WILHELM HIS.
HIS RELATION TO INSTITUTIONS OF LEARNING.

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The ancient science of anatomy has been perpetuated and extended during the many centuries of its existence by great men who have dedicated their lives to it. The list is a long one for the development of the science has been slow and progressive from the earliest ages to the present time; we find in it on the one hand, some of the names of the greatest who have ever lived—Aristotle, Vesalius—on the other, the names of those who rank as leaders of a generation, Bichat, His.

Undoubtedly the reason for the continuous progress of anatomy through so many centuries is that man has always shown an interest in a knowledge of his own structure and, in turn, that this knowledge has been of great service in battling for rationalism against mysticism in many directions. But in order that a science may progress, it must be in the hands of able men with the highest ideals and with inexhaustible zeal. The full benefits of a science cannot be obtained from its literature alone; it is well known that countries without leaders in a science live almost in ignorance of it. No science will develop to its fullness unless it is represented by men who are great enough to grasp the science as a whole and broad enough to understand its relation to cognate sciences as well as to the needs of a civilized community.

A man of this caliber was Wilhelm His. He was born of a distinguished family which felt that it owed much to the community and therefore educated its children for a strenuous life to be dedicated to the community. He was in no sense a self-made man though he had in him the qualities to make one; his powers were fortunately developed under the best possible conditions. His father taught him, by example, simplicity in living, clearness of thought and seriousness of life. His mother, who died while he was still a youth, guided his education with the greatest care, laying much stress upon a good command of German. In a pri-

vate school in a country town, he received a training so rigorous that it makes one shudder to think of it. At the age of thirteen, he returned to his home in Basel and entered the Gymnasium from which he graduated five years later, in 1849.¹ During his years in the Gymnasium, His rated only as an average pupil, for his bent toward physics and natural history was great, and what spare time he had was devoted to these subjects. He also photographed a great deal, the art then being still in its infancy; he constructed his own camera and made his own plates. In those days the professors of the University taught also in the higher classes of the Gymnasium (the *Pedagogium*, as it was called), and it was from them that he received his greatest inspiration. Especially grateful was he to the Professor of German for a thorough training in the use of the German language in which he had received such a good start in his father's house.

Throughout life the good command of language he had gained and the marked technical ability he had acquired were of the greatest use to him in furthering the cause of anatomy; it is interesting to note that these powers were developed long before he entered the University. It was fortunate for him and for anatomy that he came under the influence of able men early in his career.

Most of his student friends had decided to study law and naturally His thought that he must accompany them. His inward feeling was drawing him towards natural history, but he felt that one's inclination is to be viewed as a forbidden fruit and therefore he had nearly decided to go with the stream of his fellows. Before taking the final step, however, he consulted his superiors, one of whom was Winscheid, later one of the foremost jurists of Germany. Winscheid advised him to follow his own bent and this carried him into medicine.

As soon as he became a student of medicine in the university, he found himself free to follow his own inclinations. For the first few years he devoted most of his time to the sciences. Anatomy, physiology, natural history, psychology, chemistry and geology were studied at Basel and Bern under a variety of men. He soon learned that for the student, the quality of the teacher is more important than the subject taught; in order to have a great teacher and the important subject together, he decided to study anatomy with Johannes Müller, in Berlin.

The lectures of Müller were a revelation to him and he felt for the first time the inspiration of a strong personality. His learned from Müller and later from Remak, how great an influence a teacher can have upon a pupil, when, as an authority, he presents his own line of work. Then the teacher and pupil stand upon the common field of nature. The

power of the successful explorer is most stimulating. It encourages the pupil to attack open problems, and, if he can, he formulates questions and takes his position towards them. Thus Müller's presence worked upon His and unconsciously the latter soon found himself in the library studying Müller's monographs.

His also pursued a course in embryology with Remak in Berlin. The subject was then a new one, but it made a profound and lasting impression upon the young student for it showed the relation between histology, embryology and comparative anatomy. To Remak, His owed more than to Müller, for Remak's teaching helped him to formulate problems which occupied him during the following half century; his efforts to solve them, have, in many respects, changed the aspects of anatomy.

How different is the study of medicine in Europe from that in America! There freedom reigns and students wander from place to place being controlled only by a fairly rational system of examinations in case they wish to graduate. Weak students fall out, for there is no cram system to drive them onward; able students select great men as teachers and thereby develop themselves and become stronger. So His, soon tiring of the sterile lectures in practical medicine, turned his eye towards a new star which was beginning to illuminate the medical world and wended his way to Würzburg to study with Virchow. During one of Reinhardt's lectures, His had happened to see Virchow's great paper upon connective tissue which had just appeared and it made so great an impression upon him, that he at once decided to go to Virchow. He was then far from prescient of the fact that in a few years he was to take an important part in the great discussion which Virchow had opened.²

In the early fifties, the University of Würzburg was at the beginning of that rapid rise coincident with the appearance there of a brilliant band of young professors. The change was brought about largely by a reformer, Professor Reinecker, through whose personal efforts Virchow and Kölliker were secured. It was the good fortune of His to enter this atmosphere; a select faculty was chosen by a talented student. He entered Würzburg at the beginning of his fourth year of medical study and began to work in the clinics. He soon found that the laboratories attracted him more than the clinics and during three semesters much time was devoted to practical chemistry; the weekly meetings of the Scientific Society always found him present to hear of the new medicine from Virchow and Kölliker.

For a time he attended regularly a kind of journal-meeting at Kölliker's house where a variety of scientific subjects were discussed. There

he became acquainted with Ludwig's physiology which was then heterodox and called forth severe criticism. Ludwig, very critical towards others with pupils who were more so, kept the camp stirred up pretty well; this had the right effect upon his critics (His included) for they studied the new physiology. Converts were made at a rapid rate and before His had reached middle age, he found that both Virchow and Ludwig were very orthodox; the scientific world had come to them.

In Würzburg, a great opportunity came to His—Virchow at once set him at work in a good field to answer fundamental questions. Probably the most important step in the life of a scientist is to be started aright in research after a good preliminary training. The earlier this is done the better. His was twenty-one years old, mature for his years and he was given every opportunity to use all of his ingenuity and strength in answering important questions. Henle and Virchow had crossed swords, but this did not make the great pathologist try to enslave the mind of His in order to win a victory, but now as so frequently afterward, a desire to know and to understand were Virchow's only considerations in directing a pupil in his work. The results of His were not what Virchow had anticipated for they showed that Bowman's corneal tubes and Coccia's serous spaces were artifacts and had nothing whatever to do with the system of connective-tissue spaces described by Virchow. But His was encouraged to continue and the monograph upon the cornea which he published a number of years later has proven to be a standard until the present day. His had been in the arena and had shown his prowess; he had originality and strength as well as training from a great master and henceforth during all his life he was to win victory after victory for science.

It was still necessary for His to take his medical degree and as was customary with many at that time, he proceeded to Prague and Vienna to study with the great clinicians there. At the end of a year he returned to Basel and passed his examination with the highest mark.

The young student had received the best from his home, the school, the gymnasium and the university of his native city, had wandered for four years studying at famous foreign universities receiving information and inspiration from the greatest masters—Müller, Virchow, Kölliker and many others—and had now returned to Basel to receive his degree. How much longer must we wait for similar privileges in America?

The following three years of leisure and lack of responsibility, those in which the real stuff in a scholar is tested, were devoted to a continuance of the work already so well begun.* Part of the time was passed in his private laboratory, one of the years being broken by a journey to

Paris, another by a visit to Berlin. Throughout this period he associated only with the best, for there was a never-wavering desire in him to devote his life to science. During this time he became a Privat docent in the University of Basel and gave regular lectures there on histology.

In most of the continental universities any person approved by the faculty may teach and thus new blood is constantly being infused long before a fog or a dog in the manger has been removed by a beneficent Providence. There is thus maintained a constant competition for better teaching within the walls of the university, and strong young men are brought to the front. If under these conditions a young scientist takes deep root without being spoon-fed or coerced, and commands a broad field, adding to its borders, the greatest assurance has been given that he will remain active and productive until he is three score and ten. In America, we frequently find recent graduates who tell us that they would follow an academic career if their future were assured as far as salary is concerned. Little do they realize that this attitude of mind alone should exclude them absolutely from such a career. Unfortunately, we seem to have some university presidents who are as easily deceived by such "scientists" as the public is by a Mesmer. Within a year, I have known of a president who, when seeking a great anatomist for a rich university, selected a man who had done no scientific work whatever and had never been tested, simply on his own assurance that he would "try to do something."

In 1857 the chair of anatomy at Basel became vacant, and, as is customary, the faculty sought the best available man. They found in His an able earnest young scientist of the best training, tested through freedom and research, whose work had been continued with increasing successful results through the three years of leisure following his advancement to the doctorate. A man who had studied a subject for its own sake⁵ and had contributed to it, was more likely to represent it well than one who had studied it for other rewards. Only too often do we see scholars whose work is good and imitative, but not profound, shift from one thing to another in order to keep before the public in an upward career; they find themselves sterile at forty and have to be shelved in some good berth as an active "pensioner," at fifty. To avoid this danger, great productive men must sit in faculties, for they alone are able to recognize genius in a young man.

When the Chancellor of the University informed His of his appointment as professor of anatomy and physiology, he said: "We have thrown you into the water, learn to swim;" and the remark was appropriate, for the new professor had never served an apprenticeship in the teach-

ing of either anatomy or physiology. Often did he seem to sink but he always came to the surface again, for he had overcome great difficulties before—he was independent. After all, research is to the problem of teaching as manœuvres are to a battle.

The power in His now blossomed and bore fruit. With his great background he was able to construct strong courses, marked by his individuality, and soon he was to influence the teaching of anatomy the world over. The attitude of the comparative anatomist he had learned from Johannes Müller, that of the histologist from Virchow and Kölliker, but that which made the greatest and most lasting impression upon him was the attitude of the embryologist which he learned from Remak. The histological work begun with Virchow was continued and soon extended to include the lymphatic system. In 1862 he published a paper on lymph radicles, advocating a closed lymphatic system, by all odds the best paper on that side of the question which has ever been published.

During this time, his embryological studies were also actively prosecuted for he had learned of their great value in histology from Remak. The classic object, the chick, as well as the structure of the ovary was studied again. That a plan underlay his work was very apparent, but no one dreamed of its magnitude until the publication of his academic program in 1865, entitled "Die Häute und Höhlen des Körpers." In this paper he gives the key by which the genetic relation of tissues can be ascertained and following it faithfully, he made one discovery after another. The "Program" is now incorporated with our science; it proved to be really a program for anatomy, and it was fitting that it should have been reprinted as the last paper during His's editorship of the *Archiv für Anatomie*, nearly forty years after its first publication. It certainly must be gratifying to a scientist to see his early dreams so well realized before his work is over. As His said of Bichat, "It is a mark of genius to see great truths in a relatively small number of observations."⁶

The great contribution to anatomy during the eighteenth century was the discovery of the tissues, the conception of which received its full development in the general anatomy of Bichat, published in 1801. Cellular tissue had been gradually making its way during that century and among others, Haller was trying to see in it some unit of organization, but the cell of Haller proved to be only a connective-tissue space and the all-important fiber was viewed by most anatomists as an artificial production. But the doctrine of cellular tissue was the foundation of general anatomy and this in turn that of histology which, through embryology, has given us modern anatomy.

During the nineteenth century we see three great steps in anatomy,

general anatomy, associated with the name of Bichat, the cell doctrine with that of Schwann, and histogenesis with that of His. Compare the great text-books of anatomy of 1790 with those of 1810, those of 1830 with those of 1850 and those of 1880 with those of 1900 and the reasons for this statement will be apparent.

At the time His began his embryological studies the plan of the development of the vertebrate body, as enunciated by Von Baer with Remak's classification of tissues, had been accepted generally. But the work of Remak was incomplete and in some respects unsatisfactory as, for instance, his conclusion regarding the development of the nervous system, the central portion of which he believed arose from the ectoderm and the peripheral portion from the mesoderm. This and other defects were corrected by His who made a new classification of tissues and germ layers which differs more from Remak's classification than this in turn did from Von Baer's.

In the "Program" His also showed that there is an embryological foundation for Bichat's classification of membranes since they are related directly to the germ layers. Further, he extended the conception of the serous spaces to include the vascular system. All of the serous spaces arise in the mesoderm, and His showed that they are lined with a special kind of cell, designated from the time of his paper on, as endothelial.

After this, his greatest work was histogenetic—witness for instance his studies upon the nervous system and upon the development of the blood-vessels. Contribution after contribution was published upon histogenesis. During the last years of his life he often complained to me that his time was short and that it was necessary for him to make haste in order to round up his work.

Thus His continued to be active until he was over seventy years old; his final papers, "although fragmentary," are of the highest quality. In his great paper upon the angioblast he gave his latest classification of tissues from an embryological standpoint⁷ and stated in conclusion that the riddle which had interested him so much still remained unsolved. Similarly, in his last monograph upon the nervous system, he wrote: "The notes are not to be considered as a report of a finished research, but they only indicate the line of work which must be followed by united effort⁸ in order that a better understanding of the structure of the brain may be gained." He saw more and more clearly that many hands are required to survey these great fields and during the last twenty years of his life, thought much about the organization of research. He lived to see his efforts in this direction crowned by the establishment of a com-

mittee for the study of the brain by the International Association of Academies, of which more presently.

In 1872, the chair of anatomy at Leipsic became vacant and through the efforts of Ludwig, His was secured. Professor Ludwig told me that it was by no means the unanimous will of the faculty to call His, for in general he was not well known, nor was he considered a good teacher. But Ludwig knew his man for he had found in His the strongest opponent of his notions regarding lymph radicles; furthermore, he was fully able to appreciate the author of the great academic program on "Häute und Höhlen."^o For over thirty years Ludwig and His were colleagues, consulting each other almost daily, an ideal relation for great scientists.

The work of His had branched in many directions at Basel, but it grew with increased vigor at Leipsic, for here he had all the material aid he could desire. Photographer, modeller, mechanic, technician, artist and others were at his command. A new laboratory, which proved to be a model, was built according to his ideas. Each of these factors was to play a part in the campaign he was conducting and it was soon seen how his hands were thus extended.

Through the better technical assistance, His increased his productivity, for his plan was broad enough to use it to the greatest advantage. The members of his staff, however, were never subject to his orders in their scientific investigations, nor did he ever use "research assistants" for his ethical standard would not permit such employment of scientists. That a great man can increase his productivity enormously without the questionable use of young colleagues is shown by example in the life of His. Furthermore, his plan of organizing research is one of the best from both the ethical and the scientific standpoint.

The microtome which His had invented in Basel was now perfected and better serial sections were made of embryos of different classes of vertebrates than ever before. The great monograph upon the chick had just been published and smaller but equally important papers appeared upon fishes; these were soon to be followed in 1880 by the first part of the monumental work upon human embryology.

Throughout his embryological work His was constantly interested in the broader problems and he was among the first to view development from a mechanical standpoint. His views and general plans were brought together in 1874 in the classic, "Unsere Körperform" dedicated to his new colleague, Ludwig, appropriately for in it the subject of development is presented from a physiological standpoint. These views were immediately antagonized to the utmost; when arguments failed, his opponents resorted to ridicule, but, in general, His held his

own and continued a forward course. He now became the leading advocate of the theory of mechanics in development and it subsequently tintured all of his papers. Although he made no experiments upon the growth of animals, he must be viewed as one of the pioneers of the new science of experimental morphology.

Throughout His's embryological papers we see that he believed that the form of the animal body, as well as of its organs and tissues, is due to mechanical influences of the structures upon one another. This conception was often erroneously construed as meaning that there is a mechanical cause for growth, but His repeatedly denied this. "The stimulant which causes cells to multiply cannot be traced to mechanical influences." His mechanical conceptions of development are comparable with the study of the mechanics of the circulation rather than with that of the evolution of the heart. When analyzed, it appears to me that his mechanical conceptions are related principally to the wandering of tissues and organs in development. One of the best examples of His's ideas is his conception of the growth of nerve fiber from the central cell to the periphery, where, through secondary connections, it makes itself fast to its end organ. With this conception, we can understand and picture to ourselves the formation and the infinite number of variations of the peripheral nervous system. Other examples may be found in the wandering of the diaphragm and in the metamorphosis of the branchial arches. Mechanical influences must guide these structures to their fate. And finally, great masses of tissue wander in the embryo long before we can see what is to become of them. The best example of this kind is to be found in the early development of fishes formulated in His's brilliant theory of concrescence. According to His, the word "mechanical" is to be applied to the movements of these avalanches of tissues and their influence upon one another in gaining their final position and not to the cause of growth.

One of the characteristics of His's embryological work is that he viewed the embryo as a whole; he always approved of embryological papers which carried a subject to its logical conclusion.¹⁰ As he improved the microtome more and more, so that he could cut serial sections fifty microns thick, he constantly kept in mind the relation of the individual section to the embryo as a whole; this led to his well-known method of graphic reconstruction in 1868. At that time haphazard sections of an embryo were often compared with chance sections of older embryos which led to all kinds of erroneous conclusions. In the course of time, he perfected his method by drawing an enlarged picture of the embryo upon ruled paper into which he projected in their proper positions the sections

enlarged to the same scale. Photography, as well as a new instrument which he invented, the embryograph, aided him in his work. In order to be better able to compare stage with stage, the reconstructions were converted into models which were duplicated by Ziegler; these models now form the most valuable asset of many of the embryological museums the world over. More accurate models can be made by drawing the sections upon wax plates which when placed upon one another reproduce the embryo; this method, invented by Born, was used to a very great extent by His in his later years.

Until this time the embryological campaign had been conducted by His from all sides, but one great fortress, the human embryo, still stood before him. Human embryos were very difficult to obtain and the literature upon the subject was meagre and poor, but His was soon able to select a few important stages from a mass of poor material, normal and pathological. These he studied with such care that the knowledge of the anatomy of the human embryo now exceeds that of any other animal. To be sure the earliest stages were missing, but this mattered but little, for being master of the whole field of anatomy, he was able to produce a model work. Each chapter in his monograph is great and original, giving a mass of information; the work reaches its climax of interest and value in the part on the nervous system.

During the last dozen years of his life, His's attention was taken away from the study of the nervous system by a variety of subjects; thus, for example, he was interested constantly, as his letters show, in the embryology of fishes.¹¹ The work on this latter subject he was able to round out, but it seemed as if his promised work upon the brain would never appear. When I visited him the summer before his death, I found a broken man, working away at a large manuscript which by no means satisfied him. What could be arranged, was published in a monograph upon the brain, which will serve as a foundation for investigation for many years to come. He had hoped to write another volume, but his illness rapidly grew worse, and, unable to work longer, a week before his death, he wrote that his remaining wish was that the end might come soon.

The technical ability of His which had been pretty well trained in the gymnasium, gradually developed farther and proved to be of great value to him as a teacher. Optical instruments of all kinds, magic lanterns and microphotographic apparatus were much used by him; demonstrations with the microscope after each lecture aided in illustration. The pictures which he drew upon the board while lecturing were models of their kind and he developed them before the students in such a manner

that they could be copied gradually while being evolved. The subject matter of his lectures was chosen in a very conservative way, the substance being always sound and free from all kinds of wild theory and speculation.¹²

Early in his career, he had made crude models of the mesentery and the like, for these were subjects the forms of which were difficult to understand. Toward the end of the seventies, modelling was prosecuted on an extensive scale with the aid of the modeller, Steger, resulting in a series of papers on the form and position of the organs which are now standard. His many models have been duplicated and fill an important corner in all anatomical museums; they have made His the founder of a new school of topographical anatomy. The method which His had introduced in embryology were thus also applied to gross anatomy, for he was never satisfied until he could see adult forms in the embryo and the outlines of the embryo in the adult.

In His the power of visualizing forms—the power which enabled him to do his work of reconstruction, to make those wonderful blackboard drawings during his lectures—was developed to an extreme degree. This power was one of his principal gifts, and one of the chief foundations of his achievements in science. As he grew older there was not only an increase in the depth of insight into problems, which is natural in so able a man, but also what is rarer, a very great improvement in the power of expounding his results. His last papers are models, characterized by conciseness of style, great clearness of description and a suppression of all superfluous details.

While His was teaching and investigating, the question of nomenclature came up. Each century, each country, each school, each specialty and each teacher seemed to have a particular group of terms based upon an imaginary normal; the result was that there were so many normals that it was extremely difficult to construct a table of synonyms.

When His and a few others founded the Anatomische Gesellschaft, one of the first questions discussed was the formation of a uniform nomenclature. After much work and expense, His drew up the official report of the international commission, in 1895; it is another standard which the leading teachers and authors have agreed to follow. The new nomenclature is a compromise; it is not radical, but it has reduced the number of anatomical names, including synonyms, by about eighty per cent. It will not be difficult for English-speaking anatomists to accept this terminology, for it differs less from ours than from that of any other language.

If we consider the great amount of work His did upon the form and

position of the organs, upon the general morphology and structure of the brain, upon embryology, histology and histogenesis, and upon anatomical terminology, it may safely be said that there is barely a page in the broad field of anatomy from the ovum to the adult in which his work does not appear.

Early in his career, His showed much interest in physical anthropology as we see by the great monograph he and Rüttemeyer published on Swiss skulls. But his time was occupied in so many other directions that it was impossible for him to continue in this kind of work with the inadequate assistance he had at Basel. However, some thirty years later, he had an opportunity to open up a new line of research in anthropology. A skeleton, presumably that of Bach, had been found and His was asked to give an opinion regarding it. It was known that Bach had been buried in an oak coffin near a certain corner of a church-yard. Here among others was found the skeleton of an elderly man (Bach died at the age of sixty-five) in an oak coffin. The skull was found to be peculiar and in it the anatomist could discern the features of the portraits of Bach. His at once proceeded to measure the thicknesses of the soft parts over the bony prominences of the heads of cadavers and found that in average bodies these thicknesses are constant, varying only with age and sex. He next drew averages from the measurements taken from cadavers of elderly men of fair development, and, with these, Seffner, the sculptor, constructed a clay bust on the skull in question. It was found that the re-constructed bust presented all of the characteristics of Bach even more pronouncedly than do his portraits. The commission that had the matter in charge decided that the skeleton in question was undoubtedly that of Bach. As such, it was reinterred. The musical world through His's studies now has a bust of the great composer.

These results gave His the greatest æsthetic pleasure, for they meant a new victory.¹³ From this time on he was greatly interested in inductive anatomy and when I began my career at the Johns Hopkins, he gave me every possible encouragement in this direction.¹⁴ He often wrote and he often talked about statistical work, but little did I realize the difficulties of it until we began to tabulate a peripheral nervous system from a very large number of individual records. It became apparent from our records that variations are more common in certain parts of the body than in others and this result interested His very much.¹⁵

His was never inclined to develop a school nor was he anxious to have pupils. When I knocked at his door at first I was turned away, but after appearing a number of times, was finally accepted. When he set a problem, it was concisely stated; he outlined the general plan by which

it was to be solved. All of the details were left to the pupil and it annoyed him to be consulted regarding them. He desired that the pupil should have full freedom to work out his own solution and aided him mainly through severe criticism. Specimens and drawings of them which were not analyzed did not appeal to him and he objected much to pictures which appeared to represent a mass of "baked tissue." Through reactions, either with coloring matter or with some destructive reagents, or by means of reconstructions, tissues must be emphasized and we see this characteristic in the illustrations of all of his publications. A His drawing can always be recognized even if it appears without his name attached to it.

His was unwilling to give his own problems to pupils and though later in life he advocated the establishment of research institutes, it is not altogether clear how he reconciled the one attitude with the other. But the institute is rather for routine research and for a discussion of work by leading investigators who consequently formulate problems to be solved by organized united effort; it is not intended to dwarf individual effort in any respect. His was unwilling to write papers for his pupils and the manuscripts they placed before him were improved only through erasure, for he excluded all doubtful evidence and irrelevant matter. "Your paper will be read by a few specialists, and they do not want a treatise on the science," he would say, and this criticism coming to a pupil during the same years that silence on such subjects and encouragement came from Ludwig, proved to be of the greatest value.

His did not have much power to extend his own private work through his assistants and pupils; they were always given the greatest freedom for it was against his nature to enslave them to the least degree. Nor did he possess the patience of a Liebig or a Ludwig in training others to follow in his path. Further, he did not find that successful research can often be stimulated by example, although men, and scientists too, are imitative. He often told me that the acceptance of a discovery is frequently postponed by numerous "confirmatory" publications which are filled with so much crude and irrelevant matter that the real point is buried again; and that the desire of authors to attract attention often induces them to invent names and write much, thereby making the answer to a question more obscure than it was before.

Several visits to the Zoological Station at Naples made a profound impression upon His for it showed him what organization can do for research, and in 1886 he published a paper on the necessity of research institutes. In this he pointed out that the function of such institutes is (1) to solve problems which exceed the power of one man to settle,

and (2) to collect, classify and conserve all the material relating to such problems. After a whole life-time has been occupied in collecting material, it seems a great pity that so much work should be lost at the death of the collector; could such material and such lives be made available for the solution of the great problems by an institute or institute of institutes (as is the case in astronomy) more progress might be made. In the foundation of such an institute the many details of embryology and neurology should first be surveyed; were the field divided, this could be done quickly. Problems would have to be formulated, and a common nomenclature and standard of measurements agreed upon. In no case should individual effort be hampered. Conferences would be necessary from time to time to compare, to criticise results and to formulate new problems and new plans for their solution, thus aiding all with the best, as should be the case in ideal scientific investigation. The underlying thought is to extend the power of able investigators through the whole science without dwarfing in any way individual effort; in this way the best qualities of all could be made to serve the progress of science.¹⁸ The Anatomische Gesellschaft was founded with this as one of its objects in view; it naturally resulted as we have seen in the casting of a uniform nomenclature. Two great steps had thus been taken and His lived to see the beginning of a third.

The tendency in the world during all of His's life was more and more towards specialization and organization in science, a movement which gradually became international. An index of this tendency may be seen in the organization of the International Association of Academies and through its machinery, His was able to launch his favorite scheme.

Unlike many promoters of science, His was not an impressario and consequently the learned world had full faith in him. What he advocated always was the advancement of science. The possibility of personal gain was excluded from his thoughts as is shown by his attitude towards endowments, especially the Nobel Fund.¹⁹ He maintained all along that a research fund must fall into the right hands if it is to benefit science and that it was of positive injury to science when in the hands of impressarios.²⁰

His proposed at the first meeting of the International Association of Academies, held in Paris in 1901, that a commission be appointed for the promotion of the study of human embryology and another for the study of the anatomy of the brain. The Association agreed to the appointment of the latter, at the same time recommending that for the present, human embryology should be taken up by the anatomical societies. Later, upon the recommendation of the Saxon Academy, the Royal

Society of London appointed a Neurological Commission of seven members with His as chairman. The Commission had been established and three bulletins had been published preparatory to the first general meeting, but His died before the meeting convened. His plan will live, for it has taken deep root and has the approval of leading anatomists of the world.¹⁹

The life of His was a life of work, and his energy, industry and endurance were so great that he hardly knew the meaning of leisure. He possessed the qualities of a courageous leader, but lacked the magnetism that compels many admirers and followers. He was a daring and original investigator, possessing great technical ability and artistic feeling; he was fearless and honorable in controversy and knew no compromise. He was a great character, true to his family, true to his friends and true to science.²⁰

Through His, another milestone has been set for anatomy. Through him the great mother science has given birth to a new science, histogenesis. His career is marked by a monument of neurological research which is unique. His life was that of the ideal scholar. During youth he was strengthened through his own efforts, directed by great masters. During middle age, he won many victories for anatomy, improving the science in all its parts. In old age, he completed and rounded up his work, leaving a great legacy to his survivors, no small part of which consists of wise plans for future work.

REFERENCES AND EXTRACTS FROM LETTERS.

¹ Wilhelm His was born in Basel on July 9, 1831. His father, Edward His, was a son of the Swiss statesman, Peter Ochs. In 1818, when Edward Ochs became engaged to be married to Anna La Roche, he assumed the name of His, the maiden name of his father's mother. He did this with the consent of Peter Ochs in order to remove the ridicule of his name from which he had undoubtedly suffered. After graduating from the Gymnasium, His studied medicine in Basel, Bern, Berlin, Würzburg, Prague and Vienna, returning to Basel to take his doctor's degree, in 1854. Later, he studied in Paris, returning to Basel as "Privatdocent" in 1856. In the summer of 1857 he was again in Berlin and in the autumn he was appointed Professor of Anatomy and Physiology in Basel. In 1872 he accepted the call to the chair of anatomy at Leipzig, where he died May 1, 1904.

A charming account of His's early life is given by him in his *Lebenserinnerungen (als Manuskript gedruckt)*, Leipzig, December, 1903. See also W. SPALTEHOLZ, *Zum siebenzigjährigen Geburtstag von Wilhelm His*, *Münchener Medizinischen Wochenschrift*, No. 28, 1901; and *Wilhelm His*, *ibid*, No. 22, 1904. RUDOLPH FICK, *Wilhelm His*, *Anatomischer Anzeiger*, Vol. 26, 1904. B. RAWITZ, *W. His*, *Naturwissenschaftliche Rundschau*, No. 24, 1904.

FRANCIS DIXON, *Prof. Wilhelm His, Journal of Anatomy and Physiology*, Vol. 38, 1904. W. WALDEYER, *Wilhelm His, Sein Leben und Wirken, Deutsche Medizinische Wochenschrift*, Nos. 39, 40 and 41, 1904. J. KOLLMANN, *Wilhelm His, Worte der Erinnerung. Verhandl. der Natur. Gesell. in Basel*, Bd. 15, 1904. J. MARCHAND, *Wilhelm His, Nekrolog, Bericht. d. K. s. Gesell. d. Wiss.*, Nov. 14, 1904.

² Ich hatte in Berlin bei Johannes Müller und bei Remak tiefe Anregungen erfahren, im übrigen aber einen nur mäsigen Schatz von geordneten Kenntnissen eingespeichert. Es hatte mir an sicherer Führung gefehlt: unter den Medizinnern hatte ich keine Gleichgesinnten gefunden, und mein eigentlicher Freundeskreis bestand aus Landsleuten, meistens Theologen und Juristen. Schöne Gelegenheiten, mir gründlichere physikalische und chemische Kenntnisse zu erwerben, habe ich verpasst und statt dessen einige recht sterile medizinische Vorlesungen abgesehen. Auch die historischen Vorlesungen von Ranke und die geographischen von Ritter, von denen meine Freunde soviel Interessantes zu erzählen wussten, hätte ich ohne Opfer an Fachbildung besuchen können.—*Lebenserinnerungen*, p. 28.

³ An jene Zeit absoluter Arbeitsfreiheit habe ich seitdem oft mit Sehnsucht zurückgedacht. Allerdings bot sie auch die Gefahren des Sichverlierens, so habe ich einmal acht Tage lang an der Herstellung eines Glasbläserisches gezimmert, bin aber dann, nach dessen notdürftiger Vollendung, von einem gehörigen Katzenjammer über die sinnlos vergeudete Zeit heimgesucht worden. Im Grund habe ich aber in späteren Jahren die Erfahrung gemacht, dass für den Fortgang eigener geistiger Arbeit die Belastung mit einem mäsigen Pflichtenpensum vorteilhafter ist als die absolute Freiheit, und insbesondere habe ich oftmals beim Beginn ersehnter Ferien gefunden, dass zugleich mit dem Eintritt freier Zeitverfügung eine Erschlaffung der geistigen Spannkraft sich einstellte, die erst allmählich und durch Zwang sich wieder überwinden liess. Das Gefährlichste ist hierbei das Abwartenwollen von Arbeitsstimungen; solche wirklich fruchtbare Stimmungen können ja zeitweise unverhofft einbrechen, viel häufiger aber sind sie nur dadurch erreichbar, dass man sich erst gewaltsam durch öde und anscheinend unfruchtbare Anfänge hindurch kämpft. Hat man einmal sein Arbeitsziel klar vor Augen, dann lernt man auch bald die kleinsten Zeitabfälle des sonstigen Tagewerkes ergiebig zunutze zu ziehen.—*Lebenserinnerungen*, p. 48.

⁴ Die meisten jungen Männer müssen nach Abschluss ihrer Universitätszeit eine Periode des Missbehagens durchmachen, bis es ihnen gelungen ist ihre idealen Bestrebungen in eine Thätigkeit für's Leben umzusetzen.—*From a letter of March 20, 1887.*

⁵ Es ist ein schweres, dem seiner Natur getreu bleibenden Forscher auferlegtes Geständniss, dass die letzten Ziele, für deren Verfolgung er seine ganze Kraft einsetzt, hier, wie auf allen Gebieten der Forschung, in um so entlegene Fernen rücken, je weiter er auf dem in ihrer Richtung führenden Wege voranschreitet. In der kräftigenden Arbeit selbst, im Bewusstsein sicheren Voranschreitens und in den reichen, am Wege ihn erwartenden Früchten findet er den vollen Ersatz für alle geübte Entsagung.—*Unsere Körperform*, 1874, p. 215.

⁶ Ist es ja doch die Gabe geistvoller Naturen, dass sie, auch bei beschränkten Hilfsmitteln materieller Erkenntniss, Beziehungen zuahnen und in ihrem

Zusammenhang zu durchschauen vermögen, die Anderen bei weit reicherm Material nur stückweise zugänglich sind, und dass sie selbst im Irrthum oft Gesichtspunkte eröffnen, die der langsam und mühselig vordringenden Einzelforschung als Wegweiser für die Richtung ihres Ganges dienen können.—*Die Häute und Höhlen des Körpers* (1865), *Archiv für Anatomie*, 1903, p. 369.

¹ Soll ich zum Schluss noch einmal versuchen, die histologischen Rollen der Keimschichten zu sondern, so komme ich zu folgender Aufstellung:

Der Epiblast liefert das Nervengewebe und die Horngewebe.

Der Hypoblast gliedert sich in

den embryonalen Mesoblast, die gemeinsame Anlage für das quergestreifte und glatte Muskelgewebe, für die Epithelien des Genitalapparates und für die embryonalen Binde-substanzen.

das ausserembryonale Mesenchym,

den Angioblast, die Anlage des Blutes und der Blutcapillaren,

das Endoderm, die Anlage der Epithelien und Drüsen des Eingeweiderohres.

Der Lecithoblast, da, wo er zur Entwicklung kommt, bildet einen Theil des Hypoblast.

Das alte Räthsel erweist sich zur Zeit immer noch ungelöst: noch können wir nicht sagen, weshalb ein Theil der gegebenen Anlagen zu Binde-substanzen wird, und was die Blut- und Capillarzellen bestimmt, so frühzeitig und so scharf sich von ihren scheinbar so nahen Verwandten, den Zellen der Binde-substanzen, zu scheiden.—*Lecithoblast und Angioblast der Wirbelthiere*, *Abhandl. d. K. Säch. Gesellsch. d. Wiss.*, Bd. 26, 1900, p. 326.

² Ich schliesse diesen in jeder Hinsicht fragmentarischen Aufsatz über die intramedullaren Faserbahnen des Gehirns mit der Bemerkung, dass er zur Zeit nicht viel mehr zu bieten vermag, als ein Arbeitsprogramm für kommende detaillirtere Forschungen. Noch sind wir eben in Erkenntniss dieser Dinge in den allerersten Anfängen, und es bedarf hier, wie anderwärts, zäher Arbeit bis die Entwicklungsgeschichte des Gehirns nach ihren verschiedenen Richtungen hin befriedigend kann klar gelegt werden. Zur Zeit kann ich nur angeben, wo diese Arbeit einzusetzen hat. Früher oder später wird man auf diesem Gebiet zum System organisierter gemeinsamer Arbeit überzugehen haben.—*Die Entwicklung des Menschlichen Gehirns*, Leipzig, 1904, p. 175.

³ Im Leben unsrer Universitäten macht sich bei aller anscheinenden Fortdauer ihrer Leistungen, und auch bei ununterbrochenem Ersatz abgehender Kräfte durch neu eintretende, eine ganz bestimmte Periodicität der Entwicklung geltend. Für die Gesamtuniversität und für die Facultäten folgen auf Perioden geistigen Aufschwunges solche der Ruhe und des Rückgangs. Aeussere und innere Bedingungen wirken dabei zusammen und es ist nicht immer leicht, deren Ineinandergreifen zu verstehen. Eine Grundbedingung muss aber stets erfüllt sein, falls eine Körperschaft blühen soll. Die Körperschaft muss kräftige und zielbewusste Führer besitzen, welche deren Geist in bestimmte Bahnen zu lenken und unter ihren Gliedern die Gemeinsamkeit des Strebens zu sichern wissen.

Solch ein führender Geist ist in unsrer Facultät während mancher Jahrzehnte Ernst Heinrich Weber gewesen, welcher vom Jahr 1821 ab die Pro-

fessur der Anatomie und späterhin (von 1841 ab) noch die der Physiologie bekleidet hat. Die Spuren seiner mächtigen Persönlichkeit haben sich als bleibende erhalten nicht nur in den Acten unserer Facultät, sondern noch tiefer begründet in denen der Wissenschaften, die er vertreten und die er um ausgedehnte neue Gebiete bereichert hat.

Bis zum Jahre 1865 hat Ernst Heinrich Weber, von seinem Bruder Eduard unterstützt, die Doppellast der beiden ausgedehnten Fächer getragen. Dann aber, als die Neuschöpfung einer physiologischen Anstalt in Aussicht genommen wurde, und dadurch neue Verpflichtungen an den Lehrer der Physiologie herantreten sollten, zog sich der alternde Gelehrte auf seine ursprüngliche Anatomieprofessur zurück, und es ist nun auf Ostern 1865 (unter dem Dekanat Wunderlichs) die Berufung von Karl Ludwig als Professor der Physiologie und Director des neu zu begründenden physiologischen Instituts erfolgt.

Die Initiative zu diesen Neuerungen ist von der königlichen Regierung ausgegangen. Im Sinn ihres hohen Monarchen, des Königs Johann, hatten sich die einsichtigen Leiter des Ministeriums, Hr. Staatsminister v. Falkenstein und Hr. Geh. Rath Dr. Hübel, die Aufgabe gestellt, die Universität Leipzig mit allen aufwendbaren Mitteln zu neuem Glanze zu erheben. Die physiologische Anstalt wurde als das erste Glied einer Reihe von Neuschöpfungen geplant, deren Endziel die Umgestaltung des gesamten naturwissenschaftlichen und medizinischen Unterrichts sein sollte. In der Wahl von Professor Ludwig hat die k. Regierung eine besonders glückliche Hand bewiesen, denn sie gewann an ihm für ihre ferneren Entscheidungen einen vermöge seiner Einsicht und seiner organisatorischen Kraft ganz besonders befähigten Rathgeber. Ludwig's Einfluss hat sich während der v. Falkenstein'schen Periode weit über das medizinische Facultätsgebiet hinaus erstreckt, und seiner Anregung sind von den bedeutendsten Berufungen jener Zeit zu verdanken gewesen. Später, nachdem einmal die Organisation naturwissenschaftlichen Unterrichts für Leipzig erreicht und nachdem auch das Cultusministerium in andere Hände übergegangen war, hat sich Ludwig auf sein engeres Arbeitsgebiet zurückgezogen. Was er aber auf diesem Gebiete geleistet hat, das hat den Ruhm der Leipziger Universität bald durch alle Länder verbreitet.—KARL LUDWIG und KARL THIERSCH, *Beilage, Allgemeinen Zeitung*, Nr. 164. 19 Juli, München, 1895.

¹⁰ Ich danke Ihnen für den inhaltsreichen Aufsatz über die Darmentwicklung, die in der mir überreichten Jubiläumsschrift thatreich hervortritt. Alle diese Bezeugungen haben mich herzlich gefreut. Dauernd wird die Befriedigung über Ihre Arbeit sein, die ein bis jetzt so wenig klarer Gebiet endgültig in's Reine bringt. Was ja bei den meisten unserer bishörigen entwicklungsgeschichtlichen Vorstellungen fehlt, das ist die Beobachtunggrundlage für die Uebergangsphasen aus den früh embryonalen in die foetalen und von da in die ausgebildeten Stufen. Für den Darm haben Sie nunmehr die ganze Kette vom Anfang bis zum Ende zusammengefügt und das halte ich für einen grossen Fortschritt.—*From a letter of October 29, 1897.*

¹¹ So weit ich über solche freie Augenblicke verfüge, widme ich sie noch meiner alten unglücklichen Liebe den Knochenfischen. Ich habe seit dreissig Jahren schon unendlich viel Zeit damit verloren, sie sind ein methodisch

sehr schwer zu bearbeitendes und launisches Material, und doch locken mich die unüberwundenen Schwierigkeiten und offenen Fragen immer wieder zu neuen Anläufen.—*From a letter of December 25, 1898.*

¹² Wie bei der wissenschaftlichen Arbeit, so tritt auch bei unserer heutigen Lehrweise der Respect vor der Thatsache in den Vordergrund, und wir bemühen uns in erster Linie auch unsere Schüler dazu zu erziehen. Beim naturwissenschaftlichen und somit auch beim medizinischen Unterricht ist unsere Sorge, dem Anfänger die Kunst unbefangener Beobachtung beizubringen. Wir halten ihn an, die Sinneswahrnehmungen scharf zu trennen von den daran sich anknüpfenden Schlussfolgerungen, wir warnen ihn vor der Beeinflussung durch vorgefasste Meinungen und belehren ihn über die Täuschungsquellen, die in unsern eigenen Sinnen sowie in unsern besten Apparaten enthalten sind. Vor allem aber suchen wir den Schüler dazu zu bringen, dass er sich angewöhnt, das Gebiet eigener Erfahrungen selbständig zu klaren Begriffen zu verarbeiten. So klein Anfangs das Capital an solch eigenem Erwerb sein mag, so gewährt es dem Besitzer doch bald das Gefühl einer bestimmten geistigen Freiheit und Unabhängigkeit, das Gefühl des tüchtigen Menschen.

Was hat nun aber diese, vorwiegend auf Schärfung der Kritik hinstrebende Form der Schulung mit der Spaltung der Lehrfächer zu thun? Der Zusammenhang ist leicht nachzuweisen. So lange es sich um blosser Ueberlieferung systematisch geordneter Begriffe in dogmatischer Form handelt, ist ein fleissiger Gelehrter mit Hilfe der nöthigen Lehrbücher, der duces Arnemann, Gaubius und Metzgerus im Stande, ein ausgedehntes Gebiet als Lehrer zu umspannen, ja selbst vom Ueberspringen von einem Fache auf ein anderes, mehr oder minder entlegenes, wird ihn kein inneres Hinderniss abhalten. Wenn wir hören, dass in einem frühern Jahrhundert die Lehrfächer innerhalb der philosophischen Facultät jedes Jahr frisch ausgelöst wurden und dass auch nach Beseitigung dieses Modus noch die Verpflichtung bestand, dass ein jedes Facultätsmitglied allen Fächern gerecht sein musste, so ist diese heutzutage undenkbare Einrichtung dadurch verständlich, dass in jenen Perioden die Bedeutung der allgemeinen Gelehrtenbildung über diejenige der Fachbildung weit überwog, während wir nunmehr auf dem entgegengesetzten Standpunkt stehen. Sowie verlangt wird, dass der Lehrer die wissenschaftlichen Ergebnisse seiner Disciplin anstatt blos in dogmatischer Form, auch nach ihrer Begründung dem Schüler mittheile, so fällt eine Hauptseite des Unterrichts in die wissenschaftliche Methodik.—*Ueber Entwicklungsverhältnisse des Akademischen Unterrichts, Rektoratsrede, Leipzig, October 31, 1882, p. 33.*

¹³ Ludwig's Forscherwaffen waren eine ungemein scharfe Analyse der ihm vorliegenden Naturerscheinungen, eine stets klare Fragestellung und eine absolute Sicherheit seiner Methodik. Dabei verfügte er aber auch über eine ausreichende Dosis jenes Findersinnes, ohne den in Erforschung der lebenden Natur selbst die klarsten Denker oft machtlos bleiben. Die Natur lässt sich nicht immer mit Logik zwingen, ihre Wege sind nicht selten versteckt, und sie enthüllen sich nur dem, der sich in ausdauernder und treuer Beobachtung den Blick auch für deren unscheinbare Spuren geschärft hat. Die unmittelbare Liebe zur sinnlichen Beobachtung hat aber Ludwig im hohen Maasse

besessen, und für ihn ist ein gelungenes Präparat oder ein schlagender Versuch stets Gegenstand eigentlich ästhetischen Genusses gewesen.—CARL LUDWIG, *Gedächtnissrede, Bericht, d. K. s. Gesell. d. Wiss., November 14, 1895, p. 6.*

¹⁴ Ihre Bestrebungen eine inductive anatomische Unterrichtsmethode zur schaffen, interessiren mich sehr lebhaft. Wenn es Ihnen mit fünfzig Schülern gelingt, zum Ziel zu kommen, so ist dies jedenfalls eine anerkennungswerthe Leistung. Vor Kurzem publicirte der bekannte, Dr. Schweninger, einige Aufsätze über die Erziehung von Medizinern, worin er überhaupt das Präpariren verwarf und meinte, man soll die Anatomie gleich am Lebenden vornehmen, die Studenten durch Percussion, u. s. w. die Organe auf den Körper zeichnen lassen, u. s. w. Unsere Medizinererziehung ist zwar krank an zu vielem Auswendiglernen von Bücherweisheit und gewiss könnte auch in der Anatomie dem Studenten manches osteologische Detail erlassen werden. Aber abgesehen davon, ist ja der Präpariersaal eine so wichtige Schule der Beobachtung und der Handfertigkeit, dass eine grosse Beschränktheit dazu gehört, das anatomische Präpariren beseitigen zu wollen.—*From a letter of December 31, 1896.*

¹⁵ His's influence in America has been great, greater than in any other country, even Germany. He took a lively interest in our whole development, in the development of our universities, scientific societies and journals. He was much pleased with the numbers of the American Journal of Anatomy, and appreciated above all the leading article by Bardeen and Lewis. "Auch darüber habe ich mich gefreut dass Sie mit so viele Andere zusammen arbeiten." He always approved of coöperation.

¹⁶ Was Sie mir damals von "Carnegie Institution," geschrieben haben, muss uns, diessseits des atlantischen Oceans Lebende mit innigem Neid erfüllen. Es ist indessen keine Frage, wir sind in eine Periode eingetreten, in der die zu leistende Arbeitssumme immer grösser und die Ansprüche an Reichlichkeit des Materiales und die Präcision seiner Durcharbeitung immer strenger werden und da hilft eben schliesslich nur ein wissenschaftlicher Grossbetrieb mit guter Organisation. Noch haben wir in Deutschland bei aller Arbeit ein zu planloses Durcheinanderrogen, und zu viel Kraft geht in persönlicher Reibung verloren. Der Ehrgeiz ist ein wichtiger Antrieb zur Arbeit, aber anderseits führt er auch vielfach dahin, dass die Arbeiter anstatt sich zu unterstützen, sich gegenseitig herabzumindern suchen. . . . Noch vor zehn Jahren hatte mir die Organisation eines grosseren rein wissenschaftlichen Institutes, die grösste Freude gemacht. Mit zwei und siebenzig Jahren weiss man aber, dass die Arbeitszeit nur noch knapp zugemessen ist, ganz abgesehen davon, dass die Arbeit viel langsamer von der Hand geht.—*From a letter of March 17, 1903.*

¹⁷ Ich hatte im vorigen Sommer einen Anlauf genommen, um die Begründung besonderer entwicklungsgeschichtlichen Institute und Gehirninstitute in Anregung zu bringen, aber bis jetzt habe ich noch nicht Viel erreicht. Es fehlen uns in Deutschland und in Europa jene Milliardäre die bei Ihnen so fix bei der Hand sind, wenn grosse Schöpfungen fundirt werden sollen. Das immense Capital, dass der Ingenieur Nobel für wissenschaftlichen Zwecke vermacht hat, ist dadurch nutzlos, dass er die Vertheilung der Zinsen in Form von Preisen

bestimmt hat. Da diese Preise jedes Jahr vertheilt werden sollen so wird, wie ich fürchte, die Zutheilung bald zu Parteisache werden und viel Unfrieden herbei führen.—*From a letter of December 31, 1902.*

“Wird durch solche Preise die wissenschaftliche Arbeit wirklich gefördert?” Ich glaube, man kann diese Frage ruhig verneinen: kein aus innerem Antrieb arbeitender Forscher wird dadurch, dass ihm das Schicksal eine grössere Summe Geldes in den Schooss wirft, ein Anderer werden. Er wird eben über die Ehre des Preises und über den empfangenen Betrag sich freuen, im Uebrigen aber seinen Gang weiter gehen, als ob Nichts geschehen wäre. Und wer den Preis nicht bekommt, wird nicht anders verfahren. Höchstens liegt für den letzteren, wenn er nicht edel veranlagt ist, die Versuchung vor, dem begünstigten Collegen, oder denen, die über den Preis zu bestimmen hatten, unfreundliche Gefühle nachzutragen.—*Ueber wissenschaftliche Stiftungen, Bericht. d. K. s. Gesell. d. Wiss., 1901, p. 434.*

¹⁸ Sie haben an ihren neueren amerikanischen Universitäten einen kräftigen Nervus rerum, und wenn reiche Hilfsmittel in die richtigen Bahnen kommen, so lässt sich ja Vieles in verhältnissmässig kurzer Zeit erreichen. Die Hauptsache bleibt immer dass die Führung solch fortschreitender Bewegungen in den Händen von Männern bleibt, die wissen, woraus es bei geistigen Schöpfungen ankommt. Es ist immer befriedigender, völlig Neues zu schaffen, als am Alten herumzuflicken. Letzters Schicksal fällt uns in Europa nun allzu oft zu. Augenblicklich soll wieder an unsern Examenreglementen gefickt werden, eine Arbeit die nur wenig Freude bringt, da der Ballast alter Vorurtheile und Widerstände nicht über Bord geworfen werden kann.—*From a letter of April 22, 1899.*

¹⁹ GENERAL OUTLINE OF THE DEVELOPMENT OF HIS'S INSTITUTE FOR THE STUDY OF THE BRAIN.

A.—*Proposition to the International Association of Academies, Paris, April 20, 1901.*

Die Internationale Association der Akademien möge eine Fachcommission aufstellen zur Berathung der Mittel und Wege, wie auf den Gebieten, eines theils der menschlichen und thierischen Entwicklungsgeschichte, andernteils der Hirnanatomie eine nach einheitlichen Grundsätzen erfolgende Sammlung, Verarbeitung und allgemeine Nutzbarmachung von sicherem Beobachtungsmaterial erreicht werden kann.

B.—*Decision of the Association of Academies.*

1. Die Berathung der auf menschliche und thierische Entwicklungs-geschichte bezüglichen Abschnitte des Antrages ist vorerst den betreffenden Fachvereinen (den anatomischen Gesellschaften) zu überlassen.

2. Dagegen setzt die Internationale Association der Akademien eine Special-commission nieder, die eine nach einheitlichen Grundsätzen erfolgende Durchforschung, Sammlung und allgemeine Nutzbarmachung des auf Gehirnanatomie bezüglichen Materiales zu berathen hat. Die Commission hat insbesondere die Schaffung eines internationalen Systemes von Centralinstituten in Erwägung zu ziehen, in denen die Methoden der Forschung entwickelt, das vorhandene Beobachtungsmaterial aufgespeichert und der allgemeinen Benutzung der dabei interessirten Gelehrten zugänglich gemacht werden.—*An-*

trag der Kön. Sach. Ges. an die Royal Society of London, Ber. d. K. s. Ges. d. Wiss., February, 1902.

C.—Objects of the Institute.

1. Die Aufspeicherung und Zugänglichmachung von wissenschaftlichem (normalem) Material an Präparaten, Modellen, Photogrammen, Zeichnungen u. s. w.

2. Die technische Hilfeleistung bei wissenschaftlichen Untersuchungen.

3. Die Aufbewahrung von wertvollem experimentellphysiologischem und pathologischem, bereits bearbeitetem oder noch zu bearbeitendem Material.

4. Die Bewältigung grösserer, über die Kräfte einzelner hinausgehender Aufgaben, soweit solche zur Kooperation sich eignen.—*Antrag der von der Internationalen Association der Akademien Niedergesetzter Commission für Hirnforschung der Generalversammlung der Association in London zum 25 Mai, 1904, vorgelegt, Leipzig, 1904.*

D.—Organisation of the Institute.

1. Arbeitsfeld und Arbeitsweise bleiben jedem einzelnen Institute überlassen. Es sollen jedoch angestrebt werden:

a. Eine einheitliche Nomenklatur.

b. Verwendung eines einheitlichen Masses und Gewichtes.

2. Alljährlich stellen die Institute der Centralkommission einen Bericht über ihre Thätigkeit ab. Dabei sollen der Bestand und die Zugänge an Druckwerken, Abbildungen, Modellen und Präparaten mitgeteilt werden.

3. Die Institute sind gehalten ihre Arbeitsmaterialien und die Sammlungen ihrer Präparate einander unter sich, sowie den derselben bedürftigen Forschern nach Möglichkeit zugänglich zu machen.—*Bericht, etc., Bericht. d. K. s. Gesell. d. Wiss., June 8, 1903.*

D.—Sections.

1. Die systematische Anatomie des menschlichen Centralnerven-systems, einschliesslich der Anthropologie.

2. Die vergleichende Anatomie.

3. Die histologische Forschung.

4. Die entwicklungsgeschichtliche Forschung.

5. Die Physiologie, einschliesslich der physiologischen Psychologie.

6. Die pathologische Anatomie, experimentelle Pathologie und Teratologie.

7. Die klinische Forschung.—*Entwurf. Motiv zu den Anträgen, etc., Leipzig, January 3, 1904.*

F.—Special Committees.

1. Waldeyer, Cunningham, Mall, Manouvrier, Zuckerkandl.

2. Ehlers, Edinger, Giard, Guldberg, Elliot Smith.

3. Golgi, Ramon y Cajal, Dogiel, van Gehuchten, Retzius.

4. His, Bechterew, v. Kölliker, v. Lenhossek, Minot.

5. H. Munk, Horsley, Luciani, Mosso, Sherrington.

6. Obersteiner, Dejerine, Monakow, Langley, Weigert.

7. Flechsig, Hentschen, Ferrier, Lannelongue, Reymond.—*Protokoll von der Internationalen Association der Akademien Niedergesetzten Centralkommission für Gehirnforschung, January 11, 1904. Bericht. d. K. S. Gesell. d. Wiss., 1904.*

²⁰ Es that mir wohl aus Ihrem Brief, wie aus vielen Andern, die ich bekommen habe, zu sehen, wie mein Mann nicht nur durch seine Wissenschaft, sondern noch mehr durch sein Leben und seinen Karakter seinen Schülern etwas Gutes erwiesen hat.—*From a letter from Frau Professor His of June 8, 1904.*

Ich bin mit diesen Aufzeichnung an einen Punkte angelangt, wo ich sie abschliessen kann. In reichem Wechsel sind mir beim Niederschreiben obiger Blätter Bilder vor Augen getreten von einer Fülle von trefflichen und von hervorragenden Menschen, mit denen ich im Laufe meiner Entwicklungsjahre in Beziehung getreten bin. Gar manche Namen hätte ich der Schar noch beifügen können. Von allen diesen Menschen habe ich gelernt oder sonstwie Gutes empfangen. Die weit überwiegende Mehrzahl derselben sind längst dahingeschieden, allen aber bewahre ich ein dankbares Andenken. Mögen andere dereinst auch von mir dasselbe sagen können.—*Lebenserinnerungen.*