

THE OBJECTS OF THE WISTAR INSTITUTE.¹

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WHAT are you going to do at the Wistar Institute? I have been asked this question many times. Perhaps I cannot do better with the time allotted to me this afternoon than to attempt to answer it.

The Wistar Institute, in the first place, will take charge of the Wistar and Horner Museum. In the second place, it will afford an opportunity to advanced students in anatomy to pursue researches. In the third place, and, in part as a result of the plan just named, it will permit of extensions to be made along the lines suggested by the present state of the biological sciences. These lines are in a sense revolutionary, and, if successfully pursued, will end in the University possessing one of the finest museums of anatomy that the world has yet seen.

Now, what are the opportunities afforded by an institute such as this? First, we have unusually fine opportunities of studying the anatomy of race. And why is this so important? Permit me to quote a few lines from a recent address of Dr. J. Wellington Byers² on the causes of the pneumonia in the negro: "The bacteriology and pathology of pneumonia have been very clearly made out, though what constitute the special conditions that determine susceptibility have not been ascertained. In a general way we may speculate that there must be some anatomical defect leading to corresponding physiological incompetence of the cells and tissues engaged as the factors of vital resistance to the pathogenic agencies of this disease in the negro. Whether this be an absence of defect of leucocytosis, as has been shown to be the case in fatal instances of pneumonia, remains to be investigated and shown. My chief purpose has been to awaken some interest in the much-neglected department of ethnological medicine, if I may so use the term. A gross comparison of the physiological characteristics

¹ An address delivered at the opening of the Wistar Institute, May 21, 1894. Since this address will appear in its present form as a separate communication from that of the Provost, Prof. Wm. Pepper, as well as from that of Prof. Wm. Osler, who delivered the main address, it is incumbent upon the author to state that as Director it became his duty to represent the Board of Management, at the same time to give expression to opinions for which he alone is responsible. He believes, however, that the spirit actuating him is also that which is entertained by the Board of Management. For additional expression of opinion of the author, the reader is referred to an essay read before the Biological Section of the American Association for the Advancement of Science, 1880; to an address delivered before the Association of American Anatomists at Washington, on the Teaching of Anatomy to Advanced Medical Students, Medical News, December 26, 1891, as well as to an admirable essay by Prof. John A. Ryder, referred to on p. 591.

² International Medical Magazine, Vol. III, 189, 1894.



of the white, yellow, and black races suggests a higher and lower form of organization, though variations in skin, hair, size, and shape of skull and face do not afford an explanation of these diversities of disease, and we must pass beyond them to still finer and more subtle peculiarities of tissue and cells as the ultimate causes of difference in vital resistance or exemption from disease. Investigation may discover and interpret the nature of these." Is not this a sufficient answer why the anatomy of race may prove of interest to medical men?

Secondly, we have an opportunity equally good with the foregoing of studying the anatomy of the animals which are related to man. The psalmist tells us that the animals are placed under man's dominion. That dominion ordinarily implies a right to use animals for food, clothing, and service. But since man exercises dominion over the animals, has he not on that account also a responsibility? Are not the animals in a sense given him in trust, "to show, O Lord our Lord, how excellent is thy name in the earth"? At least upon the anatomist rests the responsibility of explaining the structure of the animal kingdom, and through a knowledge of this structure how human ills can be alleviated.

It is incumbent on the student to collect data on the structure of all our indigenous animals. Some of the larger, and to the systematist some of the most valuable, animals are threatened with extinction. Can it be doubted that this institute is an appropriate place to ascertain all that is possible to know of the organization of these members of our fauna? Surely it is not enough to collect skeletons and skins, we should prepare the viscera, describe the muscles, the brain, and the nerves. Among the forms which I now have in mind which should receive attention are the bison, the various species of deer, the pronghorn antelope, the Rocky Mountain sheep, the Rocky Mountain goat, the sea-otter, the manatee, the eared seals, and the musk-ox.

Even among animals of a less rare sort than the foregoing excellent work can be done. Forms which are infrequent in one section are common in another. A student could not do better than monograph some one type which is abundant in the locality in which he resides. In this connection our series in the anatomy of allied animals will be of service.

The cultivation of the science of anatomy is inseparably connected with that of medicine. Since every medical student must embrace anatomy in the curriculum demanded by college authorities, it is easy to see how the dormant faculties for anatomical investigation might be awakened. At rare intervals men appear who have these faculties fully expanded from early youth. The Socratic demon imperatively calls them to careers in which the inherent talent finds exercise. A second and larger group acknowledges a strong inclina-

tion to anatomical research, yet are content to unite it with a profession. The one last named naturally inclines to make medical application of anatomical knowledge. The one first named is indifferent of such application. Owing to the increase of wealth in the community a larger opportunity is now offered than has been heretofore the case for men to be independent of the support derived from the practice of medicine. Students relying upon the offices of the national service, the incumbency of endowed positions in learned institutions, or upon adequate private means, are, as a rule, but little in touch with medical anatomists.

I am of the opinion that it is not wise to separate in a plan of institute organization the last phase of expansion of any branch of science from its first phase. I believe that those workers who from inclination continue to study anatomy in relation to its ancient mistress, medicine, are pursuing a line of work identical in kind with those who treat anatomy in its relations with a scheme of evolution of organic forms. The intellectual attitude of a student in the museum of a medical college where he concentrates his energies on specimens of morbid anatomy—on physiological anatomy,—on the anatomy of race—is the same as the student in a museum of natural history who deals for the most part with normal individuals selected from the entire animal kingdom. The Wistar Institute, it is hoped, will be a centre of cultivation of medical anatomy, if one may so name it.

Let me give an example of what may be meant as the import of an anatomical investigation taking a medical trend. As late as 1877, Ercolani, in speaking of his researches on the human placenta, states that he was indebted to Ingrassius and Fabricius for a proper method of study, and criticises Kölliker, who, in 1876, had accepted (in Ercolani's opinion) a wrong one. Few will be inclined to doubt that Kölliker represents the most advanced position in embryological and histological work. Yet Ercolani insists that Kölliker forgets the important precept left us from the old Italian anatomical school, which was the same inculcated by Ingrassius for pathology, that it is of great service in clearing up intricate and difficult questions of human anatomy and pathology to consult comparative anatomy and pathology. Kölliker did not seek to fulfil the serious and important duty of explaining the physiological unity or office of the placenta. Ercolani attributes his own success to the university in which he was educated in medical knowledge, and claims that a direct gain to zoology has been the result of his researches.

I cannot forget that Linneus and John Hunter were physicians; that at one time Johannes Müller practised medicine, and was at all

times an anatomist, a zoologist, and a physiologist.¹ I cannot cease to give some value to the fact that at this moment twenty societies are in existence in Europe which exhibit in their titles the union of interests of naturalists and physicians. Nor will I assume that in this day of extraordinary development of the organic sciences careers of distinguished usefulness are not open to those who are inclined to unite natural science with medical work. Robert Tomes, a London dentist, is a leading student in the comparative anatomy of the teeth. W. F. Miller, an American dentist, practising in Berlin, has discovered the bacterial origin of dental caries. The late Franklin H. Hooper, of Boston, a laryngologist, made important contributions to the physiology of the larynx.

But a few years ago a distinguished German anatomist contended that zoology and comparative anatomy were distinct sciences, and refused to give facilities to a student of zoology who wished through the professor's aid to increase his anatomical knowledge. It is strange that such an opinion should have been held by one in Berlin at a time when Johannes Müller's example of keeping both medical anatomy and zoology in close relation to each other (and developing upon the pedestal thus formed the twin superstructure of modern morphology and physiology) should have been lost. Surely it is no longer entertained in Germany, nor should we in America renew the attempt at partition of a subject essentially one and indivisible. Indeed, I would recommend every student to become familiar with the study of at least one closely related group of species, even if he ultimately intends to confine himself to the phenomena and conditions of general biology or of any of its subdivisions.

It is well within bounds of prudence to state that all peculiarities of an organism are related to each other. The integers in the sum of these peculiarities are held together by a bond. What this bond is to be called is undetermined. It often appears to be a bond of utility; often a bond which is defined by the operations of a crudely-defined law of inheritance. To study the nature of this bond demands search over a wide field. The etiology of many diseases is based on congenital malformations, and exacts on the part of the student knowledge of the deductions drawn from general embryology. To understand the localization of diseased action he must be in possession of the physiological anatomy of the regions invaded. It cannot be a coincidence that the localities at which cancer develops in the human esophagus are those at which the greatest amount of impact occurs between the

¹ Are we no longer to have such titles as that selected by Eschricht for his classical memoir on the Cetacea? It reads as follows: *Zoologisch-Anatomisch-Physiologische Untersuchungen über die Nordischen Wallthiere.*

food and the walls of the esophagus. It cannot be an accidental circumstance that while generic characters in the cetacea are derived from the pterygoid bones that this region in a specimen of *Hyperoödon* should also be selected for the site of hyperostosis. In the attempt at elucidation of such phenomena the general biologist, the zoologist, the human anatomist, the comparative anatomist, the embryologist, and the pathologist meet on common ground.

I hope I have stated enough to show the manner in which a museum of anatomy may exist, and along what lines it can grow. I look upon a museum as a book made up of many chapters, each specimen being an illustration. What would be thought of the writer of a book whose illustrations are subordinated to a text which is not something better than a mere description of specimens! Do not we find that the books we most esteem are those that tell us of truths, the illustrations simply making clear the meaning of the author? I hope the Museum of the Wistar Institute will be spared the affliction of displaying any specimen whatever which is not in exact illustration of an idea. Of course, the ideas must be those in which professional men are interested, or at least are those in which they may be induced to take an interest.

Let me state in a general way what some of these may be. Since life is a function, so the periods of life are defined by functions. The prenatal and postnatal changes are separated by broadly-defined functions. The postnatal changes are again divided by the times of eruptions of teeth, the times of activities of the visceral organs, etc. To many of these periods we have correlations of structural changes, and I am of the impression that these correlations will be more exact if they are more carefully searched for. The functions of the embryo are closely associated in our minds with the presence of a ductus arteriosus and a foramen ovale as well as with an open umbilicus and those of the infant with an absence of all these structures. Now, if this is an exact correlation, why should we not ask for similar correlations with the later periods? It is odd that here curiosity often ends and no series express the stage when the thymus gland disappears as a time when other important functions interchange. Nor do we find ourselves to be curious about the adenoid mass in the pharynx which assumes such an important phase in modern medicine. Even the times of eruption of the teeth are looked upon more as isolated dates instead of times of import to many divisions of functional labor in the economy. It is true that the impress of the several phases of nutrition in senility is recognized, yet we lack exact knowledge of the changes of the body in the period of old age. If with propositions such as are here rudely outlined the observer walks through museums of anatomy

and asks himself in what manner are the divisions of human life checked off in the specimens therein displayed, or, to put the proposition conversely, to ask in what way these structures are arranged so as to teach the observer what have been the functions of the body which has controlled and enforced them, he will find little or nothing in the way of answers. He will not see so much as a single classification of specimens on a philosophical plan. He will not see as much as a series of skeletons of all the periods of life. It is likely the museum may not possess examples of adenoid growths, of the stages of the thymus gland, or of any specimens in illustration of the influence exerted by sex on nutrition. The absence of such series tells plainly enough the truth that professional zeal takes other directions than in expressions of functions through the forms of structure, the display of which gives opportunity to the anatomist.¹ Not that a museum erected on the plan of physiological anatomy combined with pathology is new. John Hunter outlined it a century ago.

Hunter's influence in medicine has been profound. It brought the standard of professional attainment to a higher level than it had secured before he labored. A beautiful custom exists in England of delivering addresses under the name of Hunterian orations which serve to keep the memory of John Hunter always green. Under the constant guardianship of this noble sentiment it would be supposed that the method of Hunter himself would be closely followed. On the contrary, while his countrymen acknowledge that the achievements of the man John Hunter are as yet models for practice, the methods of the philosopher John Hunter are in a measure as unregarded as they were in his own time. One would suppose that following the guidance of a man whom every one praises that each medical centre would have its museum of physiological anatomy, and its laboratories where experiments in nutrition would be fostered. I believe the time will come when this will be the case.

I object to the statement often made that studies in physiological anatomy interfere with success in practical life,—on the contrary, the work itself is urged along by the labors of many specialists. The clinician, the pure physiologist, the physicist all help the anatomist. Their studies are among those which prepare the anatomist for his work. The splendid results in studying the etiology of myxedema by clinical methods enables the anatomist to make a better classification, than was before the case, of all the so-called blood-vessel-gland series. The application of photography to animal movements has

¹ For an elaborate philosophical plan of a synthetic Museum of Comparative Anatomy as a basis for a comprehensive system of research, the reader is referred to an essay by Prof. John A. Ryder in Zoology. Contributions from Biological Laboratory, University of Pennsylvania, 1893.

given us for the first time a proper method for analysis of the body and limb muscles. The effects of sex impressions on general nutrition would never have been surmised if experimentation upon the domestic animals had not prepared us for them. The gross effects on the entire system of the removal of the sexual organs in the growing animals cannot be separated from minor effects which probably relate to retarded or transient phases of malnutrition in these organs. How can the best results be secured in working along lines established by these suggestions? In no way in my humble opinion other than by institutions especially endowed, in no way but by the sympathy and support of the medical profession, and by encouraging the younger men to pursue studies of the kind to which the management of this Institute is committed.

We can assure these novitiates in anatomical work that they will have a better time than their forerunners. The anatomist is not now compelled to work in rooms unheated in winter; or in attics so high as to be above the limit at which water supply is practicable; or in cellars so damp and dark as to be unwholesome; or in open sheds in summer where he is plagued by myriads of flies. He no longer has his plans ridiculed by attempting lines of work so far out of the common as to be removed from ordinary sympathy and fellowship.

Gen. Isaac J. Wistar has given the profession a noble institution fully equipped, adequately endowed. But with it comes a keen sense of responsibility. Endowment is not of necessity a benefit. The power of wealth expressed in the creation of a fantastic institution would be productive of harm. But a wise endowment is not only of use, but is an essential condition to scientific progress. Now the wisdom of a public act relates always to the state of the community for whose benefit it is designed. If the community is not in a condition to accept the terms of the gift in spirit as well as in letter the endowment becomes at best an encumbrance. Indeed, in no relation of society can sympathy be prudently omitted. While the multitude need not perceive the intention of a far-sighted founder, it is absolutely necessary to the success of his plans that thoughtful people should not only perceive it, but lend their aid. In military parlance a line of work, no matter how fortified, cannot exist projected in air but must be a part of a mutually sustaining system. So this institute cannot be held, without endangering its existence, as something out of the scheme of University organization. We, therefore, appeal for sympathy, and we believe that the appeal will not be made in vain.

