

## Seventh International Congress of Anatomists

R. Burton Lilly, '64

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It is hoped, with the publication of this paper, that people not directly affiliated with anatomy will get a better understanding of its scope and begin to look at it more as a dynamic science than as a didactic dissecting room lesson; that the relationship between anatomy and medicine as an active and growing one becomes explicit; and we become more aware that the construction and maintenance of a science upon its basic foundations is a product of active work by dedicated men.

This is not a "Scientific" report, for technical detail has been omitted in most cases. Subjectivity permeates this paper both in the choosing of the topics discussed and in the manner in which they are commented upon.

"... this is one world, this is one Anatomy"

H. Stanley Bennett,  
President, American Association  
of Anatomists.

On the morning of April 11, 1960, the stage of the Grand Ballroom of the Statler Hilton in New York City was adorned with the flags of over thirty nations. This was the setting for the inauguration of the Seventh International Congress of Anatomists, a meeting which was to cover eighteen hundred anatomists from forty-two countries representing every part of the world.

With a striking similarity to a United Nations meeting, a delegate from each country answered the roll called by the chairman of the Congress, Dr. George W. Corner. He next welcomed all the delegates on behalf of the Canadian and American Anatomical Association. In this welcome address, Dr. Corner clearly pointed out the development of the science of anatomy, emphasizing its ramifications into the many other branches of science that advanced as anatomy broadened its scope. It was made clear that this broadening of anatomical science took place at the expense of its being purely an instrument of classical morphology.

As the welcome address unfolded, more and more of the spirit of the Congress became revealed, as did the identity, often hidden, of anatomy itself. Although given somewhat apologetically, Dr. Corner's definition of anatomy as "... anything done

by an anatomist," certainly appeared more and more appropriate and necessary as the Congress progressed. His words did not appear to be "lip service" when he told of the past and future development of anatomy along with medical education.

The Congress was based primarily on the six hundred papers delivered "from the platform" during the week. Under the physical circumstances and because of the amount of material to be presented, the papers were all gathered under the classification of the disciplines to which they were related. The more extensive of these were as follows: neurology, cytology, histology, histochemistry, embryology, and general anatomy. Others, less in magnitude, but equal in importance were: namely, anthropological and comparative anatomy, histophysiology, physiology, hematology, and finally a division designed expressively for the presentation of motion pictures.

In addition to the papers, the scientific demonstrations, of which there were 125 remained on display throughout the entire week. These consisted primarily of photographs, diagrams, and models of recently developed concepts in anatomy. The availability of these demonstrations and their authors throughout the week allowed the delegates to study and discuss them at their discretion. Supplementing the scientific demonstrations was the commercial exhibit put on display by scientific supply and book companies. This gave the delegates a chance to see many of the latest

developments in scientific instrumentation in operation and to investigate recent and yet to be published textbooks.

In rounding out the program, the Congress committees arranged for a number of symposia on specific topics and provided facilities where discussions might be continued should time have become a limiting factor during the formal session. Invitations were presented to the delegates to inspect the medical school facilities of all the schools in New York and of Yale University in New Haven, Connecticut.

The attendance was impressive, both in number and in name. To mention a few, the authors of universal and classical textbooks, Arey, Hamilton, Grant, Hamm, Boyd and Patten; authors of the more recent treatises of descriptive anatomy, O'Rhailly, Gray, Gardner, and Fyfe; pathfinders in electron microscopy, Palade, Pease, Pallay, Sjostrand; current expanders of electron microscopy, Low, Hayke, Haley, Leeson and Leeson, Fernandez-Moran; histochemists, LeBlond and Mancini; pioneers in pituitary physiology, Green, Everett, and Markee, and finally the dramatic and controversial histologist, Elias.

The scope of the work presented was equally impressive, obviously attaining the goal of this science, which is, as H. Stanley Bennett, President of the American Association of Anatomists, describes, ". . . . to understand biological structure at all levels of organization and to bring technical competence into anatomical work." Dr. Bennett emphasized that in this field of endeavour, "Instrumentation is no substitute for intelligence." Bennett explained the current breadth of anatomy by looking at its development in historical terms. He recalled the early realization of the importance of microanatomy in the growth of anatomical sciences with the onset of the technical advances developed by Ranvier, Malpighi, and Flemming. Later advances led to the modern day polarizing microscope, valuable in relating living activity to fixed structure; the electron microscope, to be considered as important a discovery as the light microscope; and

X-ray diffraction studies, to bring research down to a molecular level. This instrumentation and knowledge demands that the present future anatomists be concerned with all other fields of basic science. The tone and spirit of Bennett's feelings were of optimism and faith that this new, yet classical, period of anatomy, the era of the electron microscope, will parallel the contributions of the earlier classical periods of Vesalius and of the light microscope.

The objectives and goals of the Congress were set at the first plenary session, as was the spirit, which was appropriately described in the translation of the Mexican delegate's remarks "...for a closer relationship among anatomists and societies throughout the world." This spirit prevailed throughout the entire week; when even during the most heated discussions, the most determined convictions never gave rise to verbal animosity and derision. Yet this atmosphere did not introduce the element of passiveness into any of the delegates. Regardless of the significance of any particular topic, whenever expression was poor, elaboration was asked for; whenever corroborating facts appeared weak, substantiation was demanded; and when ideas and concepts were questionable, they were openly questioned. The element of error was denied entrance into the Congress whenever possible.

#### THE ELECTRON MICROSCOPE

As earlier mentioned, electron microscopy was the chief topic of the congress. Fully one-sixth of the papers presented during the meeting were based on work with the E-M. This work encompassed such varied topics as iron absorption studies (Taylor, U.S.A.); E-M identification of human oxyntic and pepsin producing cells (Lillibridge, U.S.A.); ultrastructure studies in the lung (Low, U.S.A., Hayek, Austria); an entire symposium dedicated to the ultrastructure of the eye; E-M studies of intertubular tissue in the kidney (Leeson, T.S., Canada); pituitary circulation (Everett, U.S.A.), *Staphylococcus Aureus* (Suganuma, U.S.A.); and the human vitreous body (Schwarz, Germany). Also included were physiolog-

ically related topics describing the fine structure of cells concerned with secretion of water and ions (Halley, Scotland); autonomic nerve degeneration (Richardson, U.S.A.); and transport across the endothelium of blood vessels (Palade, U.S.A.). Despite the technicalities involved in the before mentioned investigations, the results are readily related to earlier and current concepts even by people not expertly familiar with the mechanisms of the E-M. This is apparent when one reviews, even superficially, some of the studies presented at the Congress.

Highlighting the above papers, was Palade's flawless delivery of his well organized study of "Transport in Quanto Accross the Endothelium of Blood Capillaries". Dr. Palade described the wall of small muscular blood capillaries as consisting of two continuous coats, an inner endothelial lining and an outer basement membrane. Photomicrographs showed the appearance of vesicles (40-60  $\mu$ ) accumulated below the plasma membrane on both the tissue and blood front. Testing the hypothesis that these vesicles transport fluid from one front to the other, colloidal gold (4-16 $\mu$ ) was injected into the general circulation. In the earlier specimens, particles gained access to the vesicles on the blood front, while in the later stages they appeared to have migrated to the basement membrane and finally to the adventitial cellular elements. Within the endothelium, the particles were contained in the intravesicular phase and never into the cytoplasmic matrix. Particles were not detected in the intercellular space of the endothelium or against the basement membrane. Thus the gold seems to travel only in vesicles which have previously been shown to be continuous with the endothelium as evaginations and invaginations. With future quantitative information to show the extent of this transport mechanism, this work will somewhat qualify the "pore theory" of transportation, as well as the theory of transportation through the intercellular cement substance.

Somewhat more controversial were the two consecutive papers given by Low

(U.S.A.) and Hayek (Austria), both which dealt with the blood-air barrier or the interalveolar septum. Both agreed on the concept of the adjoined endothelial and epithelial cells of the capillary and alveoli respectively, each having its own basement membrane. Low, however, with better resolution, described the latter membranes as being non-fibrillar and slightly granular, separated from each other by a structureless and clear interspace. The epithelial membrane was described as blending, only in the absence of a capillary, with fine ground substance. The basement membranes as described by Hayek are separated partly by connective tissue and are partly in confluence forming one single membrane.

Studies such as these appeared to emphasize to the delegates the need for uniformity in the methodology used in electromicrographic investigations. They also served to substantiate the need for proper interpretation of results obtained from constantly changing technical advances.

Canadian delegates, Leeson, C.R. and Leeson, T.S., delivered papers which had emphasis on functional and developmental aspects of anatomy respectively. C.R. described the appearance of the myoepithelial cell of the rat exorbital lacrimal gland. These cells were shown to have much the same feature as previously described myoepithelial cells. With these cells, however, it was possible to elucidate finger-like cell processes, containing mitochondria, extending around and between the acinar cells. The presence of fibrils within these processes suggest a possible functional role of contraction to aid the secretory activity of the acinar cell.

Intertubular tissue in the hamster kidney was described by T. S. Leeson, with emphasis on the intertubular cell in particular. This study involved the examination of the kidney from the one day stage to the adult. Although the outer cortex is incompletely differentiated at birth, the juxta-medullary tubules and glomeruli are similar to those in the adult. The intertubular cells are shown to diminish in number with age.

Because of their demonstrated close association with endothelial cells and their often degenerate appearance, it was suggested that they have one of two fates. They either differentiate into other cell types, most likely endothelial, or degenerate and disappear.

A technically unique study was presented by Ross, L.L. (U.S.A.), who, along with his associates, prepared a tissue culture of new-born rat cerebellum. After localizing an active area of myelin formation by light microscopy, the cultures were prepared for electron microscopic investigation. The photomicrographs from these preparations showed neuroglial cell processes arranged around an axon in lamellae. Fusion of these lamellae result in lamellae in myelin. These lamellae, which are at first noticeably separate, eventually fuse to form the mature myelin sheath.

Many of the studies considered pathological states in relation to normal structure and function, oft times with a very definite practical and clinical direction. One example of this was Farquhar's (U.S.A.) electron microscopic study of glomerular permeability. After ferritin had been injected as the tracer substance, kidney tissue was removed at timed intervals from both normal and nephrotic animals. In both animals the ferritin penetrated the endothelial openings and was found throughout the entire depth of the basement membrane. In controls only a few molecules were found in the vesicles of the epithelial cell, while the incorporation of ferritin into the vesicles and invaginations of the nephrotic epithelium was marked. This suggests that the basement membrane, the principal filtration barrier, normally allows passage of only a small amount of protein which is removed by the epithelium. Evidence of stimulated epithelial activity in the nephrotic suggest a defect in the basement membrane allowing passage of increased quantities of plasma proteins.

Perhaps the most dramatic, though by no means the most documented or adopted,

treatise on pathological anatomy was that given by Elias (U.S.A.). Elias, who used the early part of his allotted time to conclude a relatively heated discussion he had been having with Atterman (Canada), introduced a decidedly new viewpoint on the etiology of hepatocarcinogenesis. With the use of diagrams, many of which had a cartoon-like effect, Elias described the current concept that cancer spreads by multiplication of the original focus into primary and secondary sites. From observations of autopsy specimens which showed direct transformations of normal liver cells into cancer cells, he concluded that parenchymal cells of the liver become carcinogenic in a diffuse fashion throughout the entire organ. Elias then exhibited electrophotomicrographs of cells which he purports to be semi-cancerous, cells thus in the process of transformation. Regardless of the cause, which is not known, the organ will have the ability to make the transformation, thus all sites of carcinogenesis are primary. Going further, Elias denied the validity of the surgical practice of early extirpation of the primary site, claiming that even if the organ is cleared by this method, the cellular transformations would eventually introduce new cancerous areas. Since the predisposition to this transformation is characteristic in any particular organ, removal of it, if non-vital, will prevent recurrence. In conclusion, Elias suggested that the role of the nucleus in carcinogenesis be re-evaluated, particularly in the viewpoint of the proposed "multicentric theory" as opposed to the "unicentric theory", first introduced in 1889.

## GROSS MORPHOLOGY

The major part of purely morphological work was primarily concerned with neurology. Topics in relation to other organ systems received some attention, particularly the liver, lung, heart, and circulatory system. Huber (U.S.A.) and Bilbey (Canada) contributed notable additions to the work previously done in defining the segmental anatomy of the liver and lung.

Huber described findings which sub-

stantiate the phenomenon of "collateral ventilation": ventilation of one bronchopulmonary segment by another. The injection method demonstrated clearly the presence of the injected material in a segment, the bronchus of which had been previously blocked. Further evidence entailed preparation of casts which clearly delineate a definitive inter-bronchial tree communication. Perhaps the least impressive of the evidence presented, was that of the leakage of air from a "carefully" dissected out segment. In this case, the problem of dissection of a clear cut segment, without injury, remains the one drawback.

Bilbey's work appeared to be involved with similar problems; that of proper and specific injection of materials, in this case, a plastic polymer. Here, however, Bilbey attacked all possible means of anatomical segmentation; the portal and hepatic venous system, the hepatic arterial system, and the biliary system. The casts which result from this "differential injection" technique demonstrate a specific segmentation pattern in the portal system with which the distribution of the other systems coincide. In support of this work, Bilbey had placed on remonstrations, not only the casts of the various systems injected with multicolored material, but also corresponding radiographs, a large scale model, and a proposed simplified nomenclature, based on vascular segmentation. The implications the above work presents to clinical and pathological studies, as well as to descriptive anatomy, in this case appear obvious.

Following the modern anatomical research principal of relating structure with function, A. A. Puff (Germany) presented a complementing morphological and physiological study of ventricular contraction. This study, which presents a fresh viewpoint on the functional anatomy of the ventricles, was clearly illustrated by a film which was presented earlier in the proceedings. Making use of excellent photographic technique (as exemplified by the film), ECG recordings and surgically exposed hearts (sheep and human) were simultaneously photographed on the same

film. A further study was also made of ventricular muscle fibres fixed in the various stages of contraction. From this study of the fibres, it was pointed out that if all the fibres contracted in one simultaneous contraction, their effects would be neutralized.

The concept advanced for ventricular contraction is that of two functional "tracts" in each ventricle, an inflow tract and outflow tract. In the right ventricle, the initial impulse for ventricular contraction passes through the anterior papillary muscle causing it to contract, thus stretching and unfolding the inflow tract, allowing the blood to flow into this, the main body of the ventricle. As the contraction spreads through the inflow tract, the outflow tract becomes unfolded passively and receives the blood from the contracting inflow tract. In the left ventricle, the final contractions of the inflow tract cause the outflow tract to become completely cylindrical in shape as it contracts forcing the blood through the tricuspid opening and into the circulation. During the outflow, the papillary muscles are pulled up thus aiding closure of the inflow canal. In all cases the duration of contractions are equal. This activity of the ventricular fibres to work against one another temporarily, yet with one another functionally, follows a complex pattern of which much more is yet to be learned, particularly when considering the right and left ventricle in relationship to one another. It would follow from this study that the "tracts" of both ventricles must work in close harmony and cooperation with one another.

#### ENDOCRINOLOGY

Perhaps the most inclusive and thorough of all the disciplines of anatomy represented at the Congress was that of endocrinology. Although a diffuse subject by nature, all the work directly related to endocrinology was grouped into general categories and there discussed systematically, maintaining constant and direct relationships with structure and function. The work with the hypophysis consisted mainly of the now classical techniques of inducing lesions, pro-

ducing stimulation, stalk division, commonly practiced histological investigations, and finally, the yet untapped potential of the EEG.

Yamada (Japan), relating a histological study with normal physiology in mice, describes a peculiar chromophobe cell differing in appearance from ordinary chromophobes. This differentiation is made possible by interpreting staining properties of the juxta-nuclear area of this cell as well as a "cap-like rim" surrounding it. These cells appear mainly in females upon sexual maturation and are particularly abundant during pregnancy and lactation. This indicates a possible relationship to ovarian function.

Haun (U.S.A.), along with Sawyer (U.S.A.) a pioneer in pituitary investigation, demonstrated, by means of hypothalamic lesion specific areas in the CNS which are responsible for inhibition of lactation. This area, the medical basal tuberal area, has been previously shown to be responsible for the elaboration of L.H. Since lactogenic hormone release is related to the suppression of LH secretion, it is suspected that the LH is the specific neurohumoral inhibitor of the production of lactogenic hormone.

Reproductive functions, too, were studied by the classical methods on which we base most of our knowledge about them. These include cyto- and histochemical analysis of the organs during varying stages of development and of their products and constituents. Varying from this pattern somewhat was a general investigation headed by Treciokas (U.S.A.) which pointed to the spleen as a possible factor in controlling testicular function. The mechanism for this was not put forth, but further studies were mentioned suggesting the possibility of a splenic inhibitory mechanism of the pituitary.

The adrenal received particular functional attention in relationship to its circulation and participation in the stress reaction, as well as the physiological aspects of its lymphatic drainage.

The stress problem was reviewed by

Harrison (England) who described the constriction of the arteries of the adrenal medulla upon stimulation by adrenaline. This constriction drives an exceedingly rich supply of blood to the cortex, thus enabling an increase in corticoid output. These findings are made quite explicit by using the techniques of arteriography and microarteriography.

Using the previously described injection technique, Jdanov (Russia), in his paper, described the lymphatic distribution of the thyroid, thymus, pancreas, the testes, and the adrenal gland. The lymphatics, appearing in networks, surround groups of three to four folliculi in the thyroid; appear chiefly as interfollicular structures in the thymus; surrounding the Islets in the pancreas; are concentrated throughout the cortex and medulla of the adrenal as well as in its capsule; and finally efferently passing from the seminiferous tubules, to the mediastinum testes and tunica albuginea of the testes. In all cases, the terminal efferent lymphatics associate with the venous drainage of each gland. Jdanov feels that an anatomical orientation such as this confirms the participation of the lymphatic system in hormone transportation, particularly in the outflow from these glands.

A number of E-M descriptions of the endocrines were presented. These were directed toward clarifying the vagueness in the morphological explanations offered by ordinary histological techniques, for the more recent histochemical observations, and the pathological problem of neoplasm. The E-M description of tumor cells, according to Lacy (U.S.A.), was of crystalloid irregular beta granules, particularly abundant at the capillary margin of cells at the opposite pole from the ergastoplasm concentration. Between cells and the capillaries were two basement membranes separated by fibrillar material. (This type of basement membrane appearance has been discussed earlier in this paper in relationship to the lung.) Functionally more impressive was Lacy's antibody reaction study in adenomas of Islet cells. Antibodies were labeled with flourescein, a specific stain



for insulin in frozen dried sections. In the case of two adenomas, both similar in electron microscopic appearance, neither reacted with the fluorescent antibody, while the non-neoplastic Islet cells did. This finding suggesting the possibility of an immunologic difference in the two insulins.

### EMBRYOLOGY

Still in relatively early stages of development, embryology presented to the Congress a wide variety of experimental work. Direct studies of the development of organisms and organ systems were given particular attention, although the subjects of the experiments were extremely varied. Histochemical methods were also employed, particularly in noting the utilization of experimentally induced exogenous factors and the effect of the removal or deficiency of other factors. The latter type of study had as a goal a closer understanding of the mechanism underlying the development of anomalous structures.

Of particular importance in physiological studies related to embryology was the use of the tissue culture technique, which provides a suitable and known media for direct and prolonged "in vitro" studies. It has also a means by which the object of study may be removed from the influence of an unlimited number of factors in its environment. Morphological aspects were defined by the utilization of the common histological preparations, radioautographs, and, again, some very significant E-M work.

One of the more enthusiastically delivered papers in this discipline was that of a New York anatomist, M. C. Niu, who related the contrasting effects of the injection of RNA incubated tumor cells and saline incubated tumor cells into mice. The mice injected with untreated saline incubated cells developed tumors at the site of injection within six days and died within the range of four weeks. No tumorigenesis was observed in the mice injected with RNA treated cells, even through a duration of twelve weeks. Niu feels that this is in line with previous findings that RNA concentration, the proportion of which

generally determines biological activity, when well in excess of a certain optimal concentration, will actually inhibit growth of normally developing embryos.

Many of the studies concerned with teratogenic effects were noteworthy, not only by the results produced, but by the ingenuity by which they were devised.

Giroud (France) described the specific abnormalities produced by pantothenic acid deficiency as producing an exencephalic and microphthalmic state. Chemo-assays further determine that the deficiency need only be slight. In another paper, he and co-workers, Delmas and Martinet (France) utilize their knowledge of the teratogenic effect of vitamin A hypervitaminosis to produce and study the morphogenesis of anencephalia. Further studies elicited vascular abnormalities produced by hypoxia, skeletal abnormalities produced by hypoglycemic agents, effect of manganese deficiency on the development of the otic labyrinth, and other influences of chemical inhibitors of the embryo.

In a purely theoretical treatise, with reference to previous work, Sveltov (U.S.S.R.) contrived, what might be considered to be, a hypothesis concerning the critical periods of development and discussed a possible relationship between those periods and congenital disease. These "critical periods", he felt, are the precise points in development where cells are "determining" their course by making available to their environment and internal nuclear mechanisms, a high level of "cytoplasmatical susceptibility". In order to provide such a condition, regulatory mechanisms must be at a low level. Svetlov specifically defined these periods as the two points at which interrelationship between maternal and embryonic organisms are being established, implantation and placentation, two chief characteristics of mammalian embryogenesis.

Too many papers with far reaching importance in the field of embryology were given to be described here. Among them might be mentioned Patten's (U.S.A.) exposition of new factors involved in the

genesis of persistent interatrial foramen primum; E. K. Hall's (U.S.A.) study of potassium effect on the embryonic heart rate; Gray and Gardner's (U.S.A.) study of prenatal ossification in long bones; Glenister's (Great Britain) work showing the dependence of the trophoblast on embryonic mesenchyme; Knorre's (U.S.S.R.) complicated treatise on the laws of embryonic histogenesis; Lindner's (Germany) E-M study of notochordal development (the functional significance of which has been discussed in an article by Threadgold and co-author Leese<sup>et al</sup> in the Spring edition of this journal).

## NEUROLOGY

Exhibiting all the properties of what might commonly be considered a "specialty", enurological work remained within the clearly defined boundaries of its field, the CNS and PNS. In addition to the research practice of recording electrical activity and producing stimulation of specific locations, producing specific lesions, and causing degeneration of neuronal pathways, the neurologic projects adapted themselves to all the techniques and methods mentioned above. Despite this diversity in methodology, the neuro investigators were able to present a well categorized account of their progress.

The areas under concentrated study in morphological neuroanatomy are the cerebellum and the nuclei of the extra pyramidal systems, the former receiving particular attention from the point of view of the pathway which connect it with functional centres in the cortex. Cellular components from every area in the nervous system received intensive study both cytologically and histochemically. In reference to this study, the E-M was used here, more than in any other field, for the observation of the cells of the dorsal root ganglia, choroid plexus of normal and hydrocephalic rabbits, normal and malignant neuroblasts grown "in vitro", sympathetic neurons, peripheral vascular innervations, and as described earlier above, myelin sheath formation in tissue culture.

In review, other subjects discussed in the neurological sessions included reports, inclusive, with reference to the sympathetic nervous system. Among them were papers by the Russians Golub and Murat reporting new data in reference to the innervation of internal organs and the alimentary canal a study by Munroe (England) of the cell of the lumbar intermediate ganglia; and a functional investigation concerning the sympathetic effect on coronary blood flow. The structures of the rhinencephalon, the amygdala and hippocampus, along with many of its complicated pathways, were observed chiefly from the electrophysiological point of view, measuring electrical activity, stimulating, and relating other electrical phenomena with cellular properties. Inducing specific pathological lesions, by the use of chemical, electrical, and mechanical agents provided a means for their study, as well as the study of many of the processes of the sensory systems and the diencephalon.

## SCIENTIFIC EXHIBITS

The very nature of the demonstrations and motion pictures obviates their being described accurately, except from one point of view, that of their relationship to medical education. Although the main emphasis during the scientific session was on furthering the goals of the pure science, here the emphasis was to clarify the known and to bring fresh and streamlined viewpoint to bear on subjects whose very detail invites confusion. Further to this, it was generally accepted that these viewpoints and ideas should not remain with only the comparatively few delegates at the convention, but that they be passed on, if considered creditable, to the students of the delegates; in most cases these being medical students. The demonstrations, in particular, allowed for the display of new research techniques and the results of the practical use of the latest technological advances.

Included in the demonstration material were the following: an unusual, injected, and preserved dissection of the blood supply to the brachial plexus; an exhibit of stereoscopic color photographs and description of



the means by which they can be made an integral part of classroom teaching; a display of radiographs with ozalid overlays outlining the basic structure and anatomical features of the radiograph demonstrating a means by which first year medical students may be orientated in this aspect of their study. Perhaps not yet feasible from a practical point of view was an approach to the study of the nervous system, currently being used at Cornell and New York University medical schools, which is based on a construction, to scale, of the brain, with prefabricated materials. Using color schemes in the reconstruction to emphasize functional organization and discussion material from two associated atlases and a textbook, with emphasis on the clinical syndromes involved with structure, clinical neurology, neuroanatomy, and neurophysiology became one unified topic.

Basically anatomical, yet still instructional, were the models of the microscopic structure of the seminiferous tubules and of the human foot constructed of materials of various colors, showing every stress point and its magnitude. Along these lines were many electron photomicrographs elucidating significant material from respective papers given during the sessions as well as material now considered to be classical in electron microscopy. Other demonstrations of this type include unique microangiographs of the brain and spinal cord, roentgenographs of skull, three dimensional photomicrographs, radioautographs demonstrating skeletal muscle changes and changes in epiphysial structure in long bone (tibia) after localized pressure applications demonstrated by microradiographs.

#### MOTION PICTURES

The medium of the motion picture was used, relatively minimally, to illustrate research projects and their results, although the ones presented were instructive and indicative that this means should have been more advantageously used in a greater number of projects. More emphasis was placed on presenting teaching films to the anatomists for their approval as well as criticism, and in some cases to point out

their weaknesses. Among the more interesting of the research films were the pictures of the ileo-colic opening of a living subject during operation (DiDio, Brazil). In order to emphasize the fact that this anatomical point is not valvular, but papillary in nature, the author filmed this ileo-caecal "papilla" and its morphological changes upon stimulations affecting any type of expected normal activity. No valvular activity was noted. Also viewed was a film (Zirkle, U.S.A.) showing the effects of varying doses of radiation on specific areas in mitotic cells, and Puff's (Germany) film illustrating his paper (mentioned above) showing simultaneous ventricular activity and ECG recording demonstrating the existence of the "inflow" and "outflow" tract and their coordinate activity. Time lapse photography was used extensively in the films concerning work done in tissue culture.

Visual aids in anatomical instruction were given a boost by the animated films of Latarjet (France) and Markee (U.S.A.). Dealing with particularly difficult embryological principles these films clearly demonstrated the development of the omental bursa, the peritoneum, and the urinary system. Although the films, because of length, were not carried to completion, the techniques used emphasizing continuous orientation at all stages, seemed to assure the success of these films in clarifying the confusing aspects of these subjects to medical and anatomy students.

Dissection techniques were introduced in the film of Wendell Smith's (England) stressing basic principles and instrumentation, a proper dissection of the pectoral region is performed for example. More specifically, Hayek's film meticulously dissects the cubical fossa, following each step with diagrammatic illustration. The discussion period following these films pointed out that not all anatomy faculties favour the same method of dissection in all instances. Other films designed to aid anatomical instruction included a demonstration of well-defined muscular movements by a number of Brazilian athletes

(Di Dio), the aspects of a course in living anatomy given to fourth year medical students in Japan, which included the students acting as subjects for themselves, the use of professional models for demonstration, and, oft times, well-timed muscular movements of the lecturer, and finally Latarjet's animated illustrations of the radioulnar joint and prosupination movements.

A vivid lesson in pulmonary anatomy was given by Boyden's film which presented selected scenes from actual thoracic surgery illustrating the importance of the knowledge of broncho-pulmonary segmentation in performing and understanding surgery of this type. Huber's film which followed again emphasized the anatomy of the bronchial tree; this time relating basic principles to bronchoscopy.

All the films shown are, or will be, available to any department desirous of them. The procedures for obtaining them were given following the discussion of each presentation.

#### CONCLUDING PLENARY SESSION

The concluding plenary session found the number of anatomists somewhat diminished, but not in spirit. Long distance travelling had necessitated the early departure of many of the group, but the still large assembly which remained actively participated in the concluding business. The appreciation of the delegates was expressed to the Congress Committee which had spent the past two years planning the meeting and had seen it carried through to its conclusion. The technical and physical difficulties had been few and, oft times, quite unavoidable.

The subject of nomenclature was discussed thoroughly by Dr. Mitchell (Great Britain), the secretary of the nomenclature committee, who initially reviewed the history of organized nomenclature from the early BNA in 1895, through the BR in 1930, the establishment of the nomenclature Committee of the International Congress in 1936, to the formation

of a formal International Anatomical Nomenclature Committee at the 5th Congress in 1960. He then described the functioning of this committee in the form of seven sub-groups which were arranged in topics, such as angiology, osteology, central nervous system, splanchnology, and syndesmology. Representatives collected suggestions of anatomists from all over the world and, where feasible, listed them. This primary list, which for this revision consisted of thirty pages, was then circulated to anatomists for suggestions, resulting in the list being cut in half. After the anatomists again edited the second circulated list it was returned to the standing committees for final revision and drafting. The recommendation of the nomenclature committee was automatically accepted by the Congress.

The revisions accepted at the 6th Congress in Paris in 1955 consisted of five thousand words and were known as the PNA. The standing committee for this Congress passed only fifty-four revisions from the PNA, those mainly consisting of changes in the nomenclature necessary to describe the extensive changes made in describing pulmonary anatomy, with particular reference to pulmonary circulation.

After much discussion, the final business items were concluded with the acceptance of Vienna as the site of the 8th Congress to be held in 1965, and the establishment of a committee to investigate the possibilities of establishing an organized nomenclature for the science of histology and embryology.

Strengthening the basic foundations of science and opening new vistas for the future, this international exchange of new ideas, thoughts, and information successfully carried through its goals and obligations. Benefited were not only people directly affiliated with anatomy and its related sciences, but all humanity, who will, in the future, unknowingly accept the practices and principles derived from the transformation of these words and ideas into practical concepts.



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