

January 1989

Part II: Basic Sciences --- Chapter 6: Department of Pathology (pages 182-202)

Let us know how access to this document benefits you

Follow this and additional works at: <http://jdc.jefferson.edu/wagner2>

Recommended Citation

"Part II: Basic Sciences --- Chapter 6: Department of Pathology (pages 182-202)" (1989). *Thomas Jefferson University - tradition and heritage, edited by Frederick B. Wagner, Jr., MD, 1989*. Paper 39. <http://jdc.jefferson.edu/wagner2/39>

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Thomas Jefferson University - tradition and heritage, edited by Frederick B. Wagner, Jr., MD, 1989 by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.



Department of Pathology

WILLIAM E. DELANEY III, M.D.

Medicine, to produce health, has to examine disease.

—PLUTARCH (46?–120?)

PATHOLOGY literally means “study of disease” and in its broadest sense is as old as a human’s curiosity about his or her illnesses. The word *pathology* first appears in the writings of Galen (ca. 130–200).¹ Usage of the word has evolved from its broadest interpretation, which included the study of the cause, pathogenesis, abnormal function, and clinical presentation of a disease, to its narrowest application, which is limited to the gross and microscopic structural changes in disease.

Organization of the body of knowledge of disease may be said to have begun with the publication of *De sedibus et causis morborum* in 1761 by the Italian anatomist, Giovanni Batista Morgagni (1682–1771). Although the microscope had been described as early as 1646 and popularized by 1683 by Antonj van Leeuwenhoek (1632–1723), Morgagni depended solely on the changes visible to the naked eye and thus can be said to have founded modern gross pathology. The first treatise to systematize gross pathology appeared in 1793, written by the Englishman, Matthew Baillie (1761–1823), a nephew of John and William Hunter, and entitled *The Morbid Anatomy of some of the most important parts of the Human Body*. Baillie followed this with the publication of an atlas in ten parts between 1799 and 1802. *The Morbid Anatomy* went into ten English and three

American editions and was widely translated into foreign languages.

The application of microscopy to pathology lagged for a century and a half because of the imperfections of early microscopes, the images of which had considerable spherical and chromatic aberration. Nevertheless, the Frenchman, Marie Francois Xavier Bichat (1771–1802), advanced the subject immensely in 1799 and 1800 with the publication of *Traite des Membranes* and may be considered the father of modern histology. The technology was vastly improved in 1824 with the invention of the achromatic microscope of Selligie, which paved the way for an understanding of the fine cellular structure of tissues. In 1831 the cellular features of plants were delineated by the German botanist, M.J. Schleiden (1804–1881). The monumental transitional step to the application of ideas of cell structure to animal tissues was taken in 1839 by the German anatomist, Theodor Schwann (1810–1882), which set the stage for real understanding of gross pathology. It is noted, however, that earlier descriptions of the universal cellular structure of plant and animal tissues were made in 1824 by Dutrochet, a French physician-biologist.

Until the new knowledge was promulgated, however, the first pathology text published in America, *Treatise on Pathological Anatomy*, written

in 1829 by William Edmonds Horner (1793–1853), was based entirely on gross pathology. Horner was Professor of Anatomy at the University of Pennsylvania. The first systematic course of lectures in pathology in an American medical school was given from 1835 to 1839 by Samuel David Gross (1805–1884) at the Medical College of Ohio in Cincinnati. Gross was a graduate of Jefferson in the Class of 1828 and was a prodigious worker and reader, fluent in Greek, Latin, German, and French.² Largely self-taught in pathology, Gross gave credit to Baillie, Bichat, and Gabriel Andral (1797–1876) for many of the concepts in the pathology textbook that grew out of his lecture notes. His book, *Elements of Pathological Anatomy*, was published in 1839, with two further editions in 1845 and 1857.

The first edition of Gross's pathology textbook acknowledges the author's debt to Baillie and Bichat and regrets the neglect of their subject in the America of 1839.³ Illustrations in the first edition were entirely macroscopic lesions, largely copied from other authors. By the time of the second edition six years later, one-third of the illustrations were original. They showed some understanding of microscopic pathology, albeit not of the exact role of cells (six years after Schwann's promulgation of the cell theory), as in Gross's description (page 46) of "structureless lymph" becoming organized "by arrangement of the granules, through their own vital impulse, into groups of nuclei which are converted into cells, termed cytoblasts, from which the future tissue is formed," in a description of the inflammatory process.⁴

Gross's third edition, appearing eight years after the second, exhibited considerable improvement in the comprehension of histological changes (acknowledged to have been at least partially due to the "special attention" of his young colleague, Dr. Jacob Mendes DaCosta, to microscopic features), as seen (page 64) in the microscopic description of lymph that contained cells, some of which "resemble . . . white corpuscles of the blood."⁵ Gross also pointed out that "there is not, with perhaps a few exceptions, a chair of

pathologic anatomy in the forty-five American medical colleges" in existence in 1857.

Indeed, teaching of the rudiments of pathologic anatomy in most nineteenth century American medical schools was left to anatomists and to surgeons. Pathology was listed in curricula of the day as "Institutes of Medicine" and was taught at Jefferson by surgeons such as Samuel D. Gross. The only American medical school prior to 1866 to have a formal course in pathologic anatomy was Harvard, but in that year the Jefferson Professor of Medicine, Samuel H. Dickson, taught pathologic anatomy in Jefferson's summer session. The course at Jefferson was then taught yearly between 1867 and 1876 by the versatile surgeon, William W. Keen.

Much of the teaching material used in the early courses in pathology consisted of specimens from anatomical museums developed largely by surgeons. One such museum was established in 1860 in the Pennsylvania Hospital, where Dr. Thomas G. Morton was the first Curator of the Museum and Pathologist to the Hospital. With the growth of his private practice and on receiving a coveted clinical appointment to the Hospital, Morton resigned as Pathologist in 1863 and was succeeded by Dr. William Pepper, who served until 1870 when Dr. Morris Longstreth became Curator and Pathologist to Pennsylvania Hospital. Longstreth eventually became the first head of the Department of Pathology at Jefferson, after starting as Keen's successor in 1876 in the delivery of pathology lectures at Jefferson.

Morris Longstreth, M.D. (1846–1914), First Chairman (1891–1895)

In the 20 years before he assumed the Chair in Pathology at Jefferson, Longstreth (Figure 6-1) had demonstrated his growing expertise at Pennsylvania Hospital, to which his Quaker background led him naturally. He came from a family that had arrived from England in 1699 and settled in what is now Hatboro, Montgomery County.⁶ Born February 24, 1846, in Philadelphia, Morris Longstreth had an excellent educational background, attending Friends School and graduating from Haverford College (A.B., 1864) and also from Harvard (A.B., 1866). He received his M.D. from the University of Pennsylvania in 1869. Between 1869 and 1871 he had an 18-month

appointment as Resident Physician in the Pennsylvania Hospital. Self-taught as a pathologist, although undoubtedly influenced by the pathologists at the University of Pennsylvania (Joseph G. Richardson) and the Philadelphia (General) Hospital (William Pepper), Longstreth was appointed Curator of the Museum at the Pennsylvania Hospital while still a Resident Physician. In 1872 he was appointed Physician to the Outpatient Department of Pennsylvania Hospital and began to accumulate a large private practice. In 1875 he gave a course in Pathologic Anatomy at the Hospital. In 1877 he acquired a freezing microtome. In 1879 he was promoted to Professor of Pathologic Anatomy at Jefferson after lecturing there for three years as Demonstrator of Pathology. In 1880–1881 Longstreth gave the first laboratory course in Pathologic Anatomy and Pathologic Histology at Jefferson. In 1882, after many years of study of rheumatic diseases, he published *Rheumatism, Gout and Some Allied Disorders* (New York: Wm. Woods & Co.), one of the earliest pathologic treatises in rheumatology. In 1886 he became one of the original members of the Association of American Physicians.



FIG. 6-1. Morris Longstreth, M.D., First Chairman (1891–1895).

Pathology became a major department at Jefferson in 1891, with Longstreth as the first Professor and Department Head. His private practice of medicine, however, continued to grow and to compete for his time with his teaching duties. From 1885 Longstreth leaned heavily on William M. L. Coplin (then only a medical student) to carry the teaching burden, shifting the duties almost completely by 1894, when Coplin became Temporary Professor. In 1895, on being asked to do so, Longstreth resigned as Professor of Pathology to continue the very large private practice he had developed.⁷ The Chair was vacant from 1895 to 1896.

Longstreth continued his medical practice until late in life, interrupted by long periods of travel. He died September 18, 1914, in Barcelona, Spain, while fleeing from the opening hostilities of World War I, within a month after the death of his wife in the same city.

Longstreth's career in pathology paralleled a period in medicine that had been dominated by notable discoveries in infectious diseases. Weigert had first stained bacteria in tissues with carmine in 1871. Cohnheim had elucidated the mechanisms of inflammation and the role of leukocytes in 1873. Koch and Pasteur had inaugurated modern bacteriology in 1876–1877 with their independent investigations of anthrax. At the same time, by showing that filaria were transmitted by mosquitoes, Manson had demonstrated the role of insects as vectors of disease. Koch had discovered the tubercle bacillus in 1882. Phagocytes had been discovered in 1884 by Metchnikoff, who showed their important role in inflammation. Acute appendicitis had been established as an abdominal emergency in 1886 by Fitz, who then did the same for acute hemorrhagic pancreatitis in 1889.

As a practitioner, Longstreth became known through his advocacy of regular physical examinations to promote good health. His contributions to pathology were minimal but impressive if evaluated as those of a part-time pathologist. His generation was the last to consider pathology as a stepping-stone to clinical

medicine. His major contribution may well have been the training of his successor at Jefferson, the prodigious William M.L. Coplin.

William Michael Late Coplin, M.D. (1864–1928), Second Chairman (1896–1922)

The first fulltime pathologist at Jefferson, William M. L. Coplin (Figure 6-2) was born November 1, 1864, in Clarksburg, West Virginia, of Scotch-Irish heritage. Educated in secondary schools in West Virginia, Coplin spent four years at Mount Union



FIG. 6-2. William M.L. Coplin (1864–1928), Second Chairman (1896–1922).

College in Ohio. He matriculated at Jefferson in 1883, electing to take three rather than the usual two years of medical college. He began working with pathology specimens as an undergraduate and during his senior year (1885–1886) he did much of the pathologic work on specimens from the practice of the Professor of Surgery, Samuel W. Gross. Coplin's undergraduate research thesis on *Wound Infection* won a prize in pathology.

On graduation in 1886, Coplin was appointed Assistant Demonstrator of Pathologic Anatomy and spent a year as Resident Physician in Jefferson Hospital. In 1887 he was appointed Assistant Pathologist to the Hospital and became a member of the surgical and gynecological staffs. In the same year he entered the private practice of pathology with a laboratory in his home, joined the staffs of many other local hospitals, and acquired expertise in infectious diseases. In 1892 he was promoted to Demonstrator of Pathology at Jefferson and made Curator of the Pathology Museum, a facility that became one of his major interests. In the same year he was appointed Pathologist to the Philadelphia (General) Hospital, a position he retained for many years. With the publication of his *Textbook of Practical Hygiene* in 1893 and *Lectures in Pathology* during the year 1894–1895, Coplin had become a well known pathologist. Although he became Temporary Professor of Pathology at Jefferson in 1894, he was not initially considered for the permanent appointment imminently to be vacated by Longstreth, so Coplin accepted the offer of the Vanderbilt University to become Professor of Pathology. He served in Nashville only during 1895–1896 when, following Longstreth's resignation, he returned to Philadelphia as Professor of Pathology and Bacteriology at Jefferson.

The career of Coplin paralleled the early growth of clinical laboratories in the United States. Until the last two decades of the nineteenth century, pathology had been a didactic subject, based in the Medical School. With the advent of microscopy and its application to clinical problems in the hospital, a need for hospital-based laboratories was generated.⁸ Although the Massachusetts General Hospital had acquired a microscope in 1847, there was only one microscope in the Hospital of the University of Pennsylvania in 1887 (and that one belonged to Osler). Only three microscopic examinations are recorded during the entire year of 1866 at the Philadelphia

(General) Hospital and the number increased to only 21 by 1871. The counting of red blood cells and the quantitation of hemoglobin had become practical by 1887, when Osler was said to have had the first hemocytometer in the city of Philadelphia.⁹ Johns Hopkins Hospital had a clinical laboratory, and William Osler and William Welch sought to bridge the gap between the laboratory and the patient's bedside. In 1893 George Dock organized a large clinical laboratory in the University of Michigan Hospital. In 1894 the William Pepper Laboratory of Clinical Medicine was opened in the Hospital of the University of Pennsylvania. The discoveries of bacteriology made modern clinical laboratories necessary in the hospital, as ever-increasing numbers of cultures, stained smears, and microscopic examinations became necessary for good patient care. Chemical examinations were rather primitive and low in volume. By the turn of the century, however, histological techniques were relatively advanced. By 1900 paraffin embedding was standard practice and all the basic staining methods that would be used in the following 60 years were being employed.

Coplin brought about the appointment of the first Resident Physician to train exclusively in one department at Jefferson when he named H.F. Harris as the first Resident Pathologist in 1896.⁷ Coplin was everywhere in the laboratory, being found there at all hours of the day and night. He still found time to accept appointment as Bacteriologist to the Pennsylvania State Board of Health. In 1897 he published *Manual of Pathology* (a revision of *Lectures on Pathology*), which went to five editions. From 1905 to 1907, Coplin served the City of Philadelphia as Director of the Department of Public Health and Charities; he organized what became the Municipal Hospital for Contagious Diseases, and made numerous improvements at the Philadelphia General Hospital. During all this time he continued to perform his teaching and laboratory duties, but added assistants in various areas of the laboratory. In Neuropathology, appointments were given to Alfred Gordon (1906–1908), Aller G. Ellis (1908–1909), G. E. Price (1912–1913), and Michael A. Burns (Jefferson, 1907) (1913 to at least 1931). From 1908 to 1911 John W. Funke (Jefferson, 1901) was in charge of Clinical Pathology. Overlapping appointments were given in Pathologic Chemistry to Henry Leffman (1908–1919) and in Physiologic Chemistry to Philip B. Hawk (1919–1923).

Gynecologic Pathology was under H.J. Hartz (1913–1919), P. Brooke Bland (1913–1921), James L. Richards (1918–1928), and James F. Carrell (1919–1921). Coplin was in charge of Bacteriology in the hospital laboratory until 1909, when Randle C. Rosenberger succeeded and remained in charge until at least 1930.

Coplin's special interest over the years was the Pathology Museum. In 1914 it was expanded with the help of an allocation of more than \$100,000 from a member of the Jefferson Board of Trustees, John H. McFadden. This allowed the Museum to be moved to the top floor of Medical Hall (1898 Building) when space was vacated by the Department of Anatomy in 1914 (Figure 6-3).

Although among the lesser of Coplin's accomplishments, the invention of a grooved glass jar (the Coplin jar), which allowed slides to stand separated in a staining solution, is the only memorial to him that survives. Coplin jars continued in wide use in histology and microbiology laboratories of virtually all hospitals to this day.

With the entry of the United States into World War I, an Army hospital was organized from the Staff of Jefferson Hospital, supported by a donation of \$50,000 from the Gibson family of whiskey distillers.⁷ Coplin was named Commanding Officer with the rank of Colonel, U.S. Army, and served with the Hospital from 1917 to 1919, part of which time it was stationed in Nantes, France, as Base Hospital No. 38.

After the war, Coplin resumed his duties at Jefferson. He served as Head of the Pathology Department until he had a stroke in 1922, which left him disabled after 26 years as Chairman, the longest tenure of anyone. He was relieved of all duties, but in recognition of his long and distinguished service to the institution he remained on full salary for the rest of his life. He retired to his summer home in Atlantic City until he died in 1928 at age 63 of angina pectoris.

Coplin should be remembered for the diversification he brought to the Pathology Department as the general discipline of pathology

Aller G. Ellis, M.D. (1868–1953), Acting Chairman (1922–1923)

developed an identity in both the Medical College and the Hospital and fostered subspecialty interests in many areas. Among those residents who received their training under Coplin were Robert M. Lukens (1910–1911), who later became a prominent bronchoesophagologist; George F. Lull (1911–1913), who became the longtime Secretary-Treasurer of the American Medical Association; and Erwin D. Funk (1913–1914), who later contributed to the development of the Reading Hospital as Pathologist and Medical Director. In addition, John B. Flick (a resident in 1916–1917) became a distinguished surgeon and Chief of Surgery in the Pennsylvania Hospital.

Aller G. Ellis (Figure 6-4), the interim successor to Coplin, was born at Cambridge Springs, Crawford County, Pennsylvania, in 1894 (B.Sc.), having been an athlete in three sports (baseball, football, and track). He graduated from Jefferson in 1900, serving as President of his class. After internship in Jefferson Hospital (1900–1902), Ellis was appointed Demonstrator of Morbid Anatomy in 1902, beginning a long association with Coplin. His rise up the career ladder began in 1903 with his appointment as Instructor in Hematology and continued in 1904 with his promotion to Associate in Pathology. In 1907 the Trustees of the Medical College honored him with the first award of the “Corinna Borden Keen Research Fellowship,” founded in 1905 by W. W. Keen, Professor of Surgery. This enabled Ellis to study in Germany from 1907 to 1908. He returned to Jefferson in

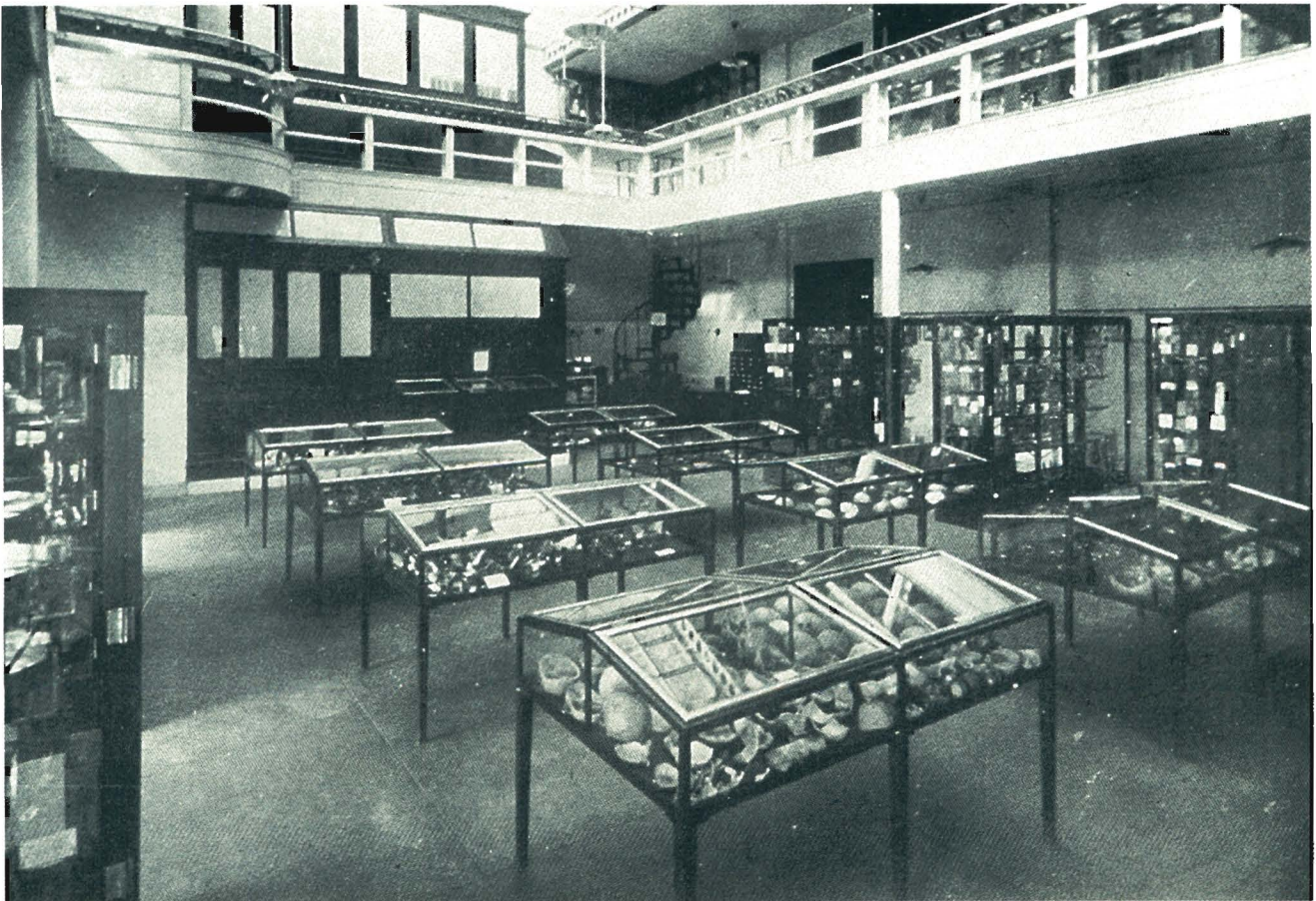


FIG. 6-3. Pathology Museum (1914), in 1898 Medical College Building.

1908 for a two year appointment in neuropathology. His status as a rising star in the Department was further confirmed in 1913 when he was sent by the Board of Trustees of Jefferson to evaluate cancer research in England and the Continent, where he visited with Ehrlich, Pick, Levaditi, and other leading researchers.

In 1917 Ellis made a trip to Lancaster to perform an historically important autopsy. The patient had been operated on 30 years previously by W. W. Keen as one of the first successful operations for a brain tumor. Keen had removed a meningioma, and the autopsy by Ellis showed that there had been no recurrence. Such a surgical achievement today would hardly be cause for comment. In those times, however, the story was a dramatic one.

From 1917 to 1919 Ellis was Director of the Ayer Clinical Laboratories at Pennsylvania Hospital. Between 1920 and 1922, under the auspices of the Rockefeller Foundation, he organized and directed the Department of Pathology of the Royal Medical College in Bangkok, Siam (Thailand). On returning to Jefferson in 1922, Ellis filled in for

Coplin for one year but left in 1923 when his appointment was inexplicably not renewed. Little is known of his career beyond 1923, except that he was a member of the Colorado State Medical Society. He retained at least one tie to his alma mater, as evidenced by the memoir he wrote for the *Alumni Bulletin* in May, 1944, on the death of Randle C. Rosenberger. Ellis died on February 19, 1953, in Plainfield, New Jersey, of arteriosclerosis at the age of 84.

The contributions of Aller G. Ellis as interim Head of the Pathology Department were minimal, although he did train a pathology intern in 1922–1923, Frank Hammond Krusen, who later achieved great prominence in physical medicine and rehabilitation.



FIG. 6-4. Aller G. Ellis, M.D. (1868–1953), Acting Chairman (1922–1923).

■ Mayer Sulzberger Pathological Laboratories

The Centennial Campaign of 1924 culminated in the construction of the new hospital building on the south side of Sansom Street between Tenth and Eleventh Streets, which became known as the Samuel Gustine Thompson Annex. Toward the cost of construction of laboratories the Jewish community of Philadelphia gave \$75,000 in honor of the Philadelphia jurist, Mayer Sulzberger, LL.D., a Jefferson Trustee who was related to the publishers of the *New York Times*. No plaque remains to identify with certainty the location of the Mayer Sulzberger Pathological Laboratories but it is likely that they were located on the fifteenth and sixteenth floors of the Annex, a location for laboratories until 1954.

Bowman Corning Crowell, M.D. (1879–1951), Third Chairman (1924–1926)

The first Canadian to chair the Pathology Department at Jefferson, Bowman C. Crowell (Figure 6-5) was born January 10, 1879, at

Yarmouth, Nova Scotia.¹⁰ He was educated at McGill University, receiving a B.A. in 1900 and an M.D., C.M. in 1904. He went directly into pathology house staff training at New York City Hospital (later Bellevue) from 1904 to 1907 and then served on the staff at Bellevue until 1911. For the next eight years Crowell practiced in the Philippine Islands, culminating in his appointment as Director of the Graduate School of Medicine and Public Health of the University of the Philippines from 1916 to 1918. From 1918 to 1922 he was Chief of Pathology of the Oswaldo Cruz Institute in Rio de Janeiro, Brazil. He came to Jefferson in 1923 after a year as Professor of Pathology at the Medical College of South Carolina. At Jefferson he served as Professor of

Pathology and Director of Laboratories; among his residents there were Frank W. Konzelman (1923–1930), later a distinguished American pathologist; Benjamin F. Haskell (1924–1925), who became an eminent proctologist at Jefferson; John Rodman Paul (1925–1926), destined to be a prominent internist and authority on viral hepatitis; and Dr. Eli R. Saleeby (1925–1926), who served in Jefferson's Departments of Anatomy and Surgery. For many years Dr. Saleeby was the sponsor of the Kappa Beta Phi Student Society and of the Black and Blue Ball.

Crowell left Jefferson and pathology in 1926 when he became Associate Director of the American College of Surgeons in Chicago. He served the ACS until 1949, notably in the cancer control activities of the ACS. On his retirement he received the first gold medal of the American Cancer Society in 1949.

Baxter Lindsay Crawford, M.D. (1886–1940), Acting Chairman (1926–1927)

The second person to chair the Department in an acting capacity in the four years between 1922 and 1926, Baxter L. Crawford (Figure 6-6) was a Southerner, born February 14, 1886, at McConnelsville, South Carolina.¹¹ He was graduated in 1908 from Clemson College and received his M.D. from University College of Medicine, Richmond, Virginia, in 1912. Following internship in Richmond Hospital, Crawford was a Pathology Resident from 1915 to 1916 at Bellevue Hospital, New York City. He served as Major, U.S. Army, from 1916 to 1919, with assignment to various base hospitals of the American Expeditionary Forces in France and Germany. In 1919, Coplin brought Baxter to Jefferson as Assistant Professor of Pathology and Assistant Director of Clinical Laboratories. On the resignation of Crowell in 1926, Crawford was appointed Acting Chairman and served until the arrival of Dr. Virgil Holland Moon in 1927.

Crawford remained at Jefferson for the rest of his life. Because of Moon's lack of interest in the Clinical Laboratories, Crawford became Director of Clinical Laboratories during the first 13 years of Moon's tenure. Crawford's office was on the fifteenth floor of the Thompson Annex with an adjacent small laboratory, used for blood collected



FIG. 6-5. Bowman C. Crowell (1879–1951), Third Chairman (1924–1926).

from private outpatients and also for Crawford's personal use. Except for Chemistry, all the rest of the laboratories were on the sixteenth floor of the Annex. Crawford's main interests were morphologic diagnosis and microbiology. His Assistant (and eventual successor as Director of Clinical Laboratories), Dr. Carl Bucher, was mainly interested in serology. They trained many Pathology Residents during this period, most notably Harold L. Stewart (Jefferson, 1926). Dr. Stewart began his Pathology Residency in 1930 and later served on the College and Hospital Pathology Staff until 1938, when he left to begin a distinguished career with the National Cancer Institute that culminated with many years of service as Chief of the Institute's Laboratory of Surgical Pathology. Stewart received Jefferson's Alumni Achievement Award in 1966. Another Pathology Resident who did well after initial training by Crawford was Hugh G. Grady (Jefferson, 1934) who later was Registrar of the Armed Forces Institute of Pathology and the founding Chairman of the Department of Pathology of Seton Hall University School of Medicine.



FIG. 6-6. Baxter L. Crawford (1886–1940), Acting Chairman (1926–1927).

In 1928 the Chemistry Laboratory was on the second floor of the Main Hospital opposite Men's Medical Ward. Although officially under Pathology, it was supervised by Dr. Joseph Looney of the College's Department of Biochemistry. It had one part-time technician who also performed electrocardiograms. There was also a chemistry intern (in 1928 it was David Farrel, later Professor of Obstetrics and Gynecology at Jefferson), whose duties included the collection of all blood specimens for chemistry tests. An 18-gauge needle without a syringe was used in a technique called the "drip method" of blood collection. In October of 1928 the Chemistry Laboratory ran 671 tests, mostly blood glucose and nonprotein nitrogen determinations, the latter being the kidney function test of choice in 1928. It was not until November of 1942 that blood urea nitrogen determination replaced the nonprotein nitrogen as the renal function test of choice. About 1932 Abraham Cantarow replaced Looney as Physician-in-Charge of the Chemistry Laboratory, and from that time chemistry tests expanded in numbers and complexity. Dr. Cantarow (Jefferson, 1924) had been trained in internal medicine but had interest in and understanding of chemistry and brought a clinician's sense to the Chemistry Laboratory. Eventually he became Chairman of the Department of Biochemistry at Jefferson and after retirement was in charge of Extramural Grants at the National Cancer Institute.

In May of 1932 the Chemistry Laboratory had increased its work to 830 tests; urea clearance testing for renal function had been added. Bromsulphophthalein tests of the excretory capacity of the liver were being done. All tests using colorimetric quantitation were done on the Dubosq colorimeter. A second technician (Ella Perkins, later the Laboratory's technical supervisor for many years) was added in 1928, a third in 1938, and a fourth in 1941. In October of 1938 the Chemistry Laboratory performed 1,509 tests, now including alkaline phosphatase determinations of liver function and bone activity.

Crawford's health deteriorated in the 1930s but he still found time and energy to serve as

President of the Pathology Society of Philadelphia in 1939. He died of pulmonary tuberculosis at the White Haven Sanatorium on January 3, 1940, at the age of 53.

David Reynolds Morgan, M.D. (1890–1978), Curator of the Museum (1923–1967)

One of the most revered and loved teachers at Jefferson, “Davey” Morgan (Figure 6-7) was born at Edwardsville, Pennsylvania, on October 4, 1890. Of Welsh descent, he grew up in the Wilkes-Barre area and was educated at Wyoming Seminary (1912). He graduated from Jefferson Medical College in 1916 and was elected to Alpha Omega Alpha. His Jefferson internship (May–November, 1916) was interrupted by service in the French Army, where he received a commission as a Lieutenant (Medecin-Chef of Hopital Militaire No. 10), was later promoted to Captain, and received a decoration. In September, 1917, Morgan requested discharge to transfer to the First Division, American Expeditionary Forces, but inexplicably he was denied a commission, and he enlisted as a private. His outstanding war record included a later battlefield commission as First Lieutenant in the Medical Corps, United States Army, the Distinguished Service Cross for gallantry in action, and the Croix de Guerre with Palm. A victim of wounds and mustard gas, Morgan was also awarded the Purple Heart. He was discharged in October, 1919, as a Major, the most decorated American medical officer in World War I.

Dr. Morgan returned to recuperate and in 1922 received a degree (D.P.H.) from the School of Public Health, University of Pennsylvania. An additional degree of Master of Science in Surgery was awarded by the Graduate School the following year.

Dr. Morgan’s lifetime career began at Jefferson in 1923 as Demonstrator of Pathology. He became

perhaps the most respected teacher in the basic sciences, always at his best in intimate section instruction. Everything he taught was done with quiet enthusiasm and good humor, with graphic demonstration of the specific lesions of diseased organs and tissues kept in formalin in large earthenware crocks (Figure 6-8). Morgan was especially skilled at relating the pathological process to clinical disease.¹²

Dr. Morgan’s major interest was the Pathology Museum. In earlier decades, specimens from autopsies and later from surgery were preserved and provided the only graphic methods of instruction. The collection was organized by Longstreth in the 1880s and was nurtured by Coplin at the turn of the century as a major teaching modality, with additions during the early decades of the twentieth century (Figure 6-9). As photography and, later, color photography became generally available, the need for the demonstrations of specimens receded and by the 1950s the need for space, the difficulties of preservation, and the use of color slides for



FIG. 6-7. David R. Morgan, M.D. (1890–1978), Curator of the Museum (1923–1967).

teaching both gross and microscopic pathology led to the phasing out of the Museum. When Dr. Morgan retired as Professor of Pathology in 1967, he was still the eminent teacher, but his Museum had disappeared. Dr. Morgan's career included his post as Director of Laboratories at St. Luke's and Children's Medical Center. During World War II he served as Colonel, Medical Corps, United States Army, in charge of the laboratory at Fort Belvoir, Virginia. A bachelor, he retired to a residence with a niece at Edwardsville, Pennsylvania, where he died January 18, 1978.

Carl Joseph Bucher, M.D. (1890–1951), Director of Clinical Laboratories (1940–1951)

Born in 1890 in Longansport, Indiana, Dr. Bucher (Figure 6-10) spent a year at Georgetown College, subsequently receiving his degrees at the University of Pennsylvania (B.S., 1912; M.D., 1916). Internships at St. Agnes Hospital (1916–1917) and St. Christopher's Hospital for Children

(July–December, 1917), were followed by laboratory training at the U.S. Navy Medical School, Washington, D.C. (1918–1919) and by graduate study at the University of Pennsylvania, ending in 1920. Bucher then served as Medical Officer in charge of the laboratory at U.S. Naval Hospital, Newport, Rhode Island, until 1925. At that time he was appointed Assistant Pathologist at the Philadelphia General Hospital, where he continued on the staff until 1939. In 1926 he joined the staff of Jefferson Hospital as Assistant Director of the Clinical Laboratories, serving initially under Dr. Crawford and succeeding him as Director on Crawford's death in 1940. By providing stability and guidance to the Clinical Laboratories during the 25 years of their transition from low- to high-volume manual operations just prior to the emergence of automated testing, Dr. Bucher made an impressive contribution.



FIG. 6-8. Dr. Morgan teaching Gross Pathology.



FIG. 6-9. Pathology Museum in 1025 Walnut Street Medical College (ca. 1940).

■ Advances in Pathology

In the 36 years between Longstreth's appointment as first Chairman in 1891 and the arrival of Moon as the fourth Chairman in 1927, enormous advances had taken place in the understanding of disease processes. The frozen-section technique, first introduced in Europe in 1818 by Pieter de Riemer,¹ was popularized in America in 1895 by the gynecologist, Thomas Cullen. Mallory and Wright's text *Pathological Technique* was published in 1897. Sternberg elucidated the histology of Hodgkins' Disease in 1899. The transmission of yellow fever by mosquitoes, first predicted in 1881 by Carlos J. Finlay (Jefferson, 1855), was



FIG. 6-10. Carl J. Bucher, M.D. (1890–1951), Director of Clinical Laboratories (1940–1951).

established in 1900 by Walter Reed, James Carroll, Jesse Lazear, and Aristide Agramonte. Also in 1900, Karl Landsteiner laid the foundation for blood transfusion (and other transplants) by identifying the four major ABO blood groups. Eugene Opie related the islets of Langerhans to diabetes mellitus in 1901. The pathologic physiology of cardiac conduction was clarified between 1902 and 1915 by James McKenzie, Thomas Lewis, J. Erlanger, Alfred Stengel, Ludwig Aschoff, Sunao Tawara, and others. *Treponema pallidum* was discovered in 1905 by Fritz Richard Schaudinn and E. Hoffman. Bernard Naunyn introduced the concept of diabetic acidosis in 1906. James B. Herrick identified sickle cell anemia in 1910, the year in which tissue culture was developed by R. G. Harrison. Peyton Rous discovered the fowl sarcoma caused by a filterable agent in 1911, laying the foundation for the study of the retroviral etiology of cancer. Between 1915 and 1918 L. J. Henderson and Donald D. Van Slyke established the importance of the acid-base equilibrium in clinical medicine. Bacteriophage was described in 1917 by Felix Hubert d'Herelle. Frederick G. Banting and Charles H. Best discovered insulin in 1921. George Minot and William Murphy elucidated the deficiency nature of pernicious anemia in 1926 with their liver diet. Most of these advances were made by the application of the new sciences of microbiology and biochemistry to the clinical aspects of disease. The stage was set for the entrance of investigative pathologists typified by Virgil Holland Moon.

Virgil Holland Moon, M.D. (1879–1964), Fourth Chairman (1927–1948)

Virgil Holland Moon (Figure 6-11) was a Hoosier of Quaker stock, born in 1879 at Craig, Indiana, the son of a country doctor. An ancestor, James Moon, had come to Pennsylvania with William Penn and had settled at Morrisville, Bucks County, adjacent to Penn's estate. Virgil moved with his family to Kansas when he was two years old. He received an A.B. in 1910 and an M.Sc. in 1911, both from Kansas State Teachers College. He received his M.D. in 1913 from Rush Medical College in Chicago, having been elected to both Alpha Omega Alpha and Sigma Xi (the latter an

indication of his early interest in the experimental approach to medicine). He never had an internship, but rather continued for an additional year his fellowship in infectious diseases at the McCormick Institute under the eminent Ludwig Hektoen from 1911 to 1914. This experience and Hektoen's recommendation were sufficient to enable Moon to be appointed Professor of Pathology and Bacteriology at the University of Indiana as well as Chief of Pathology at the Indianapolis City Hospital. He remained at Indiana until 1927, when he accepted the Chairmanship at Jefferson.

Dean Ross V. Patterson made it very clear to Moon what was expected of him, as seen in this excerpt from a letter to Moon on his appointment:

“Dr. Moon, you will be expected to devote your talents and energies to the teaching of pathology. You will not be expected to do research work. In

fact, I may say you will be expected NOT to do research work. A dog cannot chase two rabbits at the same time; should he try to do this, both rabbits will escape. A man cannot do good teaching and carry on successful research simultaneously.”¹³

This does not mean that Dean Patterson was opposed to research. In point of fact, Patterson (a bachelor) left the bulk of his estate to Jefferson to establish the “Ross V. Patterson Research Fellowships.”

Despite the Dean's admonition, Moon did both teaching and research, becoming an authority on shock, and writing two widely read monographs in 1938 and 1942 that profoundly influenced the way battle casualties were managed in World War II. Moon believed in 1927 that the viewpoint that research at Jefferson was dangerous to one's career was prevalent throughout the institution. Both Moon and Physiology Chairman J. Earl Thomas, who had also arrived at Jefferson in 1927, were anxious to do animal research, and they ignored the prevalent pessimistic viewpoint “partly because a few of the Trustees and of the Faculty believed as we did,” according to Moon, who cited Dr. Martin E. Rehfuss as a strong supporter of research.¹² Through Rehfuss' efforts, Moon's research was initially supported by a \$3,000 yearly stipend from the wife of a member of the Board of Trustees, John C. Martin. In addition, another Trustee, Percival E. Forderer, donated the building on his family's ancestral five-acre estate in the Frankford section of Philadelphia for research purposes. It evolved into animal quarters and other experimental support facilities, particularly in the immense carriage house at the rear of the estate. This animal facility proved valuable to both Moon and Thomas and was used until its sale in 1952. Moon believed that these gifts of money and property were the first expressly donated for research work at Jefferson. Despite this generous support, Moon and Thomas still had to obtain animals for research by using funds earmarked for teaching and were “ashamed that such a proud institution of higher learning should compel



FIG. 6-II. Virgil H. Moon, M.D. (1879–1964), Fourth Chairman (1927–1948).

research workers to use clandestine methods and to bootleg their investigative work.²¹³

As a result of Moon's lack of interest in the Clinical Laboratories and partly because of his failure to give any academic advancement to the Director (Dr. Bucher never rose above the rank of Assistant Professor during Moon's tenure and complained bitterly about it to all who would listen), a schism developed between the Medical School Department headed by Moon and the Clinical Laboratories (led by Bucher, who had succeeded Crawford in 1940). This made it difficult for the younger men in the Clinical Laboratories, who strove to please Bucher without offending Moon. Some of Bucher's later residents, such as Thomas Tamaki (1946–1948), did not aspire to academic advancement at Jefferson, but the new resident in 1939, Peter A. Herbut, did have academic dreams and yet managed to satisfy both masters.

During World War II the facilities and personnel of the Clinical Laboratories were severely strained. Most of the pathologists were in military service, leaving Bucher (age 51 in 1941) and Herbut (disabled by rheumatoid spondylitis) to carry the entire workload of the Hospital laboratories. The Chemistry Laboratory did an increasing number of procedures. By October 1945, test volume reached 2,879 and included such determinations as amylase, bromides, and (as a test of hepatic parenchymal cell damage) cephalin cholesterol flocculation. At this time an Evelyn photoelectric colorimeter was purchased and became the workhorse for chemical quantitation.

In 1947, Robert L. Breckenridge (Jefferson, 1944), (later Professor of Pathology at Jefferson and the 1985–1987 President of the College of American Pathologists) joined the Clinical Laboratory staff as Assistant Director. In 1946 the urinalysis laboratory was moved to the Curtis Clinic Building, freeing space for expansion of the Chemistry Laboratory, which lost its longtime mentor when Cantarow moved to the Medical College Department of Biochemistry as full-time Chairman.

Moon retired in 1948 after 21 years of service. His tenure was the second longest in the history of the Chair. He moved to Florida and was appointed Research Professor of Pathology in the Research Unit of the University of Miami Medical School. He died April 16, 1964, in his 85th year. He is remembered for his teachings on shock and for bringing respectability to basic medical research at Jefferson. He was the subject for portraiture of the Class of 1940.

Peter Andrew Herbut, M.D. (1912–1976), Fifth Chairman (1948–1966)

The second Canadian to head the Department, Peter A. Herbut (Figure 6-12) was born in Edson, Province of Alberta, Canada, on July 6, 1912. His Russian parents farmed and raised a large family. Herbut studied at the University of Alberta from 1930 to 1935 and then entered the Medical School of McGill University in Montreal, where he received his M.D., C.M. in 1937.¹⁴ His training had included a one-year (1936–1937) internship at the Children's Memorial Hospital in Montreal, and he repeated the year of internship in 1937–1938 at Wilkes-Barre General Hospital when he decided to come to the United States for training in surgery. As further preparation for surgery, Herbut took a residency appointment in the Surgical Pathology Laboratory of the Medical



FIG. 6-12. Peter A. Herbut, M.D. (1912–1976), Fifth Chairman (1948–1966).

College of Virginia from 1938 to 1939. There he was trained by Paul Kimmelstiel, who converted Herbut to a career pathologist. Having been introduced to Virgil Moon at a convention, Herbut accepted an appointment as Assistant Demonstrator of Pathology at Jefferson, where he completed his training (1939–1940). He then joined the staff of the Clinical Laboratories as Assistant Director in 1940 and began a rise in the academic ranks of the Medical College, becoming an Assistant Professor before 1948.

Herbut had decided on first coming to Jefferson that he could be Department Chairman within ten years.¹⁵ He made it in nine years. He resolved never to offend anyone, even the elevator operators, so there would be no impedance to his upward rise—this was no small task in a department where the Chairman and the Director of Clinical Laboratories were on poor terms. That he did not offend either one is strong testimony to Herbut's diplomatic powers. The major reasons, however, for Herbut's rise to the top by the age of 36 were his prodigious capacity for work and his great ability to concentrate. Not only did he almost single-handedly carry the anatomical pathology workload of the Clinical Laboratories during World War II, but he also found time and energy to publish 75 monographs during his first nine years at Jefferson. His colleagues looked upon him as a genius. He became a U.S. citizen in 1942. In 1948, upon Moon's retirement, Herbut was made Professor of Pathology and Chairman of the Department.

An excellent lecturer with a rapid delivery that induced writer's cramp in those students who tried (in the days before a note-taking service) to keep up, Herbut carried virtually the entire burden of 77 sophomore lectures in pathology, although he delegated the excellent lecture series on *Pathology in Internal Medicine* for juniors to William V. McDonnell and Joseph F. McCloskey, his major teaching associates in the Medical School for many years.

Always a prolific writer even when a Department Chairman, Herbut's first textbook was *Surgical Pathology*, which appeared in 1948 (and was followed by a second edition in 1954); *Urological Pathology* (two volumes), which appeared in 1952, followed by a Spanish edition in 1959; *Pathology* (a general textbook), which appeared in 1955, with a second edition in 1959; and *Obstetrical and Gynecological Pathology*, which was published in 1958.

Herbut was an excellent morphologist. His

greatest fame came in the cytologic diagnosis of cancer, particularly in the lower respiratory tract, in association with Louis H. Clerf, Professor of Laryngology and Bronchoesophagology. Together they won the Ward Burdick Award (the highest honor for investigative work) of the American Society of Clinical Pathologists in 1950 for their demonstration of the efficacy of the cytologic diagnosis of bronchogenic carcinoma. Up to 80 percent accuracy was achieved by going back several times with a rigid bronchoscope to obtain more cells until the cytologic diagnosis agreed with the clinical one. Because of Herbut's reputation in the cytologic diagnosis of nongynecologic cancer and the equally excellent reputation of Abraham E. Rakoff (Professor of Obstetrical and Gynecological Endocrinology) in gynecologic cytology, Jefferson acquired an international reputation as a center for cytology training and diagnosis in the 1950s and 1960s.

With the sudden death in October, 1951, of Carl Bucher, the Directorship of the Clinical Laboratories devolved to Herbut and the schism in the Department ceased. This allowed better coordination of resources (manpower, in particular) and strengthened the Pathology Residency in a four year program of combined anatomical and clinical pathology. A steady stream of residents (usually two per year) passed through the program, most of them destined for directorships of laboratories in community hospitals.

Herbut taught his residents to think as he did, in an organized way, stressing expediency, pragmatism, and simplistics. Most of them stayed on the teaching staff after completion of their residencies.

The Clinical Laboratories expanded in both quantity and quality of work under Herbut. In 1953 a total of 343,904 tests were performed, including 8,000 surgical pathology examinations. During the year 1953–1954, in which the Foerderer Pavilion was being built, the Laboratories moved from their very crowded quarters on the fifteenth and sixteenth floors of Thompson Annex and second floor of the Main Hospital building to

temporary space on the sixth floor of the Curtis Clinic. In 1954, the Clinical Laboratories moved into then-spacious quarters on the third floor of the Foerderer Pavilion, sharing the space with the Blood Bank, which was under the jurisdiction of the Cardeza Foundation. Among the Assistant Directors of Clinical Laboratories who served under Herbut were Robert L. Breckenridge (1947–1953), William C. Herrick (1948–1953), Paul N. Jernstrom (1953–1957), Henry L. Kazal (1953–1957), Richard C. Taylor (Associate Director, 1957–1970), Francis A. McKeon, Jr. (1957–1961), Paul L. Lewis (1958–1961), Simon Soumerai (1958–1961), John J. Moran (1961–1967), William E. Delaney III (1961–1968), Dennis S. O'Connor (1961–1964), and Harold L. Bauer (1964–1967). Most of these men were anatomical pathologists, but Herrick, McKeon, O'Connor, and Bauer had primary responsibilities in the Chemistry Laboratory.

In November of 1954, the Chemistry Laboratory was staffed by a supervisor, a chief technologist, seven technologists, two aides, one secretary, and numerous blood collectors (mostly medical students). The vacutainer method of blood collection had just been introduced. A flame photometer had been purchased for the ever-increasing number of electrolyte studies (replacing the Sunderman total base analyzer that had been in use since 1951). A spectrophotometer was on order. An entire room was given over to protein-bound iodine tests of thyroid function. By 1961 blood gas analysis began, using an Astrup apparatus, and a four-channel Autoanalyzer was being used for simultaneous measurement of sodium, potassium, chloride, and carbon dioxide levels in blood.

Supervision of the Microbiology Laboratory after the death of Dr. Bucher in 1951 was the responsibility on a part-time basis of Carl Clancy, Ph.D. until 1955, when it became the full-time charge of Eileen Randall, Ph.D. “Randy” brought superb professionalism and a high degree of service to Microbiology. Her departure to Evanston (Illinois) Hospital in 1969 left a great void.

No Chairman in the history of the Pathology

Department had personally carried out the three major tasks of an academic department (teaching, service, and research) better than Herbut. His success in the teaching and service mission would have been predictable from his accomplishments before assuming the Chair. The remarkable expansion of the research activities for which the Department under Herbut became known could only have been anticipated after 1946, when he began his work with the Elizabeth Storck Kraemer Foundation. As discussed in detail in the chapter on Medical Oncology, the Foundation screened more than 4,000 DuPont chemicals for anti-tumor activity. Herbut and his laboratory assistant, Edward Sekula, became adept at transplanting tumors into rodents during the 18 years of work with the foundation.

The research activities of the Department in 1961 were reviewed in the March issue of the *Alumni Bulletin* that year.¹⁶ Herbut had attracted other active, funded researchers who brought expertise in viral carcinogenesis and arteriosclerosis to the Department. The work of Drs. Robert Love and R. Gerald Suskind in the histochemistry of polyoma virus infection was supported by a \$440,827 five-year grant from the U.S. Public Health Service. Their team eventually included Kay Ellem and George Studzinski. Studzinski later became Chairman of the Department of Pathology at New Jersey College of Medicine and Dentistry in Newark. Love moved to the National Cancer Institute of the National Institutes of Health, where he served as Chief of the Office of Program Planning and Analysis until his untimely death March 5, 1978. Theodore Tsaltas' area of investigation was in the field of blood lipid and lipoprotein metabolism and the development of experimental models of arteriosclerosis. It was funded by the National Institutes of Health for \$200,000 over a four year period. Tsaltas also died early, having had polycystic disease of the kidneys that required prolonged dialysis treatment. Gonzalo Enrique Aponte spent the years from 1959 to 1966 not only teaching but also researching in the field of radiation carcinogenesis. He had taken a six month sabbatical leave from February to August, 1960, to study under Eugene Cronkite at the Brookhaven National Laboratory on Long Island. Aponte's research on rat mammary carcinogenesis was not funded. Herbut not only received Kraemer Foundation support through 1965, but also, as an outgrowth of those activities, received a National Institutes of Health grant renewal for three years in 1965. Unfortunately,

Herbut's later research on tumor-inhibitory principles isolated from mammalian blood and liver could not be continued beyond 1966. At that time he ceased active research and became President of Jefferson Medical College.

Herbut had occupied an increasingly responsible position in the guidance of Jefferson since election by his peers as Chairman of the Executive Faculty in 1956, a position he occupied until 1965. In this capacity he was in frequent contact with members of the Administration and in particular with Mr. William Bodine (President of the Medical College), whose confidence Herbut came to share. On September 12, 1966, after the resignation of Bodine, Herbut became the President of Jefferson Medical College. It was characteristic of this cautious man that he arranged for his salary to be paid partially as President, partly as Professor of Pathology (a title he kept although he did resign as Director of the Laboratories), and partly as Attending Pathologist in the Clinical Laboratories.

In connection with the Pathology Department, Herbut should be remembered as a man for all seasons who played all the roles expected of him with great distinction, who was a superb diagnostic morphologist and cytopathologist, a great teacher, a prolific writer, the mentor and model for the pathologists he trained, an excellent administrator, and a gifted researcher who might have achieved much more had he followed his investigative leanings to their fruition. His contributions to Jefferson began in earnest when he left pathology and laid the foundation of Thomas Jefferson University.

Gonzalo Enrique Aponte, M.D. (1929–1979), Sixth Chairman (1967–1979)

The first Pathology Chairman of Latin-American extraction, Gonzalo E. Aponte (Figure 6-13) was born July 15, 1929, at Santurce, Puerto Rico. Brilliant even at a young age, he was graduated after three years premedical study at Georgetown University, receiving his B.Sc. in 1948 at 18 years of age. Aponte received his M.D. from Jefferson in 1952, finishing first in his class. He began a rotating internship (1952–1953) in Jefferson Medical College Hospital with the intention of becoming an internist but decided to take a three month rotation in the Chemistry Laboratory (July–

September, 1953) and during that time became committed to pathology as a career. He finished his four year Residency in Pathology at Jefferson in 1957. Two years of duty in the U.S. Navy as Pathologist at the Naval Hospital on Guam followed (1957–1959), and then Aponte returned to Jefferson as a full-time teacher and researcher. He was the first Jeffersonian to receive the prestigious Markle Scholarship in Medical Science, which he had from 1960 to 1965. In 1967, Dr. Aponte was named to succeed Dr. Herbut as Professor and Chairman of the Department and Director of the Clinical Laboratories.

Aponte's first love was teaching, and he was given early recognition as a gifted lecturer,



FIG. 6-13. Gonzalo E. Aponte, M.D. (1929–1979), Sixth Chairman (1967–1979).

receiving a Lindback Foundation Award for distinguished teaching in 1962, three years after joining the faculty. His extraordinary intelligence, conspicuous nervous energy, great command of the English language, stage presence, and desire to excel made him an impressive Professor in the classical sense. He put a great amount of work into the preparation of his lectures, revising them yearly and including an extraordinary amount of detail, even clinical data from the 20 medical journals he read each month. Most of his students revered him; he was consistently chosen to administer the Hippocratic Oath to each year's graduating class. The Class of 1971 commissioned his portrait to be painted when he was only 41, making him the youngest Professor ever so honored. His peers also honored him. In 1967 Aponte was named Clinical Scientist of the Year by the Association of Clinical Scientists, and in 1977 he was elected President of the Alumni Association of Jefferson Medical College.

As an extension of his interest in teaching, Aponte spent a great amount of time on the residency program in pathology. Under his leadership its size was expanded to an average of three new residents yearly in the four year program. Despite the attention he devoted to the residency program, however, his interests were primarily in the Medical College and not in the Hospital. As time went on he devoted less time to the day-to-day operations of the Clinical Laboratories, especially after the installation of new staff members, notably Heinz G. Schwartz, M.D., Ph.D. in Clinical Pathology and Arthur S. Patchefsky, M.D. in Surgical Pathology. By 1972 Schwartz was advanced from Assistant Director to Associate Director of Laboratories and in 1978 he was made Director when Aponte relinquished the Clinical Laboratory appointment.

Automation of the Clinical Laboratories proceeded rapidly through the 1960s to the 1970s. In fiscal year 1969–1970 a total of 521,834 laboratory tests were done; within six years (1970–1976) the total had risen to 919,943. The largest area of increase occurred in the Chemistry Laboratory, where test volume had gone from

261,121 to 490,000 in six years. Most of the increased workload had been accomplished with relatively small increase in manpower because of automated equipment (multiple-channel analyzers in chemistry, for example). Anatomical pathology workload had risen also, with an average of 9,673 surgical and 25,863 cytological specimens processed yearly between 1969 and 1975. During the same period the number of autopsies averaged 309 annually.

In contrast to the increasing Clinical Laboratory activity, research programs in the Medical College languished in the early years of Aponte's tenure as a result of the loss of the productive researchers (Love and Tsaltas) brought in by Herbut. At the same time, funding by the National Institutes of Health and other agencies began to be more difficult to obtain. Eventually Suskind, Ellem, and Studzinski went to other institutions, and by the mid-1970s there was no investigative activity in Jefferson's Department of Pathology.

Highlighted by the brilliance of its Chairman (but increasingly as a one-man show) the Department continued to be well regarded late in the 1970s, particularly in its teaching function. It was thus a major tragedy when Aponte died suddenly, of a cardiac arrhythmia, on June 15, 1979, at age 49, shortly after having been named the first Peter A. Herbut Professor of Pathology. It was a fitting tribute to his deserved reputation as a teacher that Gonzalo Enrique Aponte himself was honored in death by his family, hundreds of devoted friends, and students who quickly raised funds that enabled his own name to be perpetuated in an Endowed Professorship.

Warren Reichert Lang, M.D. (1918–1986), Acting Chairman (1979–1983), Seventh and First Aponte Chairman (1983–1986)

The first native Philadelphian since Longstreth to become Chairman, Dr. Warren R. Lang (Figure 6-14) was born September 18, 1918, in the Bridesburg section. Of German ancestry, Lang attended Frankford High School, from which he graduated in 1936 (third in a class of 300). He then entered Temple University, graduating in 1940 (first in a class of 460) with honors (the Owl Award). He entered Jefferson in a class that

became accelerated because of World War II, enabling him to graduate in March, 1943 at the top of his class. Lang served a rotating internship at Jefferson Hospital (1943–1944) and then took a year's residency (1944–1945) in Obstetrics and Gynecology at Jefferson. From 1945 to 1947 he served as a medical officer in the U.S. Army in Korea. He returned to Jefferson in 1947, becoming associated in practice with Dr. Lewis C. Scheffey, Chairman of the Department of Obstetrics and Gynecology.

By 1963, Lang had risen to prominence in his specialty, having been appointed Professor of Obstetrics and Gynecology at Jefferson in that year after having cooperated with Drs. Scheffey and Abraham Rakoff in the early development of gynecologic cytology. Lang had served as Secretary-Treasurer of the American Society of Cytology since 1960 and had been President of the American Society of Colposcopy and Colpomicroscopy for four years. Although it surprised his acquaintances when he decided on a career change in 1968, the switch to pathology was accomplished smoothly because of Lang's many

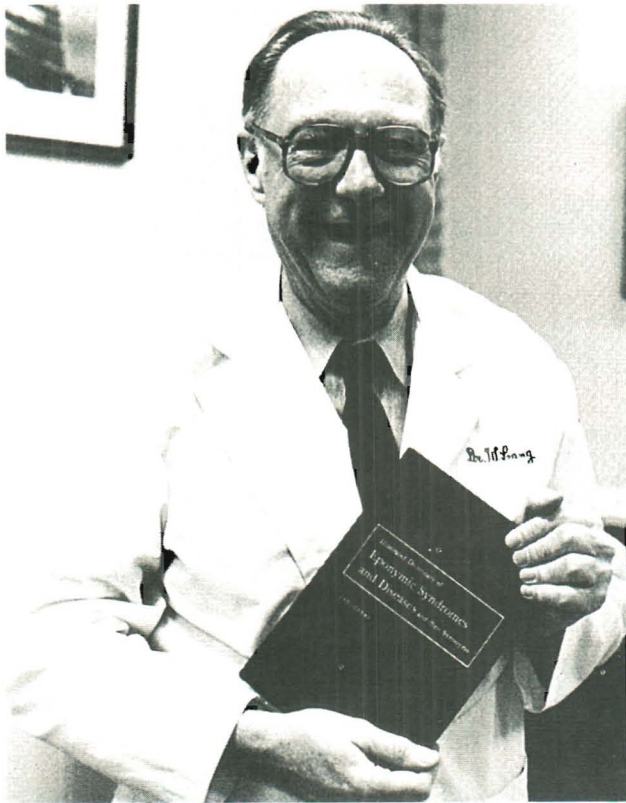


FIG. 6-14. Warren R. Lang, M.D. (1918–1986), Acting Chairman (1979–1983), Seventh and First Aponte Chairman (1983–1986).

years of morphological orientation. From 1968 to 1970 he served a Pathology Residency at Jefferson under Aponte and then spent a third year (1970–1971) at Case-Western Reserve under James Reagan. Lang returned to Jefferson in 1971 as Assistant Professor of Pathology with duties in surgical pathology, cytology, and autopsies. In 1973 he became Professor of Cytotechnology in the College of Allied Health Sciences at Jefferson. In 1976 Lang was promoted to Associate Professor of Pathology, and from 1979 he served as Acting Chairman during the first four years following Aponte's death. In 1983 Lang was named the first Gonzalo Enrique Aponte Professor of Pathology and Chairman of the Department, in which post he served until June 30, 1986, when he retired from the Chairmanship and relinquished the Aponte Professorship to his successor, Emanuel Rubin. Lang continued to serve in the Department, primarily in cytopathology, until his death from pneumonia and its complications on April 19, 1987.

Like his predecessor, Lang was principally renowned for his teaching ability during his years in pathology. His teaching style was unique, relying on aphorisms and wit, with lectures liberally embellished with Kodachromes. His enthusiasm for his subject was contagious, and his students reacted warmly to his teaching efforts. In 1977 he was given a Lindback Foundation Award for Distinguished Teaching. His portrait was commissioned to be painted by the Class of 1985. Lang's love for teaching carried over into his guidance of the pathology residency program. Continuing the dedication of his predecessors, he was responsible for the training of many pathologists.

A prolific writer, Lang published 147 scientific articles. His work was highly regarded, particularly in cytopathology. In 1984 he received the prestigious Papanicolaou Award of the American Society of Cytology, and he was the Society's President in 1984–1985. He was also a bibliophile, an opera lover, and a student of classical Greek literature.

Emanuel Rubin, M.D. (1928–), Eighth and Second Aponte Chairman (1986–)

Emanuel Rubin (Figure 6-15), current Chairman and second holder of the Aponte Professorship, was born in Atlantic City, New Jersey, on December 5, 1928. His status as one of the world's leading experts on alcohol-induced diseases is all the more remarkable when regarded in the light of the financing of his education. Not only was he the recipient of a scholarship from the New Jersey Association of Licensed Beverage Dealers, which was renewed yearly for each of his four years at Villanova University (B.S. in Biology with High Honors, 1950), but the beer and whiskey dealers, impressed with his extraordinary academic achievements, took the unprecedented step of paying for his entire education at Harvard Medical School (M.D., 1954). After internship in the Boston City Hospital (1954–55), Rubin served two



FIG. 6-15. Emanuel Rubin, M.D. (1928–), Eighth and Second Aponte Chairman (1986–).

years (1955–1957) as a Lieutenant (Medical Corps), U.S. Navy. He returned briefly (1957–1958) as a resident in Children's Hospital of Philadelphia. He then moved to New York City's Mount Sinai Hospital and Medical School, where he spent the next 18 years, receiving his clinical and research training in pathology with special emphasis on liver diseases under Dr. Hans Popper. Rubin rose to Pathologist-in-Chief of the Hospital (1971–1976) and became the Irene Heinz and John LaPorte Given Professor of Pathology and Chairman of the Department (1972–1976). He returned to Philadelphia in 1977 to become Professor and Chairman of the Department of Pathology and Laboratory Medicine and Director of Laboratories of Hahnemann Medical College and Hospital for nine years. In 1986 Rubin came to Jefferson as the Gonzalo E. Aponte Professor of Pathology, Chairman of the Department of Pathology and Cell Biology, and Attending Physician-in-Chief (Pathology) of Thomas Jefferson University Hospital. Since 1977 Rubin has also held an appointment in the University of Pennsylvania School of Medicine as Adjunct Professor of Biochemistry and Biophysics.

His dual academic appointments indicate Rubin's interests. In attempting to establish a molecular basis of behavioral tolerance to alcohol and other drugs, he has become a membrane biologist, using new techniques such as nuclear magnetic resonance to learn of the biophysical principles that govern the control mechanisms for cell membranes. The change in the name of the Department reflects Rubin's belief that the boundaries between traditional pathology and biochemistry, cell physiology, and molecular pharmacology are disappearing—in the research laboratory at the moment but in routine practice in the near future. For this reason, and because skill and training in new techniques and instrumentation are needed in order to acquire new knowledge, Rubin has changed the design of the pathology residency. He has lengthened the program to five years, beginning with a core training of three years to provide competence in subspecialty areas related to clinical medicine and a final two years to complete the program with intensive training and research in one subspecialty. Rubin predicts that in ten years the changes in pathology departments of medical schools will make them unrecognizable in terms of departments of the recent past. At Jefferson, the Department is at the cutting edge in application of

techniques to medicine both at the diagnostic and research levels. Though computerized teaching of pathology will be widely applied, the computer will never replace a good teacher as a role model. new biologic techniques to medicine both at the diagnostic and research levels. Though computerized teaching of pathology will be widely applied, the computer will never replace a good teacher as a role model.

In 1988, Dr. Rubin co-edited, with John L. Faber, M.D. (Professor of Pathology at Jefferson) and 40 contributors from the United States and Canada, a monumental textbook, *Pathology*, which features classical general pathology and systemic pathologic anatomy in the context of modern biology.¹⁷

Pathology throughout the world has assumed a distinct differentiation within the body of medicine, but at the same time it has become an integral part of disease concepts from newer aspects. Jefferson shares in this progress.

References

1. Krumbhaar, E.B., *Pathology*, Vol. 19, Clio Medica. A Series of Primers on the History of Medicine. New York: Paul B. Hoeber Medical Book Dept., Harper & Bros., 1937.
2. Wagner, F.B., Jr., "Revisit of Samuel D. Gross, M.D.," *Surg., Gynec. & Obst.* 152:1-12, 1981.
3. Gross, S.D., *Elements of Pathologic Anatomy*. Philadelphia: Blanchard & Lea, 1839.
4. Gross, S.D., *op. cit.*, 2d ed., 1845.
5. Gross, S.D., *op. cit.*, 3rd ed., 1857.
6. Tyson, J., "Memoir of Dr. Morris Longstreth," *Trans. Stud. Coll. Phys. Phila.*, 3rd Ser., Vol. 38, 1916, pp. lvii-lx.
7. Bauer, E.L., *Doctors Made in America*. Philadelphia: J. B. Lippincott Co., 1963, pp. 257-262.
8. King, L.S., "Medicine in the U.S.A.: Historical Vignettes: Clinical Laboratories Become Important, 1870-1900," *J.A.M.A.* 249: 3025-3029, 1983.
9. Morman, E.T., "Clinical Pathology in America, 1965-1915: Philadelphia as a Test Case," *Bull. Hist. Med.* 58: 198-214, 1984.
10. "Biography of Bowman Corning Crowell," 1927 CLINIC Yearbook, p. 57. (In Thomas Jefferson University Archives).
11. "Biography of Baxter Lindsay Crawford," *Jeff. Med. Coll. Al. Bull.*, Vol. 2, May, 1940, p. 49.
12. Griffith, R.S., "Biography of Dedicatee: David R. Morgan M.D.," 1935 CLINIC Yearbook, pp. 9-11. (In Thomas Jefferson University Archives).
13. Moon, V.H., "Scientific Research in Jefferson Medical College," Memoir (signed but undated) written on stationery of the University of Miami Medical Research Unit. (In Thomas Jefferson University Archives).
14. "Department of Pathology and Clinical Laboratories," *Jeff. Med. Coll. Al. Bull.*, Vol. 8, No. 7, May, 1954, pp. 3-10.
15. Herbut, P.A., "Jefferson Appointment, 1939, and Appointment, Professor of Pathology and Head of the Department, May 29, 1948," Herbut Personal Papers, Vol. 2. (In Thomas Jefferson University Archives).
16. "Expansion of Research in Department of Pathology," *Jeff. Med. Coll. Al. Bull.*, March, 1961, pp. 16-26.
17. Rubin, E., and Farber, J.L. (Editors), *Pathology*, Philadelphia: J.B. Lippincott Co., 1988.