

In conclusion it now becomes my duty to welcome in the name of the American members of this congress our associates who have journeyed, many of them so far, to join us in these meetings. Very few of you are strangers to us, at least in name, and we anticipate with pleasure the formation of that personal acquaintance which adds so much to the value of such gatherings as this. All our interests are the same; in our pursuits there are no limits as to monarchies or republics; thrice welcome to the United States.

## MEDICAL PROGRESS\*

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I invite you to take with me a reflective glance over the general intellectual movement which has led up to our latter-day modern medicine.

We hear much of the progress and of the science of medicine. It is impressed on us in our daily work, in meetings with fellow practitioners, in medical journals and in conversation with patrons and friends. The wonders of modern medicine are exploited by the magazines and in the daily press. It is a matter of common knowledge that medicine has entered on a new era, more scientific and exact, and more efficient in the relief of suffering and in the prevention and cure of disease.

If we review the general field of medicine or any of the departments into which it is divided, we are impressed with the fact that our knowledge of the human body with all its complexities of structure, function and variations in disease has been enormously increased. By the assistance of the allied sciences, which Dr. Welch has so graciously acknowledged, especially physics, chemistry and biology, aided by improved methods of investigation and instruments of precision, new facts have been discovered and many of Nature's important and well-guarded secrets have been laid bare. The new principles evolved have been put to the test and their application in practice has been followed by the most brilliant successes in the annals of medicine.

In the great scientific developments of the latter half of the nineteenth century, medicine shared generously. It has advanced with rapid strides toward a truly scientific basis and in its progress it is discarding more and more of the empirical methods which formerly characterized it. Medicine has undergone a veritable revolution within the span of a generation and to-day is taking high rank as a science and speaking with a new authority supported by demonstrable facts.

### THE RENAISSANCE OF SCIENCE

Knowledge of the natural world had been slowly and laboriously broadened and increased during the sixteenth and seventeenth centuries, and after a period of speculation there was a general reawakening of interest in the sciences toward the end of the eighteenth century. Chemistry, physics, natural history, mathematics, all felt the influence of the revival. The spirit of investigation extended rapidly in all sciences, and from Paris, the most active center of scientific study, it spread and became intensified as the nineteenth century advanced. Facts such as had caused Bacon to ask *cui bono?* were developed, and although they appeared to have little or no practical application, yet they clashed with the existing systems of thought and disturbed them as had

the scientific discoveries of earlier centuries. Their announcement was received with indifference if not with active opposition. The discoveries were, however, important and convincing and could not be ignored. They excited more and more interest; efforts were made to put them to practical use, and their champions were more insistently and successfully demanding a fair hearing withheld by prejudice. New methods were being introduced, knowledge increased and the realism created by a more active nature study caused a gradual shifting in the trend of thought from the metaphysical to a more practical vein. The reciprocal relations between the sciences were more definitely appreciated and the conception of the unity of all knowledge was impressing itself more prominently on the intellectual world. Man's mind was being rapidly opened for the reception of new truths and the belief was becoming more general that alongside the world with which he had been familiar, Nature held secrets of value to man which it was incumbent on him to investigate untrammelled by preconceived opinions. The tendency to independent thought was increasing and the spirit of science was becoming more and more restive and resentful of the hide-bound restrictions exercised by philosophies and theologic dogmas which had long held scientific investigations in check. Pasteur in saying that "science should not concern itself in any way with the philosophic consequences of its discoveries" well expressed the spirit of advance and foreshadowed the coming break with the old philosophies which was to mark the final independence of all science.

The substitution of the doctrine of evolution, in geology by Lyell for that of cataclysms, and in the organic world by Darwin for that of special creations, shed an effulgent light on the processes of Nature. It gave man a more comprehensive view of the universe, of the planet we inhabit, of natural law and particularly of the orderly, harmonious progression pervading the inorganic and organic worlds. It broadened and strengthened him and enlarged his intellectual outlook. The doctrine of evolution came as the culmination of the developments in science during the first half of the nineteenth century and was destined finally to shake to their foundations man's most cherished beliefs in the old order. After a period of loud, contemptuous and angry protest the older systems of thought capitulated and henceforth the pathway of science became easier, and the barriers to the unprejudiced reception and examination of new discoveries were to a large extent broken down. The science of biology thereby received a new impetus and the further development of medicine was especially favored. Huxley in speaking of science in general nominates evolution as one of the three great doctrines to which the greater scientific achievements of the nineteenth century may be ascribed.

It is said that all natural sciences pass through three stages in their development; first, the descriptive, during which facts are observed, collected and classified; second, the analytic, during which the problems are being examined, resolved and reduced to principles; and, third, the synthetic, the constructive period when, methods of production being known, phenomena may be reproduced and interpreted from different points of view.

### THE DESCRIPTIVE METHOD OF PRIMITIVE MEDICINE

From the earliest times in Greece physicians were held in high esteem and Homer said that "a physician outweighs many other men." Throughout history physicians have been leaders in the thought and science of

\* President's Address before the Colorado State Medical Society at the Annual Meeting, held at Pueblo, Sept. 24-26, 1912.

their time and have laid up stores of precious knowledge for which the world must ever remain a debtor; yet when we apply our formula we must appreciate that speculation and theory based on observation alone did little toward the advancement of medicine as a science but rather encouraged it during its developmental stage. For centuries superstition, tradition and dogma reigned and exercised an absolute sway over the minds of men. All efforts for innovation were subjects of amusement, ridicule and contempt, and were often harshly suppressed. All Nature — and especially the human being — was mysterious and held in awe as too sacred for inquiry except on theoretic lines, and these must not overstep certain bounds. Authority and tradition formed the supreme court from which there is no appeal. Even during the sixteenth and early part of the seventeenth century, after a scientific spirit had broken forth in connection with the physical sciences, the cry of physicians, "back to Hippocrates," was insistent.

It is toward the end of the eighteenth century that dissatisfaction with the view that the symptoms were the disease became more manifest. It is then, in the independent efforts of Anenbrugger, Bichat, Corvisart, Laennec, the Paris school of pathologic anatomy and diagnosis, and later of Louis to find the explanation of disease in the anatomic lesion rather than in its clinical manifestations and by new methods of examination correlate the two, that we note the awakening of a true scientific spirit in medicine. Having its inception coincident with the rapid development in sister sciences favored by the general movement already mentioned, this spirit in medicine has since persisted against all opposition and grown steadily to its present proportions. This careful study of morbid anatomy following more critical physical examinations, by percussion and auscultation, so richly rewarded these men in France that it was enthusiastically continued by their followers and later adopted in Germany. Biology and pathology were established as sciences and physical examination as an efficient aid to diagnosis was recognized as a method of value to be systematically adopted.

#### DEVELOPMENT OF MEDICINE BY ANALYSIS

The introduction of this analytic method of inquiry marks for us the passage from the first to the second stage of the development of medicine.

From this time important additions were made laying broad and sure foundations for the further development of medicine later in the nineteenth century. Physiology was first to feel the impress of the new scientific spirit and much progress was made by the work of Magendie, Bell, Müller, the Webers, Claude Bernard and others. Studies in comparative anatomy and physiology were more actively pursued. Facts were being accumulated in gross pathology, but its material advancement awaited the development of the compound microscope in the fourth decade, by means of which Schleiden and Schwann were able to determine that the cell was the unit of plant and animal structure and to announce the "cell theory." This discovery revolutionized morphology and permitted rapid developments in histology and embryology. About twenty years later Virchow formulated on it his doctrine of "cellular pathology" which was destined to form the basis of all future work in pathology. In the meantime Liebig at Giessen was developing the new science of that organic chemistry which was the forerunner of physiologic and the biologic chemistry of to-day. Medicine, though long called the "mother of all sciences," apparently still failed to appreciate its dependence on

other sciences. Even the growing close connection with physiology was cause for comment, and in 1859 Claude Bernard felt called on to defend physiology against the sneer that it was a "*science de luxe*" and of no practical use to medicine.

Aristotle observed that "wonderment arises from the ignorance of the causes of things." It is doubtless because of this attitude of the human mind that disease throughout all history had been enshrouded in mystery since observation, theory and the wreckage of the dead-house had yielded no explanation of its causation, but only its dire results. Many theories had been propounded, but as they rested on no demonstrable basis they were supplanted one by one and medicine was unable to make any material advancement so long as physicians had no satisfactory explanation of the causative factors of symptoms and lesions. Kircher and Leeuwenhoek had discovered microorganisms and the latter had classified and described them. Shortly after and toward the end of the seventeenth century Robert Boyle had said: "He that thoroughly understands the nature of ferments and fermentation shall probably be much better able than he that ignores them to give a fair account of divers phenomena of several diseases (as well fevers as others), which will perhaps be never properly understood without an insight into the doctrine of fermentations." Marcus Plenciz, about 1762, had contended that infectious diseases were due to microorganisms, which alone had the power of conveying infection, and that there were specific organisms for each disease. Our own Holmes and later Semmelweis asserted that puerperal fever was due to putrid material introduced from without. Schönlein, in 1839, discovered the parasite of favus, and in 1849 Pollender noticed the anthrax bacillus in the blood of dead animals, but it was not until 1863 that Davaine showed its causative relation by inoculation of animals. Otherwise the experimental method had not been applied in etiology, corroborative proofs were lacking, no practical inferences were drawn from these assertions and the origin and nature of disease remained in profound obscurity.

Louis Pasteur, thoroughly impressed with the suggestive value of Boyle's statement, and with the ambition to explain the causes of putrid and contagious diseases, entered on his experiments in fermentation; and in 1863, by his brilliant and conclusive results, established an epoch-making principle and furnished the first reliable data on which the germ theory of disease is based. Later applying it he demonstrated that certain diseases of animals and of man were caused by bacteria. The veil of mystery surrounding the etiology of infectious diseases was thus finally removed and the clear scientific light shed on the nature of these diseases opened the way for the various developments which are responsible for our present views of disease and on which our modern medicine rests.

Louis Pasteur pointed out the road, Robert Koch devised the method of solving etiologic problems and medicine passed from the second to the third stage of development.

#### THE SYNTHETIC STAGE OF DEVELOPMENT

From the earliest time of which we have historic record physicians had relied almost exclusively on bedside studies for their knowledge of disease, and all progress in medicine had resulted from deductions made from clinical observations, supplemented especially during the nineteenth century by more detailed pathologic investigations and a few chemical analyses.

Experimental methods had been responsible for all our knowledge of physiology and they had been the fruitful source of progress in all other sciences. The highly complex character of living creatures in structure and in function had, however, rendered experiment in medicine difficult and retarded its application, and though it had been used to some extent in pathology, only isolated facts had been ascertained and its results were limited. With the methods of Koch, guided by his "postulates," aided by the stains introduced by Weigert and improvements in the microscope, experiments on animals were now freely resorted to for the solution of etiologic problems and became exceedingly fruitful in results. The discovery of the causative factor of one infectious disease after another was announced and the attention of the medical world was arrested by the exact findings of the laboratories and the success following their application in practice. The superiority of the experimental over the clinical method for the study of disease became at once apparent, laboratories for medical research sprang up in all scientific centers, and an increasing number of medical men devoted their exclusive energies to the study of the pure science of medicine. The economic value of this work being recognized, medical research was subsidized by governments, universities and private foundations. Such laboratories became better organized, their work was more carefully correlated, reported and checked, and from them has emanated the new information on which all subsequent progress has been based. Osler remarks that the experimental method did more to emancipate medicine from routine and the thralldom of tradition than all the work from Hippocrates to Jenner.

Favored by the discovery of anesthetics, surgery first felt the influence of Pasteur's teachings. From the successes of Lister, who first adopted and applied them, has developed the perfected technic which has permitted the great expansion of this branch of the healing art. By its application the innermost recesses of the human body are to-day entered with comparative safety, the actual disease examined, and in many cases a far more efficient remedy applied than ever before available. Diseases heretofore not accessible during life are studied *in situ* in their early stages, and medicine avails herself of the surgeon's findings to perfect her knowledge in pathology, diagnosis and treatment. Surgical interference with certain tissues, ovaries, thyroids, parathyroids, etc., has contributed greatly to our present knowledge of the so-called internal secretions.

Advances in medicine came from determining the causative factors of many diseases, the reactions between the invading organism and its host, and the further knowledge of the cell and its activities. The first and great profits of these developments accrued to preventive medicine and in lesser degree to medicine in general. Methods of prevention at once became more specific and exact and preventive medicine has already grown to enormous proportions and achieved most brilliant results. For a long time it appeared that the inability to reach the invader without damage to the host would be an insuperable obstacle to a more direct and efficient treatment. Following the discovery of the specific germs causing disease came the knowledge of attenuated virus effective in the prevention of rabies; the bactericidal properties of blood-serum; the toxins, the products of bacterial life; the phagocytic function of the leukocyte and chemotaxis; the products of the reaction of the cells of the host in defense, the antitoxins, the bacteriolysins and later the opsonins. The facts on which our present

theories of immunity are based have been developed as the result of the labors of many observers during years of diligent research, especially of Ehrlich, who by his work and his "side-chain theory" threw such an illuminating light on the underlying principles of these complicated processes. Although it is believed that the immune bodies are derived from some form of internal secretion, their precise origin is not yet determined. Nevertheless in their activities we have the realization of that vague expression of former days, *vis medicatrix Naturæ*, which is being subjected to analysis, estimate and record in biochemical terms. These potentialities are recognized as residing in and being a physiologic property of the cell which, when stimulated, gives forth a multiplicity of substances differing in each instance according to the stimulant, and specifically adapted to combat the individual intruder or its toxin and designed to exercise an efficient control over the disease, limited only by the responsive powers of the patient. Out of these studies have come our biologic therapy, the supplying to the individual attacked of additional quantities of these physiologic products, antitoxins, lysins and opsonins, to aid in neutralizing the bacteria or their toxins, supplementing the inherent resistance and power to overcome disease. The revelations of bacteriology, the simplicity and precision of its diagnostic tests, the preventive methods against infections and the utilization of the products of humoral and cell metabolism for protection against and cure of disease form the most romantic and brilliant pages in the history of medicine.

In addition to bacteria certain other forms of microorganisms classed as protozoa are known as etiologic factors of disease and though not numerous as we now know them they are important, notably the plasmodium of malaria, the ameba of tropic dysentery, the spirochete of several diseases. These organisms do not appear to stimulate any such responsive cell activity in defense as do bacteria, and they are combated only by the direct action of chemical substances circulating in the blood, of which quinin has long been a well-known example. Efforts to find remedies of this class have led to the most brilliant success in modern therapeutics, the discovery of salvarsan by Ehrlich. The principle of these chemotherapeutics, the selective affinity of the drug for the invader without damage to the cells of the host, is most suggestive of future possibilities. Already Wassermann announces that eosin and selenium have an elective destructive action on the cells of mouse cancer.

The causative factors of many common diseases are not yet identified and it is an open question whether these microorganisms are vegetable or animal. There is good evidence that some of these, as that of poliomyelitis, are ultramicroscopic. Although in many instances the germs themselves have not been isolated and studied individually, enough is known of their habitat, life history and method of transmission to man, often by temporary hosts, to give effective weapons of protection, as in the case of yellow fever, and suggestions for treatment.

Physiology, by reason of its recent advances, has thrown much new light on disease. The more definite application of physiologic chemistry by Hoppe-Seyler in his investigations of secretions and excretions gave a clearer conception than was obtained before of the processes of digestion and tissue metabolism. This led to the more recent and elaborate studies in cell changes and intracellular ferments, or enzymes. These studies have tended to show that metabolism and function are to be explained along physicochemical lines, and it has

even been said that "the mystery of life lay hidden in the chemistry of the enzymes." The subject of internal secretions has been elaborated by many observations, and Starling has recently announced to us the existence of hormones as their active principle, a hormone for each tissue concerned, which circulating in the blood excites functional activity in other organs and tissues "coordinating the activity of various parts of the complex organism" by which a physiologic equilibrium is maintained, a function hitherto ascribed to the nervous system. Hypersecretion and hyposecretion of these hormones now explain to us conditions heretofore little understood, and such disorders may often be successfully corrected by adding to the supply by opotherapy or diminishing it by surgery. The discovery of the neurons, their axons and dendrites, and their reciprocal relations; of cortical localization of many of the functions of the brain; and increasing knowledge of the terminal nerve filaments and the various electrical reactions of nerves have enlarged our understanding of the nervous system and extended the field of neurology in diagnosis and treatment. The myogenic theory of heart contraction has been productive of a clearer understanding of the heart cycle, the irregularities of function and of heart therapeutics. Experimental interference with the heart-valves imitating disease conditions, and studies in arterial and venous blood-pressure, checked and made more exact by the aid of instruments of precision controlled by electricity and made a matter of graphic record, have led to a more accurate appreciation of cardiovascular dynamics.

Anatomy and symptomatology, heritages coming to us from the origin of medicine, are receiving additions even at this late day, and various complicated syndromes are being unraveled by a better knowledge of disease in the earlier stages of its progress.

New instruments enable us to peer into many of the cavities of the body. The Roentgen ray has permitted us to look within the body and with a great degree of certainty to determine the location, size, form and consistency of internal organs and tissues, and to detect foreign bodies and many diseases. Chemistry and biology, embracing bacteriology, have given us accurate methods of diagnosis. In consequence of numerous new methods the diagnosis of many of the infectious diseases and an ever-increasing number of others is no longer a matter of opinion on which physicians may honestly differ, but rather of laboratory demonstration by microscope, cultures, inoculation, hemolytic tests, etc., giving definite information by which the future conduct of the patient and the treatment may be clearly and effectively outlined.

While the experimental method has determined all progress, the studies themselves have been biologic. All histologic and pathologic studies have been focused in the cell, the unit of vital structure and activity. Its morphology held attention for a long time, but as the limits of the microscope were reached and it failed to reveal the further secrets of the cell, recourse was had to chemistry. Flexner tells us that intracellular chemistry is bearing the richest fruits in the pathology of intracellular ferments and our newer conceptions of immunity and physiology, and that toxicology is the cornerstone of modern pathology. Disease is therefore coming more and more to be understood as the result of a poisoning, present or past, because of the entrance of foreign substances or the presence of the products of perverted cell activity and auto-intoxication. We now look beyond the organ immediately affected and inquire

into the identity of the causative organism and consider the disease more from the point of view of an infection than of a disease of the organ in the derangement of which the attack is most manifest. We estimate the physiologic disturbance caused thereby and the capacity for service of the cells of the organ affected. Pneumonia is to-day a general infection, a septicemia with lung localization; typhoid is no longer an enteric fever but rather an infection, the typhoid bacillus circulating in the blood and the most manifest lesion being in the intestine.

According to the views of the day it is the reciprocal reactions between the invading organisms or their products and the fluids and cells of the host that we find the final explanation of symptoms, processes of disease and disturbances of functional activity. These biochemical reactions result in the elaboration and output of a long list of substances previously referred to, the terminology of which so puzzles the casual reader—the lysins, agglutinins, precipitins, aggressins, etc.—the biochemical expressions of the *vis medicatrix Nature*—which circulate in the blood and give the biologic tests in diagnosis, the vaccines for protection and the physiologic remedies for the cure of disease. Attacks of these diseases often immunize the individual and leave behind in the blood or cell their traces, which may sometimes be recognized long after. Incidental to immunization the antibodies often sensitize the system and produce the condition of anaphylaxis, from which comes the so-called serum disease and occasionally serious toxic accidents. The solution of the problems of immunity—those of personal idiosyncrasy and possibly of recovery by lysis—is supposed to be closely allied to the quality of these reactions. The phenomena were first described by Jenner in 1798 and they were noted by Magendie in 1839, but it is only recently that they have been brought clearly to our attention by Richet. The full meaning and scope of these phenomena are not yet understood, and anaphylaxis offers a large field for future study.

As we trace the results of these toxic influences of infections and perverted cell metabolism further and further they lead us from acute to chronic infections, often mild and lingering, to tissue changes and degenerations of chronic disease. It is now known that nephritis and other chronic diseases may be inaugurated experimentally by toxic influences. It still remains to be determined how far and in what manner toxic influences are responsible for the more obscure forms of degenerations, and whether or not they inaugurate tumor and cancer formations. As these studies have progressed and the problems of acute disease have become clearer attention is turning more insistently to those of chronic and occupational diseases.

The functional capacity of organs is becoming a more and more urgent problem in our clinical consideration of disease, and tests, as those for kidney function, are being sought in the hope that they will permit the determining of functional efficiency of organs with greater accuracy, and give better standards for prognosis.

In these quests biochemistry looks beyond the cell to its constituents, its colloids, their proteins and lipoids, the molecular affinities of protoplasm. It is a realm of marvelous complexity, yet here it is that the problems of that scientific medicine which we claim to be establishing are being solved. Here it is that the newer pharmacology is being developed. In the laws of the generation, growth and evolution of the cell lie the solution of present and future problems of physiology and pathology. As prob-

lems are solved others of still higher degrees of complexity present themselves and the ultimate solution recedes and as ever eludes our grasp. Our queries lead to the very origin and nature of life itself, to the verge of that gulf between the organic and the inorganic which has ever appeared impassable. Studies in abiogenesis, in the artificial development and growth of cells, work beginning with Traube at Breslau and recently extended by Quincke, Benedickt, Lehmann, Loeb and Leduc, is said to be narrowing the lines of demarcation to such a degree that the existence of this gulf is denied and a crossing only a footstep away is claimed by the enthusiast. Such cells, however, have shown no function, and so long as this essential feature of life is lacking, skepticism of any material advance must continue. The studies of Carrel and others in the growth of tissues separated from the organism, the persistence of function during this latent life, the capacity of such tissue to resume active life and function when transplanted and the successful application in man as in animals, open large fields for investigation and may lead to the solution of problems that will make for a still more marvelous development in future medicine and surgery.

#### MEDICAL SCIENCE TO-DAY

Thus along these broadly sketched lines the science of medicine has advanced during its third or synthetic stage of development, because of the more intimate knowledge of the processes of organic life gained by experimental research. Medicine overcoming every obstacle in her pathway—superstition, dogma, philosophy and many of the complexities of organic life—and protesting against the sentimentalities that would check vivisection, on which all advance in the biologic sciences depends, has reached her present high estate. Our horizon has been broadened, our views and our practice have been radically changed. Magendie was wont to say that “to express an opinion, to believe, was nothing else than to be ignorant.” A better appreciation of the vastness of knowledge, the difficulty of arriving at absolute truth, the impossibility of any one attaining more than a partial view, breed a more modest attitude and a willingness to hold opinions *sub judice* until full proof is obtained and all doubt is removed. Pride of opinion is yielding to an interested attention to the views of others. Professional men throughout the world are being brought together in closer relations, in more sympathetic emulation to avoid error and arrive at ultimate truth. Absolute proofs for the correct interpretation of clinical phenomena are being sought in the laboratory. Method and precision are now coming to characterize medicine in daily practice and in theory.

Medicine has been called an art. We are pleased to acclaim it as a science. Sir Dyce Duckworth well says that “it is an art based on many sciences.” In research it is a pure science; at the bedside for the relief of suffering and the cure of disease it must ever remain an art. The more of the science we possess the more of the art do we require to apply it skilfully. Shattuck tells us that in practice one finds a gap between our science and the concrete case varying in width; here and there it may be jumped, but usually it is bridged by the art of medicine.

Medicine has reached the high-water mark in its history. Welch has said: “Great as has been the material, intellectual and social progress of the world during the past century, there is no advance which compares in its influence on the happiness of mankind with the increased power to lessen physical suffering from disease and acci-

dent and to control pestilential disease.” What is done at the bedside is individual and cannot be properly accredited outside the sick-room. Preventive medicine has amply demonstrated to the world, however, that it is founded on scientific truth, and by its precision, efficiency and success in eradicating disease has freed immense areas of the most fertile land on the globe from pestilence and restored it to the safe habitation of man.

Every age preens itself on its accomplishments. Posterity alone can properly apportion the credit due to each, and “without history a man’s soul is purblind, seeing only the things which almost touch his eyes.” History shows many backward steps in the march of civilization, many intellectual landmarks temporarily obscured. Medicine is said to have advanced in circles. In the theories of our forefathers in medicine we find suggestions of those of to-day, and wonder often arises that without the aid of the data now available they should have come so near the truth as we know it. This generation has been reveling in a field of unknown extent and value. The fruitage has been abundant and of an apparent richness beyond compare. A correct appraisal of the value of our acquisitions and the true bearings of the work of this generation must, however, await the time when isolated facts have been harmonized and generalizations have been made and historically compared. We should ever bear in mind the thought so beautifully expressed by Sir Michael Foster, that “what we know and what we think is not a new fountain gushing forth from the barren rock of the unknown at the stroke of the rod of our own intellect; it is the stream which flows by us and through us, fed by far-off rivulets of long ago.” The additions made should be considered as the talent earned by us and added to those talents which are the heritage from the past.

There is an old Latin saying that “men resemble the gods in nothing so much as in giving health to their fellow man.” Whatever our religion may be, whatever our philosophy of life may teach us, if we may accept as a practical working hypothesis that “the highest aims of human endeavor are best and most effectually realized in the good we can do to others,” then the exponents of modern medicine in thus doing more than ever for the human race are fulfilling in larger and larger measure their high function in the human economy.

McPhee Building.

#### INTESTINAL ANTISEPSIS\*

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Any rational conception of the possible control of bacterial activities in the intestinal tract took its rise after the thorough establishment of bacteriology on a sound working basis by Robert Koch through his investigations on anthrax, tuberculosis and cholera.

It was well known through the early publications of Woodward, Nothnagel, Uffelmann, Escherich and others<sup>1</sup>

\* Read in the Symposium on Antiseptics and Germicides in the Sections on Pharmacology and Therapeutics and Preventive Medicine and Public Health of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

\* This research was conducted under a grant made by the Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association.

\* Because of lack of space this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author’s reprints.

1. Cited by Strasberger, *Ztschr. f. klin. Med.*, 1902, xlv1, 413.