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THE IMPORTANCE OF CLINICAL PATHOLOGY TO MODERN MEDICINE[1]

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BEFORE an audience composed of members and friends of the American Society of Clinical Pathologists, it would indeed be like carrying "owls to Athens" to pay a tribute to the subject of clinical pathology. In this day and time one may take for granted that all realize and appreciate somewhat the value of clinical pathology to the science of medicine. The subject which will be taught in these magnificent laboratories erected by the Louisiana State University is not only important to medicine but is at least of sufficient importance to mankind to have justified the expenditure of the large sum it represents to provide suitable rooms for the courses of study that will be given here.

[1] Read at the dedication of the new clinical pathological laboratory of the Medical Center of the Louisiana State University and Charity Hospital, New Orleans, Louisiana, May 9, 1932.

At the outset one must make clear what is meant by clinical pathology, for even now divergent ideas are held as to the limits of the field.

From time to time some difference of opinion arises among laboratory men as to the definition of "clinical pathologist" as distinct from "pathologist," or shall we say, "common pathologist." No one has furnished us with a satisfactory distinction between these specialists, which leads one to suspect that they belong to the same brood, and for my part I am quite willing to include in this brood any one with a medical degree, whose subsequent training and practice make him proficient in any medical laboratory specialty. Every one who studies or investigates materials derived from patients deals with clinical material, and if he be qualified in any of the several fields of pathology he is a clinical pathologist. Therefore, what I have to

say relative to the importance of clinical pathology to modern science includes the activities carried on in the whole medical laboratory, which can not with logic be subdivided, although it does not follow that any single individual can be proficient in all the departments of clinical pathology.

Laboratory medicine has not always been in the favorable position where one finds it to-day, and in America this position has but recently been reached. Altogether, its whole history in this country may be dated within a century. In fact, one can hardly claim a century of life for the subject of pathology in the United States. The first text written for American students was that of William Edmonds Horner, an adjunct professor of anatomy at the University of Pennsylvania, published in 1829 under the title "Treatise on Pathological Anatomy." Prior to this time pathology was purely a speculative subject in this country, and but little of the science had filtered in from Germany and France. The more progressive physicians of the day naturally turned to the anatomists for help, for it was they who had especial knowledge of histology and what little was known of morbid changes. Horner was a man of keen insight. As a young man he clearly foresaw that pathology was destined to become the basis of scientific medicine, and he set about to acquaint himself with the knowledge of the time. He journeyed to Europe and studied in the French hospitals, where he was greatly impressed with the schools of Bichat and Broussais. He brought back their ideas to America and lived long enough to see some of the fables of medicine and surgery give way to the truths of his science. It was ten years before another book appeared on the subject, and that one, "Elements of Pathological Anatomy," by Samuel Gross, remained for many years the standard text. Still, several decades passed before journals devoted to laboratory subjects in medicine made their appearance in America.

But this early development of laboratory medicine did little directly to advance diagnosis in medicine, although it greatly clarified disease entities. For the most part, material was obtained at the necropsy table. The little advance that had been made up to 1891 may be learned by recalling that when the late Dr. Warthin began his career, slightly more than forty years ago, he was dependent on Vienna for most of his material for the teaching of students, and as late as 1895 he performed only twelve post-mortem examinations in that year at Ann Arbor, Michigan.

A fresh stimulus was given to laboratory medicine in 1896, when the first text in clinical pathology was published in this country, by Dr. Charles E. Simon, under the title, "A Manual of Clinical Diagnosis by Means of Microscopical and Chemical Methods for Students, Hospital Physicians and Practitioners." This book definitely outlined laboratory methods which could be used before the patient died and chanced to fall into the hands of the then pathologist of that day. The importance of this book can be readily realized when one remembers that at that time there were practically no journals, except those published in foreign countries, devoted to laboratory procedures.

From this meager origin, clinical pathology has grown until to-day texts dealing with the subject have been published at the rate of one a month for several years. The number of journals has increased until now there are in excess of 200 devoting practically their entire space to laboratory medical subjects, and hundreds of others frequently publish papers dealing with clinical pathology.

These facts alone should leave no one in doubt as to the importance of the subject and the interest taken in it, but, as more concrete evidence of its place in the sun, let us recall the fact that last year the American Medical Association, in a survey of laboratories, found 1,080, and while it is true that but 161 could be approved, the fact that so many laboratories even exist in a way indicates their necessity.

In spite of all this development of clinical pathology, and the obvious advances made in the knowledge of medicine through its avenues, there are still those who would assign to pathology a place among the classics, saying that it is a cultural pastime for the "highbrows and long-haired professors," but one not to be ranked with the general fields of medicine or surgery or with any of the specialties growing out of these so-called more practical and humanitarian subjects. This peculiar view-point exhibits itself in many ways, but curiously enough in the requirements for advanced degrees in medical subjects. In some universities, to obtain an advanced degree specified in medicine or surgery or their specialties, one must spend at least three years in attendance, while for a degree in pathology or one of its specialties but one term of nine months is sufficient. Imagine, if you can, certifying to the proficiency of a student after nine months of study in pathology, by granting him an advanced degree! In that length of time he could hardly learn just how little he knew of the subject!

The question may reasonably be asked, then, how long will it take one to gain a satisfactory knowledge of pathology? The answer to this question may shed some light on the relation of the subject to medicine in general. Unfortunately, by the very nature of the matter, no specific answer can be made, since so much depends on the mentality of the student, on his previ-

ous training, on the institution in which he received his instruction, and on the material available to him. However, the American Society of Clinical Pathologists has rightfully designated an arbitrary minimal time as being three years, and this has been accepted by the American Medical Association. How small this minimum is may be realized by considering that the dictionary still defines a pathologist as "one skilled in the science treating of diseases, their nature, causes, progress, results, et cetera." And if this be an approximately correct definition of the field of a pathologist, not only does the length of time necessary for his training become obviously long, but his importance, and therefore the importance of his field as related to all other fields of medicine, also becomes a foregone conclusion.

But a laboratory man should be willing to submit his premise to the test-tube, just as he demands of the material he collects from the patient. Therefore, rather than deal in generalities, I wish specifically to analyze a few of the many pieces of evidence that could be used to substantiate the claim that clinical pathology and laboratory methods are not only useful but important and even necessary in modern medicine.

At once I grant that during the last decade, in many places and under many conditions, clinicians have forgotten to use their own powers of observation, and have made use of the laboratory, even to a ridiculous extent. Some physicians have been accused of ordering electrocardiograms in order to count the pulse rate.

As laboratory men, we can all agree that clinicians have neglected to develop their own powers of observation, but the laboratory and its directors have served time and time again to aid the physician by carefully verifying his observations with instruments, and by application of methods of precision, so that in the end the clinician has realized his own limitation, a very much worth-while result. An interesting example of this is the fact that, although clinicians have scientifically studied the signs of pregnancy for more than 5,000 years, recently devised, simple laboratory tests can detect pregnancy earlier and more accurately than any set of clinical observations yet perfected. It would be interesting to speculate on how well a pathologist, trained to appreciate minute quantities and to observe extremely small differences in things, would be able to practice the art of medicine, but that is another matter.

It would be hazardous to single out some particular subject in laboratory medicine and to say that it was the most important contribution of this science, but one certainly would be safe in saying that the development of procedures for guarding the public health has been of sufficient importance in human affairs to have justified all the energy and money put into the whole development of clinical pathology.

In public health work the clinical pathologist has reigned supreme, basing his fight on a solid foundation of bacteriology, chemistry and pathology. The very nature of the diseases concerned, their causes and transmission, their specific treatment and prevention, has been developed by men and women who, under my definition, were clinical pathologists. Here in the South, where typhoid fever, malaria, hookworm, dengue, amebiasis and endemic typhus fever exist, and where but a short time ago yellow fever flourished, one can well pay tribute to such clinical pathologists as Bass, Johns, D'Aunoy and Craig, to say nothing of those who before their time began the campaign that has made the tropics and the subtropics a place fit and pleasant in which to live.

But it is not necessary to confine one's observations to the South in this matter. One need only consider the fall in incidence and death rate everywhere, of typhoid fever, tuberculosis, diphtheria, scarlet fever and rabies, or the present attack being made on influenza and poliomyelitis, and one will find in the thick of the fray the clinical pathologists, trained in the fundamentals of their science, freed of the necessity of pleasing a fastidious clientele, hammering away at the unknowns in the problems.

The endeavors of the pathologists in matters of public health have not been confined to human beings, but have made it possible to control and eradicate many diseases of domestic animals, and have furnished some fundamental methods of attack on the problems related to the health of wild animals.

These matters are all well known and have been appreciated for years by the laity, although many do not realize that it has been the laboratory man who has been mostly responsible for the results. There are other more specific things that have been developed by clinical pathologists which are applicable to the individual patient.

Let us take, for example, the development of serologic tests for syphilis. Is there a clinician, however expert, who can diagnose with even a rough approximation of accuracy this protean disease without the aid of the laboratory? Is it possible intelligently to give treatment in such cases without repeated examinations by the clinical pathologist? The answer is so apparent that the matter for discussion now is not whether serologic tests should be employed, but what kind of tests should be employed, and here again the pathologist must answer the question.

It should hardly seem necessary to refer to the practical and important contribution of pathology to the

diagnosis and treatment of surgical cases. Modern surgeons do not think of considering a diagnosis of tissue as final until a competent pathologist has passed on it, and the injustice the surgeon would do his patient if he failed to take advantage of such consultation would not only be a reflection on his own judgment but might result in a judgment against him in civil court. The diagnosis of tissues obtained at operation, and the diagnosis of tissues obtained at necropsy, have furnished the entering wedge, which, hammered in by the bacteriologists and chemists, is gradually pushing into the yet unsolvable question of cancer. This is probably the laboratory man's greatest problem to-day, and the solving of it must, by the very nature of the disease, be undertaken by him.

As an adjunct to the field of medicine, the laboratory has not only aided in diagnosis, prognosis and treatment, but has been so important that one may say without fear of contradiction that modern medicine could not have developed without it. A great deal of value in the laboratory has been missed by the clinician, who has looked on it as the place where some remote person is able to perform "tests" with a positive or negative result. If the clinician will view the laboratory as a place where one may detect and measure the degree of certain varying reactions of the body to stimuli, the true worth of the so-called "tests" will become more apparent. The importance of the clinical pathologist is not so much that he makes diagnoses, although he often does, but that he gathers facts which, when fitted into the general picture, help to portray the true condition.

But one could go on indefinitely in listing the importance, indeed the absolute necessity, of clinical pathology to modern medicine. One could point out the brilliant results which have been achieved in hematology, where we are beginning to see more clearly than ever before the nature of obscure diseases, unfathomable to any but the keenest observers who have devoted their whole energies to such studies in the laboratory. One could stress the necessity of numerous checks on operating room procedures made by skilled bacteriologists or the importance of identification of various bacteria and animal parasites that make their homes in our bodies. Even the elemental fact of the presence of leukocytosis or albuminuria can not be learned unless the laboratory is employed, and if it is not in the hands of a skilled pathologist, what havoc can be wrought!

But there is a greater contribution that the laboratory has made to modern medicine than the wholly practically things I have mentioned. It is the stimulus it has given to explore the unknown, to reach out beyond whatever was known at the time. It is the imagination, grounded in specific, fundamental knowledge, which clinical pathology has given to medicine, that has been its greatest gift. This stimulus has not been confined to the practitioner alone, but has affected the thousands of students passing through the universities, who, catching a spark of fire from the altar of pathology, have gone out inspired to observe more closely and to record for mankind. The laboratory has furnished superior opportunities not only to study the relation of the unknown to the individual patient but to the general sciences which underlie every phase of medical science.

It is with the hope and knowledge that this stimulus to discover the unknown will be preserved and nourished here in New Orleans, that this building was erected and that it is being dedicated in accordance with the conviction of Jean Cruveilhier that a physician without a knowledge of pathology could, indeed, be ever so skilful in practice, but, although he might see many patients, he would see no diseases.

THE TREATMENT OF ELECTRICITY FROM A LOGICAL RATHER THAN HISTORICAL STANDPOINT[1]

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THE historical method of presenting the subject of electricity has some advantages, in that the subject is expounded in the order in which it evolved. Each new field of the subject has its own mystery, in the unfolding of which there is a certain natural logic. The history connected with each field increases the cultural value of the course and adds interest through its human touch. It is, therefore, not the historical order as such that causes the dissatisfaction with the presentation of the subject but rather the facts that the different fields are not properly coordinated and that each set of phenomena is separately described and not explained in terms of basic phenomena which underlie the whole subject. There are even apparent contradictions: a magnetic field is ordinarily considered to be inseparably associated with an electric

[1] A paper read before the American Association of Physics Teachers, New Orleans, on December 31, 1931.