Leaders of Pathology

by Morris J. Karnovsky

WHILST THERE IS NO NEED TO JUSTIFY having an excellent scientific symposium, especially when it provides an opportunity to see old friends and colleagues again, we thought that some explanation of why we are claiming this our 150th birthday is warranted. I guess this is the penalty one pays when reaching a certain stage of seniority: I was the one called upon to reminisce about the past 150 years! As Lincoln said, "We cannot escape history," but I am certainly no historian.

In reviewing the history of the department, I will prove that we are indeed 150 years old, and that we are the first Department of Pathology ever to be created in the United States. I shall trace the history and development of its chairmen and of the first full-time chiefs of each of the teaching hospitals. In doing this, I will unfortunately have to show portraits of many white males, mostly dead. Regrettably the first two women professors of pathology, Lynn Reid and Shirley Driscoll, were only appointed in 1975, and unfortunately, there are no people of color.

After the founding of Harvard Medical School in 1782, the anatomist John Warren established an anatomical cabinet, which later became the Warren Museum, and which contained a few pathological specimens. Pathology seems to have been taught at Harvard and elsewhere only as an appendage to other disciplines.

Somewhat later other schools had professorial chairs in which pathology was part of the title but always linked to surgery, anatomy, physiology or medicine. For instance, although Samuel D. Gross was appointed to a chair of pathological anatomy at the University of Cincinnati in 1835, that chair was actually located in the Department of Medicine. Other chairs with the appellation of pathology were created in 1767, at Penn and at Kings College (later Columbia), but were also linked to physiology and medicine. Furthermore, the part-time incumbents were expected to derive their income from the practice of medicine or surgery, because fees earned from lectures and demonstrations in pathology were not substantial.

Harvard was the first institution to recognize that pathology was a separate discipline in its own right. On April 13, 1847 the president and fellows resolved "that a new professor be chosen to be called Professor of Pathological Anatomy to lecture at the medical college, and to have charge of the museum, that the compensation of the said professor of Pathological Anatomy be exclusively derived from fees paid by the medical students."

The first appointee to this chair was John Barnard Swett Jackson, who in 1847 took up the chair of pathological anatomy. Jackson was a Harvard graduate and had studied at Guys in London with Hodgkin and Addison. He was a gross pathologist par excellence, but even though the microscope objective lens had been perfected some 20 years earlier by the father of Lord Lister, of antisepsis fame, correcting for achronomeric and spherical aberrations, Jackson was not at all interested in microscopy.

Indeed, the president and fellows in creating the chair had allocated $50 for the purchase of a microscope. But Jackson never took them up on that offer even though it had been stipulated that one of his duties was "to examine microscopically and analyze all growths, tumors and diseased parts that may be removed from patients by operation or otherwise... and if an accumulation of valuable knowledge shall have been made... he could under the patronage of the hospital and at the discretion of the surgeons
and physicians publish it to the world as the result of his labors in this department."

His friend Oliver Wendell Holmes said "that his look penetrated like an exploring needle, and he never pretended to have the slightest knowledge beyond what his honest naked eyes could teach him." His bust is located at the left-hand entrance to the Carl Walter Amphitheatre at HMS, and there he is wearing a bow-tie and looking very dapper and modern. He was a splendid teacher and had great vitality and enthusiasm.

He was also appointed curator of the Warren Museum, and his own collection of pathological specimens, which was famous, was merged with that of the Warren Museum. When I inquired at the Warren Museum recently as to what pathological memorabilia they had, I was informed that there were none, which is sad.

Jackson worked at Harvard Medical School, then situated on North Grove Street adjacent to the Mass. General Hospital, with the flats of the Charles River in front (later filled in as Charles Street). The microscopy room was in the attic of the North Grove building, shared with histology and embryology. Calvin Ellis, MD, Jackson's assistant, was a microscopist who also worked at the Mass. General. Generously, he had bought 10 microscopes out of his own pocket for student use. Ellis endowed a chair in pathology with $150,000 (at least $6 million in today's money), which in those days was an enormous sum—in fact, it constituted one-third of HMS's total endowment! It was never used for the professorship, and some years ago was absorbed into the school's general funds.

In 1854 George Cheyne Shattuck, professor of medicine, endowed the Shattuck Chair of Morbid Anatomy in honor of his father, also a distinguished professor of medicine. The endowment stated that "Harvard may ever come up to the wants of the people, by furnishing the means for their instruction, is the earnest desire of her humble well-wisher." The endowment consisted of two shares in New Hampshire textile mills, worth at that time about $14,000.

Shattuck was an interesting person. He was a Dartmouth graduate and benefactor, establishing the Astronomical Observatory there. He helped Audubon publish his great work on American birds, and had a habit of sending his poor patients to his tailor to be outfitted in suitable clothing. He had a dissecting room at home, and it was said that he grew excellent grapes, no doubt because the detritus from the dissecting room went into fertilizer.

Jackson was appointed as the first Shattuck Professor of Morbid Anatomy and also became the dean of the medical school in 1854, succeeding Oliver Wendell Holmes. Calvin Ellis, his assistant, also became dean some years later. It seemed at that time that becoming dean, then a part-time job, was a hazard facing professors of pathology.

In 1879 Reginald Hibber Fitz, a Harvard MD who had studied abroad with Chiari, Rokitansky, and the great Virchow, succeeded Jackson as chairman and as Shattuck professor, which at that time was re-named the Shattuck Professorship of Pathological Anatomy.

Fitz, it was said, saved more lives at that time than any other person, because he showed that the so-called

Harvard Medical School at the corner of Exeter and Boylston streets.
disease of typhlitis was actually an inflammation of the appendix and not of the cecum. He promulgated the idea that appendectomy was the cure for this disease, and in doing this he saved countless lives. The pathologist and historian, William B. Ober, has suggested that “Fitz’s study of appendicitis signals the beginning of the surgical pathology in Boston,” and his contribution was “a major step in elucidating the pathogenesis, morbid anatomy, surgical pathology, and treatment of a major disease.”

Fitz also described the pathology of, and named, acute pancreatitis. Fitz worked both at North Grove Street, and at the elegant new Harvard Medical School at the corner of Exeter and Boylston streets. As or about this time the pathology department was so well thought of that Henry J. Bigelow, professor of surgery, stated that “no single branch of education is more essential to the medical student than pathological anatomy, the cornerstone of medicine.” This from a surgeon of all people!

Technical developments were to spur the future directions of the department. Between 1830 and 1890, achromatic and oil immersion lenses, the Abbe condenser, (which improved resolution and illumination), microtomes, paraffin embedding, frozen sections, and the synthetic aniline dyes for staining sections, were all invented.

With these new technical developments, and with the concepts of Virchow, Pasteur and Cohnheim sustaining an intellectual approach, a new type of pathology was born—histopathology. Furthermore, because bacteriology and pathology were intertwined, and mutually reinforcing, pathologists (who were frequently also bacteriologists) could for the first time identify specific causes for specific diseases. With the introduction of ether anesthesia in 1846, and the gradual acceptance and practice by surgeons of the Listerian principles of antisepsis, the scope of surgery expanded, and the role of surgical pathology was transformed and enlarged.

It is not surprising then that Fitz’s successor in the chair in 1892, and as Shattuck professor, was William T. Councilman, a histopathologist, microbiologist and surgical pathologist. It was the first appointment to the senior Harvard pathology faculty of someone who had not graduated from Harvard Medical School.

Councilman’s MD was from Maryland. He had studied with the great experimental pathologist, Julius Cohnheim, and he was a well-established and famous professor at Hopkins, one of William Welch’s “rabbits,” as were called the colleagues and students of the great Welch. Welch was appointed chairman of pathology at Hopkins, and dean, even though Councilman had been there as professor for several years and was senior. But Councilman had a stammer and was regarded as too outspoken, undiplomatic and too utterly informal to be dean, or even chairman. Nevertheless, for eight years, until Harvard recruited him (having failed to garner Welch or Osler!), Councilman was a loyal colleague of Welch.

Harvey Cushing, who was one of his medical students at Harvard, stated that he was a breezy, informal, pipe-smoking man. In Baltimore he would collect gross material for the weekly conference by riding his bicycle across the city to the city hospital and back to the school bearing the specimens. He seems to have been an absolutely wonderful teacher, and probably would have been at home in the New Pathway.

Councilman’s scientific contributions are many, including classifying amebic dysentery as a distinct disease and describing Councilman bodies in livers of patients with yellow fever and with viral hepatitis. Today, we know that these bodies are apoptotic cells. He realized that the major teaching hospitals, namely Boston City and MGH, required full-time heads of pathology and he had the vision to appoint geniuses such as Frank Burr Mallory at Boston City (1908), after whom the Mallory Institute is named, and James Homer Wright at the MGH (1896). Both these men went on to great fame and glory, using techniques of staining that they helped develop, as the stains were becoming available from the German aniline dye industry. They published their influential book Pathological Technique in 1897, which was the bible for laboratories of pathology for decades.

There are at least 20 references to Mallory in the current vade mecum, Lillie’s Pathological Technic. Mallory’s studies on typhoid fever, hepatic cirrhosis, and tumors, using the then-new stains, are classics. Wright developed his stain, a simplification of the Romanowsky method for studying blood cells, and thus went on to make his most famous and important discovery of the origin of platelets from megakaryocytes.

In the 1890s Harvard President Eliot expressed his belief in a possible role for insects and animals in disease causation in humans, and with Councilman’s support, George Fabyan, a merchant of Boston, who
was a great lover of horses, endowed a chair of comparative pathology in 1896. The first incumbent of this Fabian chair was Theobald Smith, who was truly a great scientist. His was the first demonstration of the importance of insect vectors in disease. He produced anti-toxins for diphtheria and tetanus, developed culture techniques for anaerobic bacteria, and made contributions to anaphylaxis.

He was succeeded in 1916 by Ernest Edward Tyzzer, one of Councilman’s protégés. Tyzzer was also a polymath, and it was said that if you wanted to know anything, ask Tyzzer. Among other contributions, he produced the first evidence of hereditary factors in cancer.

At the Peter Bent Brigham Hospital, which was founded in 1913, Councilman himself became the part-time pathologist. He loved gardening, nature, fishing and hunting. He took great interest in landscaping the grounds around the Brigham and planting the climbing roses, which used to exist there, and spent much time cultivating and pruning them (and took delight in being mistaken for the official gardener). He was a crack shot, and on Sunday mornings in the laboratory frequently held target practice. It was said he could hit a thumb tack at 20 paces.

Councilman was a congenitally bad speller, so Welch put him in charge of editing a medical dictionary in the hopes that it would improve his spelling. I’m not sure that it worked. It was well known that he swore on many occasions, and his oaths when addressing a golf ball were legendary. He always traveled with his microscope and became interested toward the end of his life in fungal diseases of plants. He was found once sitting on a bench in a park in San Francisco, studying some diseased plants with his microscope.

Another of his accomplishments was to establish the Department of Neuropathology at Harvard. He received four honorary LLDS from various universities, and was a member of the National Academy of Sciences. He was chairman for 30 years—the longest of anyone—and moved the department to the Quadrangle in 1906.

Councilman was succeeded in 1922 as Shattuck professor and chair of the Department of Pathology by S. Burt Wolbach, a Harvard MD who was born and raised in Nebraska, where he enjoyed hunting, shooting, fishing and riding. Wolbach trained under Harold Ernst, the professor of bacteriology, and also under Councilman and Frank B. Mallory. Ernst had been recruited by Councilman, and later Wolbach would recruit Hans Zinsser to bacteriology. Indeed Wolbach’s first faculty appointment was in bacteriology, where he rose to be an associate professor.

Wolbach became associate professor of pathology in 1916, was appointed by Councilman the pathologist-in-chief at Children’s (1915), PBBH and Boston-Lying-In (1916), and succeeded to the chair and Shattuck professorship in 1922. Wolbach successfully symbiosed the academic and clinical interests and resources of the Quadrangle and the hospitals, to their mutual benefit. To these ends Wolbach became pathologist-in-chief part time at Children’s in 1915, and at Peter Bent Brigham in 1917, in addition to carrying out his research and teaching duties on the Quadrangle. It should be emphasized that, unlike at other institutions, at Harvard surgical pathology was associated from earliest days as an integral part of the department and not as in other centers as a separate entity or even part of surgery.

Wolbach’s greatest contributions were in infectious diseases and parasitology. Most important were his monumental studies on the relationship of rickettsia to the pathogenesis of rocky mountain spotted fever and typhus. His classic studies on the typhus epidemic in Poland, where the causative agent was identified, was typical of his meticulous studies. With little boxes strapped to their legs, his team entered Poland, lice in the boxes feeding on their skin. His vitamin researches are extremely perceptive, such as on scurvy, where he related the multiple tissue changes to a single biological process—a defect in the formation of the extracellular matrix. We now know of course that there is a defect in the cross-linking of collagen in this disease.

In his last public address, he pointed out that the demands placed by modern medicine and surgery upon the services of the pathologist were so great that there was little opportunity...
for research, and hence while the practice of pathology was flourishing, the science of pathology, that branch of pathology that investigates the reactions of living things—unicellular to man to injurious agents—was languishing and had a "doleful future."

I feel that Wolbach was too pessimistic. Both the practice and science of pathology have flourished since his time and are flourishing today as never before. But has the wheel come full circle? Is there a place for the practitioner/scientist pathologist in the current climate of managed care? Hopefully the great Wolbach tradition of the physician/pathologic/scientist will continue to flourish despite obstacles.

Wolbach was a stately man who wore a bow tie, a fresh boutonniere daily, smoked cigars, rode and fox hunted, and was keen on fly fishing. He was another chief who was a crack shot. One of the duties of his assistants was to fill a syringe of xylene which was kept handy at his microscope for shooting down flies on the window panes, no matter how engrossing the slide being examined.

Wolbach realized that the chairman of pathology at Harvard could no longer also be a part-time pathologist-in-chief at the Brigham and Children's, as Councilman had previously realized in regard to the Boston City Hospital and MGH. He urged that these institutions have their own full-time chiefs. Three famous Harvard pathologists, Sidney Farber, Shields Warren and Arthur T. Hertig, were attracted to pathology by Wolbach's charisma during their early formative years.

His distinguished students became professors and chiefs at various Harvard teaching hospitals, including of course Farber at Children's, a man of great and diverse achievements, founder of pediatric pathology and chemotherapy, and creator of the complex of organization and buildings that advanced tumor biology and the treatment of cancer so greatly. He was a fantastic medical politician and statesman and was instrumental in helping to found and fund the external programs of the NIH. For 20 years Wolbach was his chief and backed Farber's concepts and programs.

Shields Warren, also a protégé of Wolbach's, who trained with Frank Burr Mallory, in 1927 became chief of pathology at New England Deaconess Hospital. Warren made great contributions in the fields of diabetes, thyroid disease, cancer, radiation effects on normal tissue, radiation carcinogens, atomic energy and medicine. In passing I should note that Warren, despite his great abilities, was an assistant professor for 12 years!

Another student of Wolbach's was Monroe Schlesinger, who in 1927 was the first member of the faculty appointed at Beth Israel Hospital when that hospital became affiliated with Harvard Medical School. Schlesinger is well known for the meticulous injection studies he performed on the coronary circulation and demonstrated the importance of collateral circulation.

In 1952 Arthur T. Hertig succeeded S. Burt Wolbach. With Hertig's appointment the central department on the Quadrangle would no longer have any clinical duties, which was in accordance with Wolbach's recommendation.

After college, Hertig worked with his brother, a famous entomologist, in China on Kala Azar. At Harvard Medical School he therefore was attracted naturally to Wolbach and to pathology, and was invited by Wolbach to establish the pathology lab at Boston Lying-In Hospital. Hertig developed a life-long interest in early human development and in obstetric and gynecological pathology. The "egg hunts" that he conducted led to the classic studies with John Rock on early human embryos: the descriptions of 34 ova recovered by elective hysterectomy and evaluated by meticulous microscopy. A humorous and witty man, Hertig summarized his career as "forty years in the female pelvis, a case of prolonged dystocia."

Shortly after Hertig became chairman, Wolbach's wish that the Brigham have its own full-time chief was fulfilled in the appointment of Gustave Dammin, who in 1952 was appointed to the then-called Peter Bent Brigham Hospital. Dammin organized a research-oriented department, which has had many distinguished graduates, and was himself a first-class investiga-
tor. He was well known for his contributions in detailing host reactions to various infective agents and to kidney transplantation, and his collaborations with Joseph Murray '43B, in the latter area, led to a Nobel Prize for Murray.

When Hertig retired, Baruj Benacerraf became chairman in 1970, and the tradition of the Shattuck professor being also the chairperson of the Department of Pathology passed very appropriately to the Fabyan chair, in view of the contributions of the previous Fabyan professors—Theobald Smith, Ernest Tyzzer and (briefly) Rene Dubos—to immunology and host responses. Dr. Benacerraf is well known to all of us as pathology's very own Nobel laureate for his work in immunogenetics. Under his leadership the department served as an umbrella for the greatly expanding field of immunology at HMS. In 1993 the chairmanship and Fabyan professorship passed on to Peter Howley '72, who fills it with distinction.

The history of the department mirrors advances in technology that drive science: gross pathology with Jackson, microscopy with Fitz and Councilman, histological stains with Mallory and Wright, intertwining of morphology and the techniques of biochemistry and microbiology with Wolbach, electron microscopy and cytchemistry with Hertig, immunological approaches with Benacerraf, and molecular biology with Howley. It is also of interest to note how entwined the department has been with microbiology, immunology and infectious diseases.

So, in summary, we were born in 1847, we were the first department of pathology pure and simple in the United States, and Harvard was the first institution to recognize pathology as a discipline in its own right.

It is generally thought that Henry Ford said "history is bunk," but that is not quite correct; what he really said, I believe, was "history is more or less bunk!" I trust this talk falls in the "less" category, and doesn't follow Lord Chesterfield's dictum that "History is only a confused heap of facts."

In conclusion I might quote from something that Shields Warren said: "There isn't time to talk about the past. There are so many new and exciting things happening in pathology, it's a lot better for pathologists to be concerned with those." 

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