. Huxley and hosts of others have eloquently pleaded on these lines, far beyond the feeble powers that are given me to uphold them. We can not hide ourselves behind that self-satisfaction which attributes to ourselves qualities and virtues a little above those of the ordinary man. We must do character building on a platform similar to that applied to ordinary men. Let us arm men with truth, surround them with truth, and give them the means of seeing truth. It has been shown that there is no necessity for the therapeutic lie, that it is unscientific, as well as inconsistent. Truth only can be cultivated. The constant use of speechless, yet speaking, instruments of precision that deal only in truth, begets truth. Truth to ourselves, to our patients, truth to our fellows, truth to our profession, will silently, even unknown to ourselves, grow if scientific habits of thought are cultivated.

Assuming, then, that in the practice of our art we are engaged in establishing a business—a fact, if not acknowledged, is always tacitly assumed—it can be said as a matter of business, that the scientific habit of thought must be cultivated. It is “business” to secure the confidence of your patient, for it is a step toward getting him well. If secured by the honest method of an honest study of his ailment it is divorced entirely from quackery. The “lie,” not existing, is not paid for. It is “business” to establish truth between ourselves and our patients. Brains are necessary, but character is essential. People are far more willing to pay for character than for brains; they are far more willing to pay for honesty than for specious dogma.

The close of the nineteenth century witnesses the application to a high degree of the facts of science to the daily avocations of life. In whatsoever department of human activity we make investigation we find the application of scientific methods employed in the course of the industry. Reference has been made to the rise and progress of industry in the dawn of the nineteenth century. The close is fast approaching a consummation. In the great iron and metal industries, from mining to the conversion of the metal into its final mold, the man of science presides over its destinies. Every mine has its geologist; every furnace and every foundry its chemist; in tanning, in refining, in the making of sugar, of paints, of varnish, of oils, in dyeing, in the manufacture of cotton and woolen goods, scientific experts are employed constantly. There is no trusting to luck. Large hat-factories have chemists to pronounce upon the felt used; in

the manufacture of food-products, the knowledge of the biologist is commanded; brewing, cheese-making, and the manufacture of all dairy products can be scientifically controlled. Hansen grows and furnishes yeasts of various kinds for the many varieties of beers. Kahn has changed butter-making from an art to a science. It is needless to further multiply illustrations. Look around you; in every mill and in every factory is seen this change from an art to a science—art, so-called, is declining, science is extending.

The nineteenth century cormorant, wealth, and its coadjutant competition, have thus pushed science to the fore. The large amounts of money invested in business operations make it necessary to preclude all elements of chance.

Just as some connoisseurs aver, and others deny, that the beer of the day is not quite like the beer of the good old days of hand-brewing, so we are forced to admit that the science of medicine is not what yet may be expected of it. Science has much yet to learn from art. The change is in progress; it is irresistible; it will accrue to the benefit of mankind.

We have thus seen how, on parallel lines, art, *i. e.*, chance methods, is being replaced by science, and by the same analogies that the value of the science of medicine above the art of medicine can be appreciated. Where we have but little knowledge, the more so-called art is essential, the less precision is noticeable in our work; hence the greater the opportunities for the display of quackery; the less of the knowable, the more of charlatanism.

The history of all science and the history of medicine point to the absolute necessity for its development and growth, and its practical application to the welfare of man, that he who prosecutes it must possess a scientific habit of analysis and comparison, to put aside that which is false, recognize that which is true, or withhold judgment, as did Newton, who, when asked why he walked, replied with courage of power, “he did not know.” With the conviction that essential to the art of medicine are those qualities of heart and head that belong to him who possesses a scientific habit of mind and cultivate science in the true spirit, come new responsibilities, new hopes, new fears, new rewards, new inspirations.

Our first responsibility will be to our successors. Those of us who are teachers must change our methods. Formerly, the apprentice acquired from the master an art that required the limited training of only one or two senses. After acquiring the secrets of the art as his master divulged it, lectures were attended to hear the problems (theoretic) discussed. Now, senses must be trained—a mind developed that possesses only a scientific habit; years are required. The early labors of the college must be supplemented by labor in the medical school. Two years should be devoted to the study of anatomy, including histology and embryology, to physiology, including as much biology as possible, to medical chemistry and to pathology. We owe it to our profession and to our students. We have added a year to our medical curriculum and robbed the college course of its valued year. We must replace it by honest training. The laboratory and the hospital-ward are to be the student's theater of action. Didactic lectures are to be the exception rather than the rule. In this manner, and in this manner only, can the student be fitted for his life-duties. Our further duty is toward the noble charities placed under our guidance. We cry against hospital abuse and dis-

pensary injustice. Need we not look to ourselves? Do we conduct our labors in such institutions in accordance with modern scientific methods whereby we contribute to knowledge and human health? Pardon a passing thought. All such institutions should be under the guidance of a State board, similar to the State Board in Pennsylvania controlling lunatic asylums. Undoubtedly abuse creeps in on the side of the management as well as the physicians. Then, if dispensaries are conducted on scientific methods there would be room for every man who deserved a position in a dispensary—certainly in the dispensaries of Philadelphia. Time will not permit further extension of this thought. The fact is, our methods must be reformed in our dispensary as well as in our hospital work. It is unjust alike to science and to the public to see as many as twenty-five patients per hour in dispensary practice.

Our fear is the possibility that we may become practical in the sense that the politician has grown practical. In this stage of our evolution such fears can be awakened. The ophthalmologist is our most scientific man; we know the dangers that surround him, but we see him emerge unscathed from the ordeal. Moreover, the environment of the physician is such as to preclude the possibility of the development of any but the higher and nobler traits of character.

The truths of medical science and their practical application are cosmopolitan. Law is limited by political barrier; religion by race and by mental development. The promulgation of truths in medicine, or the establishment of a method of its art, affects for good the entire universe, and not only men but all animal creation. The labors of Mitchell on snake poisoning, in Philadelphia, touch the welfare of the entire population of India. The result of Lister's researches are as valuable in China as in England. The words of Koch are as powerful in Japan as in Berlin. What greater reward is it than to be an humble fellow worker in a field so broad, and what higher inspiration than the stimulus attending such labors.

Our hope is that with such necessity for scientific labor will come the greater development of truth and character. Cant and hypocrisy, quackery and deceit, can not thrive in such an atmosphere, and as the years of toil are added one to the other, character grows broad, firm, clear. Constant association with instruments of precision that can not lie, incites truth. With the attainment of scientific habits, what more glorious rewards can come than that which accrues from the noble purpose, the lofty aim, the chivalrous spirit of the man of science.

Let us then, be not impatient. The adamant position secured by the labors of Lister and Koch and Pasteur; the advanced state of preventive medicine at this day; the scientific method of the treatment of disease, as seen in that of diphtheria; the vistas that are opening with the advent of organ-therapy shows the rise of a new science of medicine. Unfortunate only are we, that to witness the dawn only, is our privilege. Of what the high noontide of medicine will show we can but hear the whisperings.

*Sal Ammoniac in Tropical Dysentery* has been found effective by Attygalle (Ceylon), administered every four hours, combined in some cases with small amounts of opium and cannabis Indica. The blood disappeared from the discharges and the colics ceased by the third or fourth day in nearly every case.—*Semaine Méd.*, May 11.

## ORIGINAL ARTICLES.

### SOME DISORDERS OF DIGESTION OF FREQUENT OCCURRENCE.

Read before the Medical Society of Erie County.

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Probably there is no complaint more frequently encountered in practice than disordered digestion. It is seen at all seasons, at all ages, and in all ranks of life. This paper will attempt to describe in outline the class of cases we see almost daily, and which are frequently spoken of as "functional disorders of digestion." By this is meant an abnormal condition of function unaccompanied by any pronounced anatomic change in structure, so far as we know. This limits the scope of the paper, as it excludes all those forms of disordered digestion resulting from organic disease of the alimentary tract, or any other part of the body, also the very acute forms, often called cholera morbus, and the indigestion of very young children. The rarer forms manifested by various reflex symptoms will not be considered.

The simplest method of describing the class of cases treated in this paper is to relate the average history and symptoms given by a patient applying for relief: The patient usually begins with the statement, "my stomach must be out of order," or "I am sick at my stomach all the time," or "everything I eat seems to sour on my stomach." Sometimes there is a complaint of epigastric pain. This is about all the patient volunteers as to the nature, or description of the disorder, but questioning at once elicits other significant symptoms. There is apt to be an eructation of gas with or without a bitter sour taste after the ingestion of food, accompanied by epigastric distress relieved by the belching of gas. The above phenomena are often attended with precordial pain and oppression extending across the left chest and a variable distance down the left arm, shortness of breath, worse on exertion; in other words, the group of symptoms described as palpitation of the heart. Sometimes there is a slight feeling of uneasiness in the head, but never amounting to headache, also a feeling of languor, though not pronounced. The tongue is inclined to be coated presenting rather a brownish appearance, with the accompanying disagreeable taste. Vomiting is rare in the cases under consideration, though nausea is met with in a few cases. Usually the bowels are undisturbed; diarrhea does not occur in this form of digestive disturbance.

There is another class of cases more common than the one just mentioned, and the variety, in my experience, is the more frequent. These patients always begin their complaint with, "I am all used up," or "I am good for nothing and don't know what the matter can be," or again "I must be bilious," or "My liver must be out of order," and most frequently is the assertion made "I must have malaria from the way I feel." Complaint is made of the desire to sleep most of the time and inability to attend to customary duties without great mental effort. Further questioning brings out the statement that the languid feeling is always present and that sleep brings no sense of refreshment, the patient often feeling worse after sleeping. There is very apt to be a change in the disposition, the individual becoming irritable and trivial affairs cause much worry. There is often an