

Surgical Pathology

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SURGICAL PATHOLOGY as a discipline distinct from autopsy pathology stems from approximately the 1870s, when the microscope began to be brought to bear to a significant degree on examination of tissue specimens for patient care. As it did at many other institutions, it took some time for the advance to bear fruit at Massachusetts General Hospital (MGH)—but once it did, a proud and successful tradition took root. That surgical pathology could ascend so quickly in the early years was based in part on the large and innovative MGH Surgical Services; indeed, the hospital has often been called a “surgeon’s hospital.” The tradition continues today, with about 70 active operating rooms.

The contributions of those who have handled tissue biopsies and resection specimens over the years could be the basis for an entire book. Unfortunately, space limitations preclude a complete account of all who have been (or are currently) engaged in surgical pathology at the MGH because of their large number and to some degree a lack of adequate information. This chapter therefore focuses primarily on those before the current era and on those who have led, or currently lead, surgical pathology and its subspecialty groups at the MGH or have gone elsewhere to prominent careers in surgical pathology subspecialties. The basic features of surgical pathology (e.g., laboratories, volumes of cases, and so on) are covered in the sections on surgical pathology in chapters 1, 3, 5, 7, and 13 and the

subspecialties of neuropathology and dermatopathology in chapters 17 and 18, respectively. Overviews of four areas of MGH Surgical Pathology are presented here:

1. The early years and prominent surgical pathologists before subspecialization
2. Technical developments that have advanced the practice of surgical pathology, in chronological order: frozen sections, electron microscopy, immunohistochemistry and immunofluorescence, and molecular diagnostics
3. The interface of clinical service and teaching: sign-out activities and intramural conferences, extramural teaching, and interactions with other MGH departments
4. The later years of subspecialty pathology, covering each of the major subspecialties, in alphabetical order: bone and soft tissue, breast, cardiac, endocrine, ear, nose, and throat (ENT) and eye, gastrointestinal, gynecologic and obstetric, hematologic, medical renal, pulmonary, and urologic.

THE “GENERAL” SURGICAL PATHOLOGISTS

Surgical pathology made a very early appearance at the MGH. In 1837 one of the cofounders of the hospital, the surgeon Dr. John Collins Warren (chapter 1), published a book on tumors (*Surgical Observations on Tumours, with Cases*

and Operations, Boston, 1837), which, as it was written in the premicroscopic age, focuses only on surgical and gross aspects of neoplasms. The book (figure 16.1) is impressive, 607 pages long and containing 16 plates, most in color. There are 14 sections dealing with various types of tumors, and Warren concluded with a section entitled “Distinguishing Characters of the Most Common Tumours.” In that section he presented a series of definitions, many of which use now-antiquated terminology but some of which have not changed at all, such as *hydrocele* and *osteosarcoma*. His definition of hydrocele is as good today as then: “a rounded, smooth, undulating,

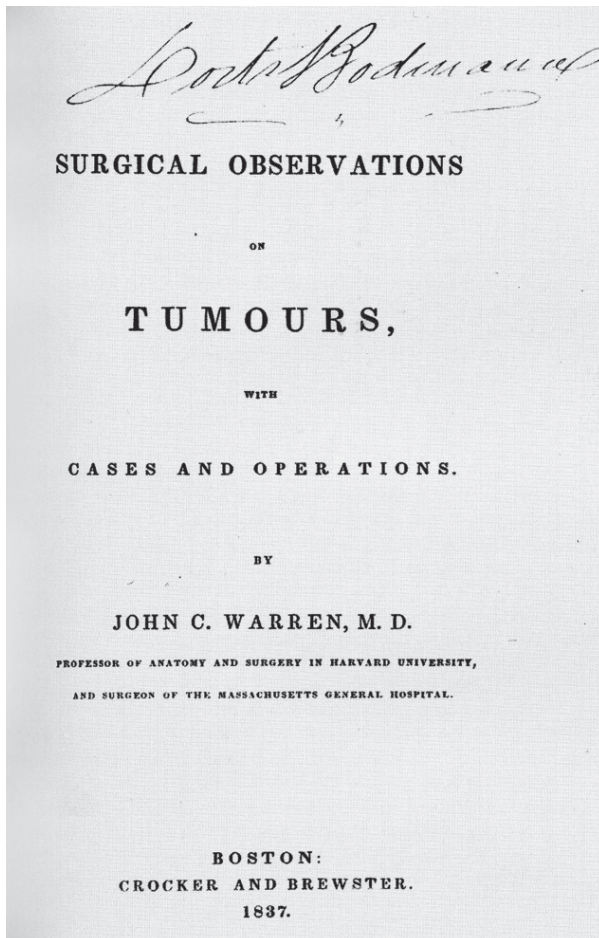


Figure 16.1 Title page of a book by John Collins Warren, one of the founders of the MGH, on the gross appearances of tumors

translucent tumor within the tunica vaginalis testis, or tunica albuginea.”

Those who practiced surgical pathology on the basis of gross appearances in the early years—such as Dr. J. B. S. Jackson—and who probably also practiced microscopic evaluation of specimens to some degree in the years circa 1870–1890—Drs. Ellis, Fitz, and Warren, for example—are considered in chapters 1 and 2. Mention of Dr. J. Collins Warren, the grandson of Dr. John Collins Warren, is made here because the title of his 1895 book, *Surgical Pathology and Therapeutics*, contains the term *surgical pathology* (see figure 1.8). He played a significant role in bringing about biopsies for microscopic diagnosis, including those using the Mixter biopsy needle (figure 16.2), developed by another MGH surgeon, Dr. Samuel Mixter. The crucial role that pathology examination played in good patient care was clearly evident to J. Collins Warren. In the preface to his book he writes: “No young practitioner can be regarded as thoroughly equipped for surgical pathology who is not both a good pathologist and an expert bacteriologist. The confidence born of a knowledge of pathology and bacteriology enables him to assume grave responsibilities and to grapple successfully with the most complicated problems. It is from men thus equipped that we have a right to hope that the future masters of surgery are to be evolved.”

Although Warren used the words *surgical pathology* in his book, none of the early practitioners styled themselves as “surgical pathologists” until Dr. William Fiske Whitney (chapters 1 and 3; see figure 3.6) at the end of the nineteenth century. In those days diagnostic (surgical) pathology was under the aegis of the Surgery Services, and Dr. Whitney thus worked in that division, initially as Assistant Pathologist from 1888 to 1892, as Pathologist from 1893 to 1901, and then as Surgical Pathologist until his retirement in 1916. During most of this time he appears to have been the one responsible for the evaluation of all biopsies and resection specimens. Although he was initially working solely under Surgery, Dr.



Mixer Biopsy Instrument Used by Dr. J.C. Warren (1889).
Early Needle Biopsy Technique

Figure 16.2 An illustration of a Mixer biopsy needle, which would have been used by J. Collins Warren to sample tumors at the end of the nineteenth century

Whitney's work came partly within the domain of Pathology sometime after Dr. Wright became the Chief of Pathology, probably circa 1900.

James Homer Wright (chapter 4) practiced surgical pathology to some extent throughout his tenure as chief, but his interests in microbiology and research restricted the time he had available for evaluation of routine specimens (figure 16.3). As a result, the daily load of surgical pathology was handled by Dr. Whitney as well as Drs. Oscar Richardson and Harry F. Hartwell (from 1911). Dr. Whitney had originally worked in the first Allen Street House, which had an amphitheater, morgue, and small laboratory that had been built in 1874. After the new laboratories were fitted out under Dr. Wright's supervision, Dr. Whitney, Dr. Richardson, and ultimately Dr. Hartwell (who did surgical pathology in the department until 1937) worked with Dr. Wright in the new quarters as well as in the various laboratories off the operating theaters. The practice of surgical pathology in those days differed significantly from how it is performed today; for example, the eminent surgeon Dr. Maurice H. Richardson visited the homes of the more well-to-do to operate on them, often at their kitchen tables, with Dr. Whitney in tow, presumably so that he could give an opinion based solely on the gross characteristics of the neoplasm to be removed.

In 1916 Dr. Hartwell succeeded Dr. Whitney, and surgical pathology gradually became amalgamated with general pathology; annual reports of Drs. Wright and Mallory do not make reference

to a separate status for surgical pathology. The title "surgical pathologist" seems, however, to indicate that the diagnostic work was considered at least somewhat separate from the research, microbiology, and autopsy pathology that were clearly in the bailiwick of Pathology. In his 1934 book *Tumors of the Female Pelvic Organs*, Dr. Joe V. Meigs, then Chief of Gynecology (see figure 19.2), acknowledged the help of three members of MGH Pathology, but he gave precedence to Dr. Hartwell when he commented, "His advice, help and patience made a difficult and painstaking work a decided pleasure, and without him it

Mass. General Hospital.

All requests for consultations between members of the Medical and Surgical and Out-patient Staff, and also the opinion of the consultant, are to be made in writing unless the consultation is held personally. Such written opinions are to be incorporated in the hospital records. Opinions should be written directly in to records, if possible.

To Dr. *James H. Wright*

Name of Patient, _____

Ward, _____ No. of Bed, _____

O. P. D. _____ Dept. _____

Give probable diagnosis, and state particular information desired.

Myeloblastic leucæmia.
Do you agree that the cells are not
leucocytes or neutrophilic myelocytes
but "stroma cells" or myeloblasts?

Date, *Oct 21, 1916*

Signature of Attendant, *R. Cabot.*

Opinion:

The predominating cells do not
seem to me to "stroma cells" or
myeloblasts, but I think they are
atypical tumor cells, closely related
to lymphocytes.

J. H. Wright.

Date, *Oct. 21-1916*

Signature of Consultant.

Form 2.

Figure 16.3 Consultation report between Richard C. Cabot and James Homer Wright, 1916

could have not been accomplished.” Dr. Meigs indicated that in preparing the illustrations for his book he consulted Dr. Hartwell most frequently, but he also thanked Dr. Mallory and his assistant Dr. John I. Bradley. Those who practiced surgical pathology were probably busy; even though the volume was relatively small, there was not a single house officer or resident during Dr. Wright’s entire tenure, so presumably all the gross descriptions and cutting of specimens were done by the small attending staff.

The invention of the rotary paraffin microtome in 1899 was an important development, brought about through the efforts of Francis Blake, a Trustee of the hospital, working with Dr. George Minot and with Dr. Wright’s input. Another important development was the advent of microscopic photography, enabled by the head technician and photographer, Louis Brown, who joined the department in 1896 and served in this capacity for 24 years (chapter 3). Brown’s talents were known beyond the walls of the MGH, and others came to MGH Pathology in the early years of the twentieth century to use the photographic equipment. In a 1908 Festschrift honoring Dr. Fitz, an essay on multiple myeloma by Dr. Henry A. Christian, first Chief of Medicine at Peter Bent Brigham Hospital, acknowledged Brown’s assistance in obtaining the high-quality photographs used therein.

In 1928, two years after Tracy B. Mallory became Chief of Pathology, a new position of Assistant Pathologist (distinct from the positions occupied by Drs. Whitney and Hartwell) was created, and Dr. John Bradley was appointed. In 1929 the Allen Street House was “completely gutted,” according to Dr. Mallory. The autopsy room was remodeled and reequipped, and a room for photography and a small research laboratory were constructed on the second floor. In 1935 Dr. Mallory and Dr. Benjamin Castleman published their seminal paper on the pathology of the parathyroid glands in hyperparathyroidism, heralding the long interest in pathology of

the endocrine glands in the department. The next year Dr. Bradley resigned as Assistant Pathologist, and Dr. Castleman (chapter 8) was appointed in his place.

A trainee under Dr. Mallory’s tenure who had an illustrious career was Dr. Edward A. Gall (1906–1979). Dr. Gall graduated from Tulane University School of Medicine. As Dr. Castleman recounted many years later, he had met Dr. Gall when Dr. Gall was a district physician at the Boston Dispensary. One evening, on a double date, Dr. Castleman asked Dr. Gall if he knew anyone interested in a pathology residency, because Dr. Castleman was about to finish his. Dr. Gall inquired about the salary. The figure of \$500 per year did not dissuade him; a few days later he applied for the position and was accepted. Dr. Gall already had some background in hematology, and this led to an interest in lymph node pathology and papers with Dr. Mallory on the classifications of lymphomas (chapter 6) and with Dr. H. A. Stout on infectious mononucleosis. Dr. Gall left the MGH in 1940 to go into private practice in Cincinnati, but he returned to academic medicine and ultimately became Professor and Chairman of the Department of Pathology at the University of Cincinnati. He was also a father figure for pathologists in training and practice in southern Ohio and Kentucky for decades. He was an international leader in pathology and held a number of prestigious positions in national and international societies. He wrote over 160 papers, among which were seminal works on liver disease. He remained Dr. Castleman’s close personal friend throughout his life.

An important addition to the staff in the middle years of Dr. Mallory’s tenure was Dr. Ronald C. Sniffen (1912–1966) (see figures 5.7, 7.7, and 7.8). He was born in Pittsfield, Massachusetts, went to medical school at the University of Toronto, and did his internship at St. Michael’s Hospital, Toronto. He then did a fellowship with Sir Frederick Banting, followed by a year as a junior assistant in pathology at the British

Postgraduate Medical School in London. He then returned to the University of Toronto for six months of further training in pathology and came to the MGH in 1940 to continue his training. Dr. Gall left three months later, and Dr. Sniffen was appointed Assistant Pathologist, despite the fact that he had not yet completed his residency. In a letter some years later, Dr. Castleman noted that during World War II, while Dr. Mallory was away, Dr. Sniffen “carried a tremendous load of the routine—both autopsy and surgical pathology. In fact, while I was out sick for two months, he ran the entire department.” Dr. Sniffen had a major interest in nonneoplastic testicular pathology and wrote a number of papers in this area, and the observations made in those papers are a foundation for our knowledge of the normal histology of the testis. In 1949, Dr. Sniffen left the MGH to become Director of Laboratories at Memorial Hospital in Worcester, but he kept a close association with MGH Pathology, where he came every Friday for the rest of his career until his untimely death.

Three years after Dr. Sniffen joined the faculty, another person with major interest in genitourinary pathology joined the staff. Dr. Fathollah (Kash) Mostofi (1911–2003) was from Iran and had trained from 1940 to 1943 in pathology at the Peter Bent Brigham Hospital, Lying-In Hospital, Free Hospital for Women, and Children’s Hospital, all in Boston. In the summer of 1943, he was recruited to the MGH staff by Dr. Mallory but he left in October of the next year for military service. Dr. Mostofi went on to a distinguished career focusing on genitourinary pathology. He was a major figure in the U.S.–Canadian Division of the International Academy of Pathology. Although his time at MGH was short, Dr. Mostofi remembered his 15 months in the department fondly and continued his connection through MGH reunions held in conjunction with the annual United States and Canadian Academy of Pathology (USCAP) meetings.

Dr. David G. Freiman (1911–2003) was recruited the year after Dr. Mostofi, 1944. Dr.

Freiman had done an internship and residency in pathology at Montefiore Hospital in New York. He served on the MGH faculty until 1950 (see figure 5.8), and then worked with Dr. Gall at Cincinnati General Hospital before returning to Boston in 1956 as Chief of Pathology at Beth Israel Hospital, a position he held until 1979. Dr. Freiman played a major role in medical student teaching at HMS and had a number of research interests, including histochemistry, and wrote major papers on sarcoidosis and beryllium disease as well as on the pathogenesis of vascular thrombi.

Near the end of Dr. Mallory’s tenure, Dr. Leonard Atkins (see figures 7.6, 7.16, and 13.2) joined the department. Dr. Atkins was born in Newark, New Jersey, in 1922 and received a bachelor of science degree from Yale University in 1942. He then volunteered for the U.S. Army and served with distinction in World War II, receiving the Silver Star for extraordinary courage under fire. After returning home, Dr. Atkins obtained his medical degree from Johns Hopkins in 1950. He volunteered at the MGH in the summer of 1951 and shortly thereafter was appointed Assistant Resident in Pathology. Dr. Atkins quickly developed an interest in the new field of chromosomal analysis (chapters 7 and 13). On being asked in 1957 by the Commonwealth of Massachusetts to appoint a pathologist living in Suffolk County to succeed Dr. William Brickley as county medical examiner, Dr. Castleman chose Dr. Atkins. The job was to consume approximately one-half of his time thereafter. In 1966–1967, Dr. Atkins became Acting Head of Legal Medicine at HMS. Throughout his long career at the MGH, Dr. Atkins took his routine turn signing out surgical pathology specimens in addition to his other obligations as medical examiner and cytogeneticist. Dr. Atkins retired from the MGH in 2001 for health reasons.

Dr. Mallory’s last two recruits to the faculty, Drs. Austin L. Vickery Jr. and Robert E. Scully, were to be the two most dominant figures in MGH surgical pathology for the next 50 years (chapters

9 and 10). Upon Dr. Castleman's retirement in 1974, Drs. Vickery and Scully became Co-directors of Surgical Pathology, stepping down from those positions only late in their careers. It is also noteworthy that their relationship was more than cordial, it was symbiotic (chapter 7); they helped each other with various hospital duties like two soldiers in a single foxhole, and their contributions to the daily flow of diagnoses were more than the sum of their respective parts.

Another individual who trained at the MGH and served for a time on the faculty during Dr. Mallory's tenure was Dr. Robert H. (Hank) Fennell (see figures 5.8, 7.6, and 19.6). He practiced surgical pathology, but his most important contributions at the MGH concerned the development of cytopathology (chapter 19).

TECHNICAL ADVANCES IN SURGICAL PATHOLOGY AND THEIR IMPLEMENTATION AT MGH

Frozen Section Pathology

Frozen section diagnosis began in Dr. Wright's era. In the 1950s and 1960s frozen sections were performed in quarters adjacent to the grossing stations and formalin hoods, which in that era were situated in an alcove between the main desk area for residents doing general pathology and a smaller desk area for residents doing neuropathology. Trainees and junior staff would cut their own sections, whereas senior pathologists were assisted by histotechnologists, who for the most part were not specialized in the technique but were called upon on an ad hoc basis. In the 1960s a self-contained cryostat was brought into service. This also was housed in the residents' laboratory, two feet from the nearest resident's desk and in a very busy area. One benefit of this positioning was that it was easy to find many sets of eyes in the immediate vicinity for consultation and instruction, but it was a noisy environment.

In the 1970s the handling of surgical pathology specimens from the operating room was moved to its own quarters on Gray 3, immediately adjacent

to 40 MGH operating rooms. A histotechnologist was devoted to cutting the frozen sections; for many years this was Mertice Currier; later it was Sven Holder. A resident and staff pathologist were assigned to the area on a daily rotation. This practice continues in the current, expanded Surgical Pathology Laboratory on Blake 3, which was constructed in the early 1990s in conjunction with the new main Histology Laboratory immediately across the corridor. The Blake 3 laboratory has two cryostats and three multiheaded microscopes, one of which is connected to a camera that can be accessed electronically for review of slides elsewhere in the hospital or off-site. In this laboratory the spatial proximity of frozen sections with specimen grossing has enabled more efficient and accurate setting aside of tissue samples for specialized techniques such as immunopathology, electron microscopy, flow cytometry, and tissue banking, and for up-front dissections for research laboratories.

Electron Microscopy

Electron microscopic examination for surgical pathology began in the mid- to late 1960s, but it had been used before for experimental work by faculty such as Drs. David Spiro, Irwin Roth, James Caulfield, and Robert Trelstad (chapter 7). In 1975 the Electron Microscopy Unit was set up in Cox 5 and run by Dr. Ann Dvorak (chapter 24). The unit included for the first time a significant number of routine diagnostic cases, including renal biopsies that were interpreted by Drs. Robert McCluskey and Robert Colvin. In 1976, when Dr. Ann Dvorak left the MGH for a position at Beth Israel Hospital in Boston, Dr. G. Richard Dickersin became director of the unit. Dr. Dickersin (1927–) (see figures 7.7, 13.1, 13.2, 23.5, 23.7, and 25.3) graduated from Johns Hopkins University and Jefferson Medical College of Philadelphia and did his training at Pennsylvania Hospital in Philadelphia and the MGH. After additional time at the National Cancer Institute and at the MGH, he was the head of the Department of Pathology at the nearby Brockton

Hospital from 1959 to 1971. Following an additional four years as a pathologist at Tufts–New England Medical Center, he returned to MGH to direct Diagnostic Electron Microscopy. He was the first speaker at the New England Society of Pathologists to lecture on electron microscopy and published an outstanding atlas on diagnostic electron microscopy. Dr. Dickersin also did surgical pathology until his retirement in 1999.

Upon Dr. Dickersin's retirement, Dr. G. Petur Nielsen, one of the bone and soft tissue pathologists (see below), became head of Diagnostic Electron Microscopy. To this day, the Electron Microscopy Unit remains clinically very active, its emphases on kidney, nerve/muscle, metabolic disease, and tumor diagnosis.

Immunohistochemistry and Immunofluorescence

The advent of immunohistochemistry and immunofluorescence has had a tremendous effect on the field of surgical pathology over the past three decades. MGH Pathology was well positioned to take advantage of these advances because of its successful Immunopathology Unit. This unit and its introduction of immunohistochemical and immunofluorescence assays for clinical diagnosis are covered in detail in chapter 23.

Molecular Diagnostic Pathology

Molecular diagnostic pathology has also begun to make major contributions to surgical pathology, primarily over the past 10 to 15 years. Advances in this area at MGH are covered primarily in chapter 25.

THE INTERFACE OF CLINICAL SERVICE AND EDUCATION: SIGN-OUT AND TEACHING

Sign-Out Activities and the Outs Conference

The activities of those who have practiced surgical pathology over the years have had three components: diagnostic service, teaching, and

research. For most of the existence of the department, and for the most part still, the cases have been handled by a team of two individuals, the staff pathologist and the resident. This time-honored system has served well by making sure that most cases are seen first by a resident but then by a staff pathologist. Junior faculty generally sign out in a “sign-out booth” in the residents' room, but senior faculty juggling multiple responsibilities on any one day often sign out in their offices.

The expectation that the resident will study all the cases means that residents regularly work late into the evening, which has resulted in the reputation of the department as demanding of residents' time and efforts—but with the benefit that most of the trainees emerge at the end ready to be leaders in diagnostic pathology. The pairing also means that most of the cases are utilized for teaching. From about the mid-1990s, a subset of cases has been handled only by a staff pathologist, usually with the help of a pathology assistant in the case of large resection specimens, because the volume has become so great that it is impractical for every case to be seen by a resident. The sign-out of the cases has traditionally begun at 8:00 every morning, which allows the resident the previous afternoon or early evening to review the cases on his or her own. This practice continues, although with some modifications necessitated by recent resident work-hour rules.

Fellowships have been an important part of the program over the years for both residents and visitors desiring more clinical and research experience. During the past 20 years, one- and two-year fellowships in general surgical pathology and in some specialties have increased in number. As the demands in anatomic pathology have increased, the fellowships have become increasingly popular and competitive. Since about the mid-1990s, named fellowships have existed, honoring distinguished former members of the department, specifically Drs. Castleman, McCluskey, Vickery, Scully, Wright, and Mallory, in addition to Drs. Priscilla and Edgar Taft, jointly. There is also the



Figure 16.4 A surgical pathology conference, 1950s. Benjamin Castleman is in the center. At the far left is E. P. Richardson Jr.; Winfield Morgan is between Drs. Richardson and Castleman.

Gillette Fellow in Women's Cancers, focusing on breast pathology. More numerous than the specific fellowship positions have been visiting fellows from all points of the globe. These fellows have often been paid by their home institution with the expectation that they would return after a year at the MGH to take a leading role in their own institutions. Many, if not most, of these individuals have risen to the professorial rank, and several have become departmental chairman.

Although the fundamental teaching of residents has been the one-on-one sign-out with the staff pathologist, the service has prided itself over decades on the daily surgical pathology teaching conference, referred to as the Outs Conference (figures 16.4, 16.5, and 16.6). This term evolved because cases were simply left out in the laboratory for the residents to review before the conference. For many years this conference was conducted at 2:00 P.M. by Dr. Castleman. He reflected on the Outs Conference:

Every afternoon from 2 to 3, I personally check the interesting and problem microscopic slides of the surgical pathology specimens that have come through that day. These two hours [one hour autopsy in the morning and this hour in the afternoon] each day give me an opportunity to actually know what is going on in the department and also give an opportunity to the various members of the department, who are working on research problems or who are assigned to bacteriology, hematology, or chemistry to return to the laboratory each day in the morning before they start their regular work and right after lunch before they start their afternoon's work.

Upon Dr. Castleman's retirement, Dr. Austin Vickery took over primary responsibility for the Outs Conference. Increasing subspecialization slowly affected the conference, the result being that certain days were devoted to specific areas of surgical pathology, initially gynecologic



Figure 16.5 A surgical pathology conference, 1980s. Robert Fienberg (left) and Eugene Mark are shown with the “flamethrower,” a device used to project microscopic slides onto a screen.

pathology and dermatopathology. Nonetheless, the conference remained largely a session devoted to a mixture of “general surgical pathology” cases until complete subspecialization was instituted on July 1, 1995. At that time several of the one-hour conferences became split into two half-hour sessions; time is apportioned roughly to the respective volumes of the subspecialty services. In some specialties the cases are mainly routine MGH ones, whereas in others they are consultation cases from around the world. At these sessions the residents present their descriptions and opinions of a case, and the staff pathologist then makes his or her own remarks. The department has been proud of the continuance of this exercise for so many years, since it provides an educational benefit for the trainees. The downside has been that specialists attend only their own conferences, and the interaction of senior pathologists commenting outside their specialty has been lost.

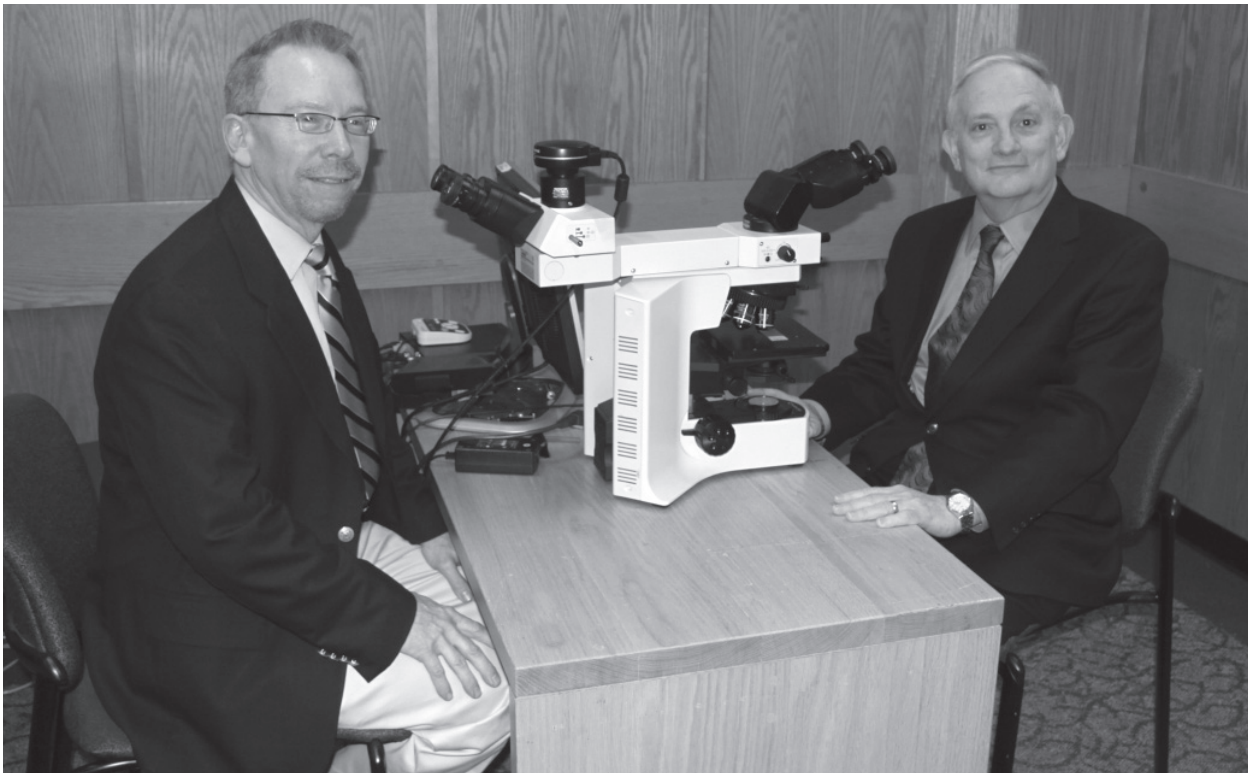


Figure 16.6 Surgical pathology conference, 2010. Ben Pilch (right) and William Faquin are at the currently used microscope, which features a digital camera.

For many years, Dr. Walter Putschar (chapter 12) sat in the front row at the conferences, and his many insights will be remembered by many. Another who had a role somewhat similar to Dr. Putschar's though on a part-time basis was Dr. Robert Fienberg (1906–1998) (figure 16.5). Dr. Fienberg represented a unique blend of academic pathology with community practice. He graduated from HMS and trained with Dr. Lauren Ackerman at Pondville State Hospital under Dr. Shields Warren. Although he spent most of his career as Chief of Pathology at Beverly Hospital, Dr. Fienberg had particular interests in gynecologic and pulmonary pathology, especially Wegener's granulomatosis, which he liked to term "pathergic granulomatosis." He had met with Friedrich Wegener, who reportedly preferred Dr. Fienberg's term. For decades while practicing at Beverly Hospital, he regularly attended the CPCs and came weekly to the Outs Conference. Dr. Fienberg worked with Dr. McCluskey and Dr. Mark on granulomatous diseases. In later years he had a consultant position similar to Dr. Putschar's, with whom he shared an office.

Extramural Teaching

In addition to the many invited lectures and seminars given locally, nationally, and internationally by MGH surgical pathologists and their frequent participation in the CPCs (chapter 24), MGH surgical pathologists have played key roles in postgraduate medical education. The initial postgraduate course run by the department was on endocrine pathology (figure 16.7). It was first given in 1960 and directed by Drs. Castleman, Vickery, and Scully. The course was successful, but it was labor-intensive, requiring the preparation of slide sets for study by the participants; it was ultimately discontinued. Quickly, however, it was replaced by a number of other courses, all under the auspices of Harvard Medical School Department of Continuing Education. In the mid-1970s courses were instituted on gynecologic-obstetric pathology and on general surgical

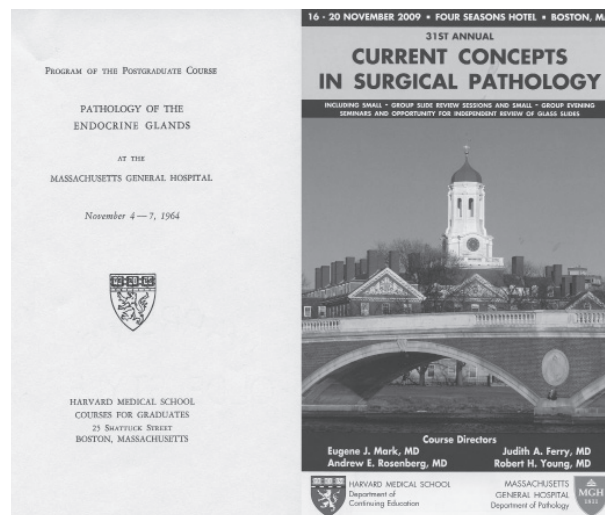


Figure 16.7 Booklet covers for the “Pathology of the Endocrine Glands” course from 1964, and the “Current Concepts in Surgical Pathology” course from 2009

pathology; both are still ongoing, the “flagship course” on surgical pathology having been given every November since 1978 (figures 16.7 and 16.8). It has been offered at a nearby hotel and attended each year by 150 to 220 pathologists, primarily from North America, but significant numbers from abroad also attend. Recently, small group slide tutorials and informal evening seminars have been added. The lectures are now broadcast to the department by closed-circuit television so that residents who are on service can still profit. The most recent course was “oversold” by 25 attendees, some having registered for the next course a year in advance.

At the time of this writing, postgraduate courses are also given annually on dermatopathology, gastrointestinal pathology, thoracic pathology, and urologic surgical pathology. For several years a highly regarded course on breast pathology was held in collaboration with pathologists from Memorial Sloan-Kettering Cancer Center, the site of the course alternating between Boston and New York. In addition, a workshop has been given in the fall for several years on placental pathology. Beyond these exercises, beginning in the late 1990s, the department has given

postgraduate courses at various off-site locations, current offerings being on general surgical pathology in Scottsdale, Arizona, every January and Fort Myers, Florida, every March. The department has cosponsored three separate courses in Italy, codirected by Drs. Robert H. Young and Juan Rosai. These have been given in Milan (2003), Florence (2006), and Riva del Garda (2009). They have all been most successful, the most recent drawing a record 511 registrants. For some years Dr. Rosai had the honorary title of visiting professor of pathology at Harvard Medical School in recognition not only of his remarkable contributions to pathology but also of his close ties to the department.

An additional activity in Surgical Pathology going back to the 1950s is participation by staff and residents in pathology societies, particularly the United States–Canadian division of the International Academy of Pathology. In the earlier years contributors focused on traditional surgical and autopsy pathology and gradually proceeded to incorporate histochemistry, electron microscopy, immunochemistry, and molecular pathology.

Many staff or alumni have served as President of the New England Society of Pathology, whose meeting usually has taken place at the nearby Museum of Science in Boston. The list of past Presidents with MGH ties includes Drs. Vickery, Scully, McCluskey, Fienberg, Flax, and Bell; Dr. David Louis is scheduled to begin serving as President in 2011. A relationship has existed over the decades with the Armed Forces Institute of Pathology (AFIP). Dr. Putschar served as a consultant in orthopedic pathology and anthropology to the AFIP. Dr. Mark, in his role as a pathologist in the U.S. Army Reserve, served during summer intervals at the AFIP. Several members of the department have also been authors of the AFIP fascicles: Drs. Castleman, Roth, Scully, Young, Clement, DeLellis, Pitman, Louis, and Lauwers (see Appendix). Faculty have also played prominent roles in World Health Organization

classifications: Drs. Scully, Harris, and Louis (see Appendix).

Participation of Surgical Pathology in Other MGH Departments

Most clinical services have a weekly, bimonthly, or monthly conference relating to surgical pathology that goes back many decades. Perhaps most notable has been the weekly Surgical Grand Rounds, held every Thursday at 8:30 A.M. in the Bigelow Amphitheater. A staff pathologist generally represents the department, although, sadly, pathology is not called on now as frequently as it was earlier. The Medical Service has held a weekly medical morbidity and mortality conference, usually Friday at noon and attended by senior and junior medical attending staff, house officers, and medical students. The chief resident or a senior resident in pathology generally represents the department. Each oncologic service has its own conference, the longest-running ones being in gynecology and orthopedics. Pediatrics has its own share of conferences, usually one or two a month, including new specialty conferences for pediatricians in gastrointestinal and pulmonary diseases, where pathology plays an important role.

THE “SUBSPECIALIST” SURGICAL PATHOLOGISTS

Over the past few decades surgical pathology has become subspecialized; MGH Pathology on July 1, 1995, became the first hospital department to achieve complete subspecialization. The following sections cover the major areas of subspecialty surgical pathology at MGH in alphabetical order, except for neuropathology and dermatopathology, which are covered in chapters 17 and 18, respectively. In addition, although the current department does not have a specific subspecialty in endocrine pathology (endocrine cases being covered according to the location of the organ), endocrine pathology is covered separately below because of the strengths in that area over the years. On the other hand, although obstetric

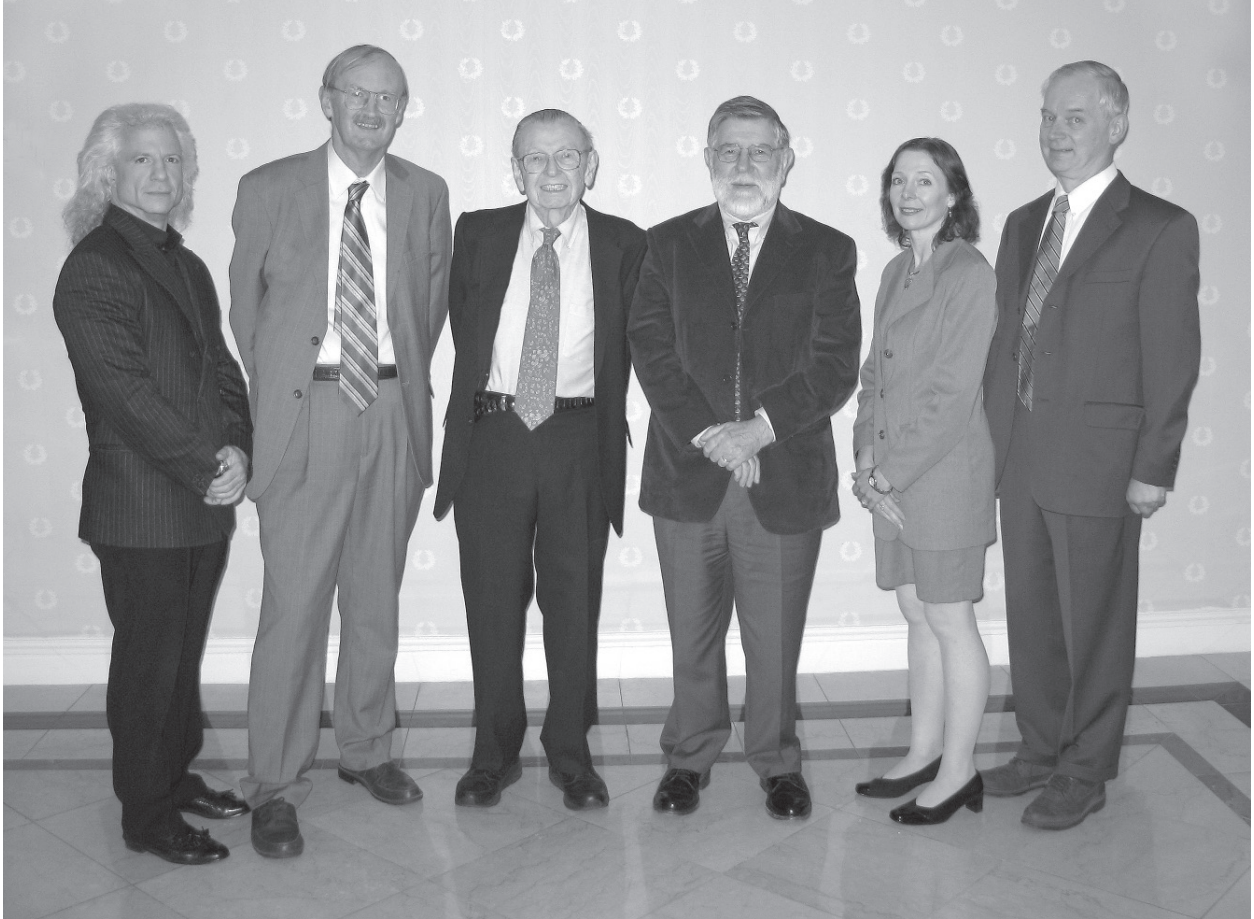


Figure 16.8 Course directors and distinguished lecturers, “Current Concepts in Surgical Pathology,” early 2000s. Left to right: Andrew Rosenberg, Robert Young, Robert Scully, Juan Rosai, Judith Ferry, Eugene Mark.

and perinatal pathology is now a separate unit, it is handled under gynecologic pathology below. (Many of the individuals mentioned below are pictured throughout this book, particularly in figures 16.8, 16.9, and 16.10 and in chapters 5, 7, 13, and 25.)

Bone and Soft Tissue Pathology

Dr. Ernest A. Codman (1869–1940) began the MGH legacy of work in bone and joint pathology. Dr. Codman, a surgeon, described the radiological and microscopic features of chondroblastoma of the shoulder and wrote books on the shoulder and on bone sarcomas. In 1920 he founded the first tumor registry in the world, the Bone Sarcoma Registry, together with Dr. Joseph

C. Bloodgood of Johns Hopkins Hospital and Dr. James Ewing of Memorial Hospital in New York City. The collection of tumors in the registry was later given to the AFIP.

Another who contributed significantly in the overall field of musculoskeletal pathology was Dr. Granville A. (“Red”) Bennett (1901–1986). He trained under Dr. S. Burt Wolbach, Shattuck Professor of Pathology at HMS and Chief of Pathology at Peter Bent Brigham Hospital. Dr. Bennett was recruited by Dr. Walter Bauer, Chief of the Arthritis Unit, to be the unit histopathologist. Dr. Bennett wrote important papers on the pathology of joint diseases and both rheumatic and rheumatoid nodules, coauthored a book on the pathology of the knee joint, and wrote the



Figure 16.9 Robert Scully and some of his trainees and coauthors, 1990s. Left to right: Judith Ferry, Silvestro Carinelli, Debra Bell, Philip Clement, Jaime Prat, Robert Young, Robert Scully, Pascasio Aguirre, Richard Dickersin, John Eichhorn, William Welch, Dwayne Lawrence, Cynthia Flynn, Takako Kiyokawa, Esther Oliva, George Kleinman, Mahpareh Mostoufizadeh.

chapters on the bones and joints in *Anderson's Pathology*. He later became Chief of Pathology at Tulane Medical School and then at the University of Illinois College of Medicine at Chicago, where he also served as Dean from 1954 to 1967.

Beginning in the late 1950s this area was dominated by Walter Putschar. A physician influenced by Dr. Putschar in the late 1960s was Dr. Alan L. Schiller (1943–), a native of Brooklyn, New York, who graduated from Chicago Medical School in 1967. He trained in pathology at the MGH and took a special interest in orthopedic pathology as well as autopsy pathology (chapter 15). Dr. Schiller was a dynamic speaker and received numerous awards for teaching. He left the MGH in 1986 to become Chairman of the Department of Pathology at Booth Memorial Medical Center in New York and in 1988 became the Irene Heinz Given and John LaPorte Given Professor and Chairman of Pathology at Mount Sinai Hospital in New

York, a position from which he retired in 2010.

Dr. A. Kevin Raymond (1950–) trained in the department from 1976 to 1980 and from an early stage in his training took a special interest in musculoskeletal pathology. Dr. Raymond subsequently served as the senior attending staff with special interest in bone pathology at the M. D. Anderson Cancer Center in Houston.

Dr. Andrew E. Rosenberg (1953–) succeeded Dr. Schiller as the senior orthopedic pathologist in 1986. A native of Philadelphia, he attended Temple University School of Medicine and trained at the MGH as a resident in the early 1980s and was the last orthopedic pathologist to have the good fortune to come under Dr. Putschar's influence. Dr. Rosenberg's diagnostic skills were evident from an early stage in his training, and his alert eye has led to his being widely recognized, both locally and internationally, as an outstanding microscopist. He has written extensively in

both bone and soft tissue pathology, his particular interests being in skull-base tumors, epithelioid vascular tumors of the skeleton, chordomas, and the immunohistochemistry of soft tissue and bone tumors. Dr. Rosenberg has given many courses under the auspices of various societies and has lectured around the world.

Dr. G. Petur Nielsen (1962–) is a native of Iceland, where he did his initial training before coming to the MGH in 1991 to complete his training. He took an interest in bone and soft tissue disease from an early stage and has recently succeeded Dr. Rosenberg as head of the subspecialty. He has a wide range of interests within the field, but particularly noteworthy are his papers on mesenchymal tumors of the female genital tract. Dr. Nielsen has also signed out in the urologic pathology group in the past and currently is also a member of the ENT group.

Dr. John X. O’Connell (1962–), originally from Dublin, did a residency in the department

in the late 1980s and a fellowship in bone and soft tissue pathology. Dr. O’Connell moved to Vancouver General Hospital at the University of British Columbia and has contributed significantly to the literature. Another recent graduate of the program with special interest in musculoskeletal pathology is Dr. Justin M. M. Cates (1967–). Cates did a residency and a fellowship year focusing on bone and soft tissue pathology in the late 1990s. He is currently the faculty member with senior responsibility for bone and soft tissue pathology at Vanderbilt University.

Breast Pathology

As the surgical department has always had an active program in breast tumors, pathologists have gained considerable experience in this area. Drs. Castleman, Scully, Vickery, and A. Jane Lingeman were all experts in this discipline. Dr. Lingeman (1931–2003) was on the staff from 1974 to 1985 and was a remarkably talented general



Figure 16.10 MGH surgical pathologists in the MGH Trustees Room, 2010 (not all pictured). Seated, left to right: Drucilla Roberts, Peter Sadow, Esther Oliva, Gregory Lauwers, Judith Ferry, Mari Mino-Knudsen, Andrew Rosenberg. Standing: Eugene Mark, Chin-Lee Wu, Petur Nielsen, Melinda Lerwill, Kamran Badizadegan, Richard Kradin, Frederick Koerner, James Stone, Dennis Sgroi, Nancy Lee Harris, Robert Young.

surgical pathologist. She had trained in part at Memorial Hospital in New York and had also spent time in the hematopathology division of the AFIP.

Dr. David L. Page (1941–), who became an internationally known expert in breast pathology, trained at the MGH from 1967 to 1969. After leaving the MGH, Dr. Page spent time at Johns Hopkins Hospital and the National Institutes of Health before accepting a faculty position at Vanderbilt University in Tennessee, ultimately becoming Professor. His study of long-term follow-up of patients with breast cancer and the categorization of early lesions and correlating them with therapy was a major contribution to the field, as was his textbook on breast cancer pathology.

In the 1970s through early 1980s, Dr. Karl Proppe (1941–), from Iceland, worked in breast pathology and other areas, including soft tissue, urologic, and infectious disease pathology. Dr. Proppe had trained in Iceland under Dr. Jónas Hallgrímsson (chapter 7) and then done a residency at MGH from 1970 to 1975. He joined the MGH faculty in 1975 and for many years was the Pathology representative at regular conferences with the breast surgeons. Dr. Proppe left to become Chief of Pathology at Salem Hospital (now North Shore Medical Center), Salem, Massachusetts, and later established a private laboratory specializing in dermatopathology in Cambridge, Massachusetts.

The role of senior breast pathologist passed in 1984 to Dr. Frederick (“Fritz”) Koerner (1948–). Dr. Koerner, a native of Vermont, trained in part with Dr. Merle Legg at New England Deaconess Hospital. He was the director of breast pathology through much of the 1990s, and he has been active in teaching, participating in postgraduate courses in breast pathology, one of which was a conjoint course with another graduate of the department, Dr. Edi Brogi, currently at the Memorial Sloan-Kettering Cancer Center. Dr. Koerner was instrumental in developing a

fellowship in breast pathology and has authored a recent book on pathology of the breast.

Since the early 2000s Dr. Dennis Sgroi (1961–), an MGH trainee, has directed the breast pathology section while maintaining an active research laboratory in molecular breast pathology. His laboratory has played a leading role in employing advanced gene expression and proteomic technologies to study breast cancer, and he has identified a gene expression signature that is both prognostic and predictive of therapeutic response to adjuvant tamoxifen.

Other members of the breast sign-out team at the current time are Drs. Melinda F. Lerwill, Elena F. Brachtel, John H. Eichhorn, Thomas Gudewicz, and David C. Wilbur. Dr. Lerwill codirected the postgraduate course taught by Drs. Koerner and Brogi and has lectured extensively at other HMS courses because of her excellent teaching skills.

Cardiac Pathology

In the early years, cardiac pathology was mostly a facet of autopsy pathology, whereas diagnostic surgical pathology generally reviewed heart valves, aneurysms, atherosclerosis, blood clots, and the rare tumor. Dr. Robert Scully maintained an interest in the field for many years, and, with Benjamin Castleman, he ensured that cardiac cases with autopsies formed a prominent role in the published CPCs (chapter 24).

Dr. John T. Fallon (1946–) was a resident and fellow in the department. He graduated from Albany Medical College in 1974 and trained at MGH from 1974 to 1978 before joining the faculty. He was the Chief of Pathology at the nearby Shriners Burns Institute for 10 years and one of the first in the department to specialize almost entirely in cardiac pathology. In 1994 he was recruited by Alan Schiller to Mount Sinai School of Medicine, and has recently moved to chair the Department of Pathology at New York Medical College. Dr. Fallon has performed important work in the progression of

atherosclerosis, using magnetic resonance imaging and digital imaging.

Dr. James Southern (1947–) (chapter 15), who trained at the University of Oklahoma, directed cardiac pathology from 1986 to 1996. With the advent of heart transplantation at the MGH, Dr. Southern was in place to evaluate the subtleties of cardiac rejection.

Dr. H. Thomas Aretz (1948–), originally from Germany, became Director of Cardiac Pathology in 1996. Dr. Aretz had trained at the MGH in the late 1970s and then did a one-year fellowship in cardiovascular pathology. After spending some years at the Lahey Clinic and New England Deaconess Hospital, he returned to the MGH and served as leader of the Cardiac Pathology Service until late 2003, when he took a position as Vice President for Education of the Harvard Medical International Group. He remains a consultant in Pathology at the MGH.

Dr. Stuart Houser (1944–) joined the department in 1996 after a career in cardiothoracic surgery at Saint Francis Hospital in Hartford, Connecticut. He trained in pathology at the MGH, did a three-year fellowship in cardiovascular pathology, and then joined the staff in 2001. As a surgeon he had a superior knowledge of the anatomy of the heart and of the surgery and surgical complications of heart disease, and this led to his single-authored treatise, *Pathology of the Operated Heart*. He retired from pathology in 2008.

During the late 1990s and early 2000s Drs. Richard Kradin, Eugene Mark, Stuart Houser, and Rex Neal Smith were the specialists for surgical cardiac pathology.

Dr. James Stone (1967–), who obtained his medical and graduate degrees from the University of Michigan, joined the department in 2003 after training at Brigham and Women's Hospital in anatomic and cardiac pathology. For the last six years he has headed the Cardiovascular Pathology section and has a special interest in amyloidosis and atherosclerosis, as well as endothelial cell biology.

Endocrine Pathology

The department has long had expertise in the pathology of the endocrine organs, namely parathyroids (Drs. Castleman and Roth), thyroid (Drs. Vickery and Wolfe), adrenal (Dr. Cohen), thyroid and adrenal (Dr. DeLellis), ovary (Dr. Scully), and testis (Drs. Sniffen and Scully). As a result, all but the most mundane cases in these areas have been evaluated by one or more of these experts; this was the case even before official subspecialization began. Comments are made here only on those who do not receive coverage elsewhere in this book.

Dr. Richard Cohen (1923–2006) (chapter 7) trained in pathology initially at Beth Israel Hospital in New York from 1948 to 1951 and then moved to the MGH for further training, acting as both chief resident and research fellow in pathology from 1951 to 1954. He then joined the faculty at the MGH and was regarded as an outstanding diagnostic surgical pathologist in many areas but with particular interest in the adrenal gland. His investigative efforts focused on histochemistry, and he wrote many original papers in that area, in regard to both the adrenal gland and to a lesser extent the ovary. Apart from this diagnostic and research activity, Dr. Cohen was an enthusiastic and outstanding teacher at both the resident and postgraduate level, the latter as a member of the faculty of the endocrine pathology course. He remained on the staff of MGH until 1969, when he moved to Beth Israel Hospital in Boston to become Codirector of Surgical Pathology.

Dr. E. Dillwyn Williams (1929–) was a visiting fellow in the department from 1962 to 1963. Dr. Williams was already known for his work in endocrine pathology at that time, having worked with the eminent British expert Professor Israel Doniach at London Hospital. Dr. Williams became internationally renowned for his expertise in endocrine pathology, particularly thyroid pathology, including seminal observations on medullary carcinoma. He subsequently became

Professor of Pathology at the National University of Wales in Cardiff and thereafter was Professor of Pathology at Cambridge University. Dr. Williams served as President of the Royal College of Pathologists and was knighted for his services to pathology. For many years he was a member of the faculty of the endocrine pathology course and had a lifelong close friendship with both Drs. Scully and Vickery.

Dr. Ronald DeLellis (1941–) was a research fellow and intern in MGH Pathology from 1966 to 1967. His experience with endocrine pathology stimulated his contributions to the field over the years, first at Tufts–New England Medical Center, then as Vice Chairman and Director of Anatomic Pathology at New York Hospital, Cornell Medical Center from 1998 to 2001, and then as Pathologist-in-Chief at Rhode Island Hospital in Providence. He has written extensively on thyroid diseases, particularly issues related to C-cell hyperplasia and medullary carcinoma, and coauthored the third series AFIP fascicle on the thyroid gland. His interests have extended to parathyroid disease and disorders of the adrenal gland. With Dr. Hugh Wolfe (see below) and others he also wrote extensively on immunohistochemistry in many endocrine conditions.

Dr. Hugh Wolfe (1934–2001) had a career that to some degree paralleled Dr. DeLellis's, as the two were good friends and colleagues at Tufts–New England Medical Center and at MGH. Dr. Wolfe was a graduate of the University of Louisville. After an internship in pathology at the Mallory Institute of Pathology at Boston City Hospital, he trained at MGH from 1960 to 1964 and then stayed on the faculty until moving with Dr. DeLellis to Tufts when Dr. Martin Flax assumed the chairmanship there. Dr. Wolfe played an active role in academic affairs at Tufts and also in the International Academy of Pathology.

Dr. Irwin Roth (1932–) graduated from HMS in 1956 and completed his residency in pathology in 1960. He then entered the U.S. Army and served two years as a captain in the U.S. Army

Medical Corps and staff pathologist in the Skin and Gastrointestinal Branch of the AFIP in Washington, D.C. He returned to the MGH in 1962, rising to the rank of Associate Pathologist, before leaving in 1975 to become Professor and Chairman of Pathology of the University of Arkansas Medical Center in Little Rock. At MGH he did important work in the pathology of the parathyroid glands and coauthored the second series AFIP fascicle on the parathyroid glands with Benjamin Castleman. In 1981 he joined the faculty of Northwestern Memorial Hospital in Chicago. In 2000 he became Professor Emeritus at Northwestern, and he returned to the MGH as a consultant in Pathology.

Currently, those surgical pathologists with interests in endocrine pathology are in the ENT group (see below).

ENT and Eye Pathology

The strong tradition of the study of head and neck pathology dates back to the early days of Dr. James Homer Wright's tenure when Dr. Joseph Lincoln Goodale (an otolaryngologist at MGH from 1895 to 1907) wrote a series of papers on ENT pathology, many of which are still available as bound reprints in the office of the Chief of Pathology. (Dr. J. L. Goodale was a cousin of Dr. Fairfield Goodale; see chapters 7 and 15).

Surgical pathology at Massachusetts Eye and Ear Infirmary (MEEI) has been a close relative of the main department for approximately a century. Dr. Harris P. Mosher (1867–1954) was Chief of Otolaryngology at MEEI and Professor of Otolaryngology at HMS from 1922 until 1939. He gave an annual postgraduate course in head and neck anatomy beginning in 1922. He established the Mosher Pathology Laboratory at MEEI, where histologic slides were prepared for his course and biopsies were processed and interpreted. Subsequently, Dr. Werner Mueller (1892–1965) ran the laboratory and consulted on cases. ENT pathology had been physically separated from general surgical pathology at MGH because the operating

rooms at MEEI were in a different building with a separate facility for frozen sections.

Upon Dr. Mueller's retirement in 1962, the new Chief of Otolaryngology, Dr. Harold F. Schuknecht (1917–1996), asked Dr. Castleman to recommend a board-certified pathologist to take on the leadership of the pathology department and be director of ENT pathology. This position was offered to Dr. Karoly Balogh (1930–). Dr. Balogh, a native of Budapest, had immigrated to the United States in 1956. After being a Rockefeller Fellow at the Department of Pathology at Tulane University in New Orleans, he joined MGH Pathology as a clinical research fellow in 1958. While at MGH he published many papers relating to general surgical pathology, enzyme histochemistry, and ENT pathology with a research focus on the inner ear. Dr. Balogh moved to Boston University Hospital in 1968, where he became Professor, and he subsequently moved in the mid-1970s to Deaconess Hospital in Boston and was then on the staff of the merged Beth Israel Deaconess Medical Center.

During these years the Pathology Laboratory was initially on the third floor of MEEI and included two large rooms, one for the secretary and another for histochemical research. Specimens were processed at MGH, and MEEI paid for the processing. In this manner the specimens could be used for training purposes at MGH. The separation of MGH Pathology from MEEI Pathology continued through the 1970s. There was a separate accessioning system: MGH specimens began with the letter *S* and MEEI specimens began with the letter *E*. The *E* slides were stored at MEEI.

Dr. Max L. Goodman (1932–1996) succeeded Dr. Balogh. He had been recruited by Dr. Castleman in 1968 from Boston University to be Director of ENT Pathology at MEEI. He published over 100 papers. His knowledge of ENT pathology was great, and he was regarded as an excellent teacher. Dr. Goodman was from Tennessee and graduated from the University of Tennessee

in 1955. He spoke with a soft southern gentility and a modest twang. He trained in pathology first at the City of Memphis Hospital and then at the Mallory Institute of Pathology at Boston City Hospital from 1958 to 1961. For a brief time after completion of his training, Dr. Goodman was on the faculty at Emory University Medical School, serving for a time as Acting Chairman, but he returned in 1962 to Boston University School of Medicine, where he stayed until joining the MGH faculty. Dr. Goodman's office was at MEEI, but he was a constant presence in MGH Pathology. He suffered a fatal stroke while on a fishing excursion; his sudden death was a great blow to the department not just because of his diagnostic acumen but because of his genial personality. Few have been as popular with staff and residents over the years. Even 15 years later, those who fondly remember him miss discussing the weekend sporting events with him on Monday mornings.

Dr. Benjamin Pilch (1944–) succeeded Dr. Goodman as Chief of Pathology at MEEI. Dr. Pilch had trained for a brief time in surgery in Michigan and came to MGH in 1973 as a resident. At the conclusion of his residency, having worked closely with Dr. Goodman, he specialized in ENT pathology and later edited a textbook on the subject that Dr. Goodman had initially undertaken. Dr. Pilch had a Broadway-caliber showmanship when talking at staff meetings or giving lectures, and he was always able to lighten up any topic. He was a renowned diagnostician and consultant to many members of the department on numerous issues. ENT surgeons often called him to review frozen sections even when he was not on duty for frozen sections, and he always gracefully accepted the duty. He retired in 2009.

Dr. William C. Faquin (1959–), an HMS graduate, became chief of MEEI Pathology in 2009. He had trained in pathology at Brigham and Women's Hospital and had already made significant strides in diagnostic service, research, and

teaching before succeeding as chief. He also has a major interest in cytology and has coauthored books on the cytopathology of the thyroid and salivary glands.

More recent recruits to the faculty in ENT pathology are Drs. Peter Sadow and Jennifer L. Hunt. Dr. Sadow trained at Brigham and Women's Hospital and focuses on thyroid diseases. Dr. Hunt came to the MGH from the Cleveland Clinic, where she had risen to prominence in anatomic pathology because of her work in ENT pathology. As noted earlier, Dr. Petur Nielsen also is part of the ENT group.

MEEI has separate ENT and Ophthalmology departments, and the Eye Pathology group has not had as close a relationship with MGH Pathology as has the ENT Department; the Cogan Laboratory for Ophthalmic Pathology has always been a separate entity in the Department of Ophthalmology. Over the years, prominent ophthalmic pathologists have been primarily ophthalmologists and have included Drs. Daniel Albert, Thaddeus Dryja, and Frederick Jakobiec. In recent years Dr. Anat O. Stemmer-Rachamimov, a neuropathologist (chapter 17), has also covered the Eye Pathology Service. Over the past decade, MGH Pathology has undertaken the processing of all eye pathology specimens for the ophthalmic pathologists.

Gastrointestinal Pathology

Drs. Edward Gall (see above and chapter 5) and Austin L. Vickery (chapter 9) were authorities in gastrointestinal pathology; Dr. Gall was particularly interested in the liver. Cooperating with Dr. Vickery as the gastrointestinal pathology specialist in the 1970s was Dr. James J. Galdabini (chapter 7), who had trained at the MGH in the late 1960s and was considered one of the best all-around surgical pathologists of his era. He was also particularly interested in liver disease. Dr. Galdabini left the MGH in 1981.

Dr. Si-Chun Ming (1922–), originally from China, trained at the MGH from 1952 to 1956,

during which years he was considered an outstanding resident. He went on to have a distinguished career focusing on gastrointestinal pathology. After leaving the MGH, Dr. Ming was a surgical pathologist at Beth Israel Hospital, Boston, until 1967. He then spent several years at the University of Maryland before being recruited in 1971 as Professor of Pathology at Temple University Medical School, where he remained for the rest of his career. Dr. Ming contributed significantly to the literature on gastrointestinal pathology and also had a major interest in autopsy pathology. He was the senior author of the second series AFIP fascicle on tumors of the esophagus and stomach. Dr. David Freiman (see above and chapter 5), who was Dr. Ming's chief at Beth Israel Hospital, described him as the best surgical pathologist he had ever seen.

Dr. David L. Gang (1946–) was a staff pathologist from 1976 to 1985 and during those years took special interest in gastrointestinal and pediatric pathology as well as doing routine general surgical pathology. He was highly regarded by his colleagues from both pathology and the clinical staff, the latter appreciating his conducting many conferences for them. Dr. Gang left for the University of Massachusetts in 1985 and is currently at Baystate Medical Center in Springfield, Massachusetts.

Dr. Carolyn Compton (1947–) joined the MGH Pathology faculty in 1985 as the first formally designated Director of Gastrointestinal Pathology. She was an HMS graduate who had trained at Brigham and Women's Hospital, then worked at the University of Massachusetts Medical School in Worcester. She was interested in colonic and pancreatic neoplasia, among other issues, and had a research program focusing on skin regeneration after burns. With this latter interest, she served as Chief of Pathology at Shriners Burns Institute. She was active in teaching HMS students and, in conjunction with Dr. Robert Odze of Brigham and Women's Hospital, initiated a successful postgraduate course on gastrointestinal pathology that

continues to this day. Dr. Compton became Chair of Pathology at McGill University in Montreal in 2000 and moved from there to become Director of the National Cancer Institute Office of Biorepositories and Biospecimen Research in 2005.

With Dr. Compton's departure in 2000, Dr. Gregory Y. Lauwers (1958–) was recruited to head the division. Dr. Lauwers, originally from Paris, had been working at the University of Florida in Gainesville after training at Lenox Hill Hospital and Memorial Sloan-Kettering Cancer Center in New York. Over the past 10 years he has brought together a large and academically productive group of gastrointestinal pathologists. Dr. Lauwers's interests center on neoplasia of the upper gastrointestinal tract, but he has published extensively in other areas of gastrointestinal pathology and is coauthor of the latest AFIP fascicle on the stomach. He was appointed Director of Surgical Pathology in 2008 and Vice Chair of the department in 2011.

Dr. Rhonda K. Yantiss (1969–) did a residency and then fellowship in the department in the late 1990s and has become known for her work in gastrointestinal pathology, which began during her training at the MGH. She is currently on the faculty of Weill Cornell Medical College in New York City, where she focuses on gastrointestinal pathology.

Other current members of the gastrointestinal pathology faculty (and their academic emphases) are Dr. Vikram Deshpande (pancreas), Dr. Fiona Graeme-Cook (who serves in a consultant capacity, with expertise in the liver), Dr. Joseph Misdraji (liver and appendix), Dr. Mari Mino-Kenudson (pancreas), Dr. Martha B. Pitman (pancreas), Dr. Kamran Badizadegan (pediatrics), and Dr. Lawrence Zukerberg (general gastrointestinal).

Gynecologic and Obstetric Pathology

For most of the history of the department, specimens from the female and male reproductive system and obstetric pathology were handled by the general surgical pathology sign-out staff.

Beginning in the mid-1970s the gynecologic and testicular specimens were evaluated separately. The story of gynecologic pathology at the MGH is dominated by the contributions of Dr. Robert Scully (chapter 10), but many others have also contributed significantly.

The first major work in gynecologic pathology at MGH came from a surgeon, Dr. Joe Vincent Meigs (1892–1970) (see figure 19.2). He was a 1919 HMS graduate and initially trained in surgery under the leading Harvard gynecologist of that era, Dr. Wilbur P. Graves of the Free Hospital for Women. In the early 1920s Dr. Meigs became an assistant to Dr. George Brewster of the MGH and soon became greatly interested in gynecologic cancer. Dr. Meigs was appointed Chief of Gynecology at the Pondville State Cancer Hospital in Norfolk, Massachusetts, in 1927, a position he held for thirty years. He became Chief of the Vincent Memorial Hospital Service of the MGH in 1931 and reviewed all the pathology material of his cases and incorporated his experience into his well-received 1934 book, *Tumors of the Female Pelvic Organs*. Dr. Meigs maintained his interest in gynecologic pathology throughout his life. When Robert Scully came to the hospital in the early 1950s and became the consultant in gynecologic pathology, he frequently interacted with Dr. Meigs and his colleagues, who often came to Pathology to review unusual cases and to discuss their management. Dr. Meigs also was an early proponent of cytology in the MGH and beyond (chapter 19). He is immortalized in the eponym “Meigs syndrome” (ascites and hydrothorax due to a fibromatous ovarian tumor), even though he acknowledged he was not the first to note the association.

Many of Dr. Scully's residents and fellows have gone on to make significant contributions to the field of gynecological pathology (figure 16.9). Dr. Robert J. Kurman (1943–), after graduating from Upstate Medical Center in Syracuse, came under the influence of Dr. William B. Ober of Beth Israel Hospital in New York, an eminent

gynecologic pathologist and medical historian. After further training at Peter Bent Brigham Hospital in Boston, Dr. Kurman became, in 1971, the second American Cancer Society Fellow under Dr. Scully's direction. Dr. Kurman subsequently completed his training as one of the small number of physicians board-certified in both pathology and obstetrics and gynecology. In the late 1980s Dr. Kurman was Professor of Pathology and Obstetrics and Gynecology at Georgetown University School of Medicine, but he was then recruited to Johns Hopkins University Medical School to become the Richard W. TeLinde Distinguished Professor of Pathology and Obstetrics and Gynecology. Dr. Kurman's interests have resulted in seminal observations concerning trophoblastic disease, ovarian tumor pathology, and cervical neoplasia. Dr. Kurman succeeded Dr. Ancel Blaustein as the Editor of the well-known text *Blaustein's Pathology of the Female Genital Tract* and was President of the International Society of Gynecological Pathologists from 2006 to 2008.

Another individual who came under Dr. Scully's influence at around the same time as Dr. Kurman was Dr. Stanley J. Robboy (1941–). A 1965 graduate of the University of Michigan Medical School, Dr. Robboy became a resident at the MGH in 1966. He was the first American Cancer Society Fellow under Dr. Scully in 1967 and, with the exception of two years in the Army as Chief of Pathology at the Army hospital in Fort Knox, Kentucky, was on the staff at the MGH until 1984. Dr. Robboy has made many contributions to gynecologic pathology. During his MGH years Dr. Robboy was active in the study of the effects on the female genital tract of prenatal exposure to diethylstilbestrol (DES) and was a founding codirector of the continuing postgraduate course on gynecological and obstetrical pathology. He was one of the first pathologists to actively pursue the computerization of surgical pathology (chapter 13), and he has long maintained an interest in this area as well as being, under the auspices

of the College of Pathologists, a leader in the development of the systemized nomenclature of medicine (SNOMED) for pathology. In 1984 Dr. Robboy left the MGH to become Professor of Pathology and Chief of Pathology at the College of Medicine and Dentistry of New Jersey in Newark. A few years later he became Professor of Pathology and Chief of Anatomic Pathology at Duke University Medical Center. In 2010 he was elected President of the College of American Pathologists.

Another trainee of Dr. Scully's who has attained international eminence because of his contributions in gynecologic pathology is Dr. Philip B. Clement (1946–), a native of British Columbia, where he attended medical school. Dr. Clement was a resident at the MGH from 1970 to 1974 and then did a one-year fellowship in gynecologic pathology with Dr. Scully. Dr. Clement then returned to his home city of Vancouver, where he has served at Vancouver General Hospital as Professor of Pathology. Dr. Clement has written many original papers in gynecologic pathology and has a particular interest in mesenchymal and mixed tumors of the uterus, nonneoplastic lesions of the ovary, and peritoneal lesions. He was a coauthor of the third series AFIP fascicle, *Tumors of the Ovary, Maldeveloped Gonads, Fallopian Tube and Broad Ligament*, and served a record 10 years as Editor in Chief of the *International Journal of Gynecological Pathology*.

Dr. Jaime Prat (1944–) joined the faculty in 1976 after initial training in his home country of Spain and as a fellow at Memorial Sloan-Kettering Cancer Center. Dr. Prat remained on the MGH faculty until 1981, when he returned to Spain, initially in Alicante and since 1986 as Professor and Chairman at the Hospital de la Santa Creu i Sant Pau of the autonomous University of Barcelona. He served as President of the International Society of Gynecological Pathologists from 2008 to 2010 and has held many other prestigious positions in academic pathology. His contributions to the literature have spanned many areas

of gynecologic pathology and have included both conventional morphologic interpretation as well as translational research.

Dr. William R. Welch (1944–) joined the department in 1974 as a clinical fellow funded partly by the American Cancer Society and remained on staff for three years as a faculty member in gynecologic pathology. Dr. Welch obtained his medical degree from Duke University and trained at the Upstate Medical Center in Syracuse, New York. He was one of the group under Dr. Scully's direction who worked extensively on the DES-induced lesions in the vagina and on endometrial hyperplasia. In 1979, Dr. Welch moved to Brigham and Women's Hospital, where he still serves as a senior member of the faculty in gynecologic pathology.

Dr. Robert H. Young (1950–), a native of Northern Ireland and graduate of Dublin University, joined the department in 1977 as a resident, was subsequently a fellow in gynecologic pathology, and since 1981 has been a member of the faculty. Dr. Young specialized initially in gynecologic pathology with Dr. Scully and subsequently also took a major interest in urologic pathology. He has written extensively in both areas and, in addition to coauthoring three AFIP fascicles, has written books on the testis, bladder, and uterus and served on senior editorial boards of many pathology journals. Dr. Young also has a major interest in the history of pathology and in 1996 instituted a series of historical essays that appear in the *International Journal of Gynecological Pathology*. For some years Dr. Young served as Director of Surgical Pathology and then Director of Anatomic Pathology at MGH, and at this writing he is the leader of the Gynecologic Pathology and Urologic Pathology subspecialty groups. Dr. Young serves as the inaugural Robert E. Scully Professor of Pathology at HMS.

Dr. Dwayne Lawrence (1947–) trained in anatomic pathology at MGH from 1979 to 1982 and had an early interest in gynecologic pathology prompted by his postgraduate work at the

University of Alabama. Dr. Lawrence joined the faculty in 1982 and remained at MGH until 1985, when he left to take up the position of Director of Anatomic Pathology at Hutzel Hospital in Detroit, where he remained until 2000. He was then appointed Chief of Pathology at the Women and Infants Hospital in Providence, Rhode Island, where he currently practices. Dr. Lawrence has made many contributions to the literature and is a highly regarded teacher.

Dr. Debra A. Bell (1953–), a 1976 graduate of Albany Medical College, joined the department after training in pathology at New York University Medical Center and undertaking a fellowship in cytopathology at Memorial Sloan-Kettering Cancer Center. She was on the faculty at MGH from 1982 to 2008 before being recruited to the Mayo Clinic in Rochester, Minnesota, where she is currently Professor in Laboratory Medicine and Pathology. Dr. Bell has particular expertise in gynecologic pathology and cytopathology and has written extensively, including a number of seminal papers on surface epithelial neoplasms. She is renowned both as a diagnostician and as a teacher.

Dr. Joanne K. L. Rutgers (1955–) was an American Cancer Society Clinical Fellow in gynecologic pathology from 1986 to 1988. Her academic productivity continued after she left the MGH to practice in California. She was a member of the World Health Organization group on the classification of breast and female genital tract tumors.

The other faculty specializing in gynecologic pathology at this time are Drs. W. Stephen Black-Schaffer, John H. Eichhorn, Melinda F. Lerwill, Esther Oliva, Drucilla J. Roberts, Rosemary Tambouret, and David C. Wilbur (chapter 19), who directs the annual HMS postgraduate course on gynecological pathology with Dr. Young. Dr. Eichhorn trained at the MGH and has written on ovarian tumors. Dr. Lerwill (see above, under "Breast Pathology") has coauthored the chapter on metastatic tumors to the ovary in the Blaustein textbook. Dr. Oliva, originally from

Barcelona, Spain, trained under Drs. Scully and Young. She has made widely recognized contributions to the gynecologic pathology literature, relating particularly to uterine neoplasia, and lectures throughout the world.

In the late 1990s MGH reestablished its Obstetrics Service (which had been closed decades earlier), which necessitated hiring a specialist in obstetric and perinatal pathology and the separate evaluation of those specimens. In 1994 Dr. Drucilla J. Roberts (1955–), a 1985 HMS graduate, was recruited from Brigham and Women's Hospital to MGH. She had trained initially as an obstetrician-gynecologist at Brigham and Women's but then changed course to complete training in pathology. She has been a dynamic leader in developing an obstetrical and perinatal pathology group and over recent years has had the assistance of Drs. Esther Oliva and Rosemary Tambouret. Dr. Roberts is also involved in global health initiatives in underdeveloped countries, emphasizing maternal health and the role of pathology in this effort.

Hematopathology

The tradition of hematopathology dates back to the seminal observations of James Homer Wright (chapter 3) and Drs. Gall and Mallory's important paper on malignant lymphoma (chapter 6). Many general surgical pathologists practiced hematopathology at a high level over the years, particularly Dr. A. Jane Lingeman, who played an important role in this area in the late 1970s and early 1980s. Dr. John C. Long was the first to focus solely on this area but was dismissed from the institution (chapter 13).

The current high standing of this discipline within the department is due in significant measure to the contributions of Dr. Nancy Lee Harris (1943–), who has headed the unit for most of the last quarter century. Dr. Harris trained in pathology at Beth Israel Hospital, Boston, from 1974 to 1978 before coming to MGH to serve as a fellow for two years. She joined the faculty

in 1980 and was one of the first in the United States to utilize the application of immunohistochemistry to the diagnosis and subclassification of malignant lymphomas. She has contributed numerous original reports to the literature and played a crucial role in arriving at the modern classification of malignant lymphomas, serving on many important groups that have advanced that area, such as the Revised European-American Lymphoid (REAL) Classification and the current World Health Organization Classification of Hematologic Neoplasms. She has edited or written a number of books, including one with her colleague Dr. Judith Ferry. In addition to her academic contributions, Dr. Harris has served the department in a number of leadership capacities: Director of Hematopathology; Director of Surgical Pathology for seven years; Director of Anatomic Pathology for almost as long; and director of all pathology training programs. In 2002 she succeeded Dr. Robert Scully as the Editor of the MGH Case Records (chapter 24) and is the inaugural Austin L. Vickery, Jr. Professor of Pathology at HMS.

In 2010 Dr. Harris relinquished her position as Director of Hematopathology so that she could spend more time on the Case Records; she was succeeded by Dr. Judith A. Ferry (1957–). Dr. Ferry had obtained her medical degree from New York University and trained in pathology at the MGH in the mid-1980s. After a two-year fellowship, sponsored partly by the American Cancer Society, she joined the faculty in 1986. Dr. Ferry's teaching skills, diagnostic acumen, and wonderful personal qualities have made her one of the mainstays of the staff for almost a quarter of a century, and she is widely known for her work in hematopathology, having a particular interest in extranodal lymphomas, on which she has completed a book, *Extranodal Lymphomas: A Site-Specific Approach to Diagnosis*.

Other faculty members specializing in hematopathology are Drs. Robert Hasserjian (who has particular interest in leukemias and thymomas

and directs the hematopathology fellowship), Abner Louissaint, Aliyah Sohani, and Lawrence Zukerberg.

Medical Renal Pathology

The degree of sophistication of renal biopsy interpretation paralleled the developments in that field in the 1960s, specifically in the incorporation of immunologic techniques and ultrastructural evaluation. Dr. Robert T. McCluskey had his primary clinical and research interest in this area (chapters 14 and 23), and Dr. Robert Colvin (chapters 23 and 25) had an interest in the subject from his early training days and is the current head of the MGH renal subspecialty group. Drs. McCluskey and Colvin have been the mainstays of the diagnostic service for the last few decades, and in recent years they have been assisted by Drs. Eveline Schneeberger and R. Neal Smith. MGH trainees who have gone on to careers in academic renal pathology include Drs. Vivian Pinn (see chapters 7 and 23), Shane Meehan at the University of Chicago, and Volker Nickenleit at the University of North Carolina.

Pulmonary Pathology

A number of MGH graduates have gone on to academic careers centered on lung pathology, including Drs. William (“Whitey”) Thurlbeck, James Hogg, Mario Saldana, and Gerald Nash.

Dr. Thurlbeck (1929–1997), a South African, received his medical degree from the University of Cape Town. He came to the MGH in 1955 to train in anatomic pathology and was chief resident from 1957 to 1958 (see figure 7.19). He then became a postdoctoral fellow in the laboratory of Dr. Lynne Reid, first at Brompton Hospital in London and then at Children’s Hospital in Boston, where Dr. Reid was Chair of Pathology. Dr. Thurlbeck left HMS for a position at McGill University in 1961, where he stayed for 10 years before spending a year on sabbatical at the Nuffield Department of Surgery at Oxford. He then spent five years at the Midhurst Medical Research

Institute in Sussex. He became Professor and Head of Pathology at the University of Manitoba in Winnipeg in 1975, where he remained for five years. He completed his academic career at the University of British Columbia, as he continued in his investigations into airway resistance until his death. Dr. Thurlbeck devised quantitative measurements of the bronchus that led to understanding of the anatomy and function of the airways and small airways disease. He was an influential member of the College of Chest Physicians and edited a book entitled *Pathology of the Lung* through two editions; the third edition was named in his honor posthumously. He was known for his ribald sense of humor and effervescence. He never turned down an invitation: when asked if he would be willing to give a talk, his answer was “I am setting up a folder for that right now.”

Dr. James Hogg (1935–) graduated from the University of Manitoba in 1962 and then earned a Ph.D. at McGill University. He was a resident at the MGH from 1969 to 1970 and then returned to McGill to complete his residency training, after which he joined the faculty there for several years. His academic interests have been in the pathophysiology of obstructive lung disease and its anatomic basis. For most of his career he has been Professor of Pathology at the University of British Columbia, where he is currently an emeritus professor.

Dr. Mario Saldana (1933–) served as a fellow in surgical pathology in the department from 1969 to 1970. Dr. Saldana, a native of Peru, came to the United States in 1963 and worked initially at Yale University with Dr. Averill Liebow, one of the authorities in pulmonary disease. After leaving the MGH, Dr. Saldana first went to the University of Pennsylvania and then served for many years on the faculty of the University of Miami Medical School, rising to the rank of Professor. His interests in hematopathology, pulmonary disease, and infectious disease led him to write often-quoted articles on lymphoproliferative

diseases in the lung and the interpretation of vasculitis.

Dr. Gerald Nash (1937–) trained in the department from 1964 to 1968 and was then called to active duty at the U.S. Army Institute of Surgical Research, Fort Sam Houston, San Antonio, Texas. On the basis of that experience he studied and wrote on the lung in severely burned patients, including diffuse alveolar damage and infections. After his military service, he returned to MGH Pathology in 1971 and became the pulmonary pathologist for three years before taking a position at Cedars-Sinai Medical Center in Los Angeles and the UCLA Medical Center. He then practiced at Baystate Medical Center in Springfield, Massachusetts, and more recently at Mercy Hospital in that city.

Dr. Eugene J. Mark (1942–) succeeded Dr. Nash as Director of Pulmonary Pathology. A native of Ohio and a 1967 HMS graduate who had done a year in pathology at the University of Zurich, Dr. Mark trained as a medical intern at Stanford University and did his pathology training at MGH. Having studied under Martin Mihm and later becoming board-certified in dermatopathology, he joined the staff to do dermatopathology. In the interval between his departure from active duty with the U.S. Army in Landstuhl, Germany, and his return, however, Dr. McCluskey told him that a more pressing need was for director of the nascent Pulmonary Pathology and that he would be given that responsibility until a substitute could be found, after which he could return full-time to dermatopathology; no substitute was ever appointed. Dr. Mark's work in pulmonary pathology increased over the next few years, while his obligations in dermatopathology diminished. Dr. Mark was the single author of the 1984 book *Lung Biopsy Interpretation*, which came to be known as "The Little Red Book" and which was widely used at a time when there were not as many lung pathology books as there are today. Dr. Mark also instituted the first pulmonary pathology post-graduate course in North America. His academic

interests have centered on Wegener's granulomatosis (stimulated by Dr. Fienberg; see above) and malignant mesothelioma, and he is a colonel (retired) in the U.S. Army.

Dr. Douglas Flieder (1965–), who graduated from the University of Rochester School of Medicine and Dentistry in 1992, trained in general pathology at the MGH and worked closely with Dr. Mark in pulmonary pathology. He first went to the pulmonary and mediastinal branch of the Armed Forces Institute of Pathology for two years, then to Cornell University, and is now Director of Surgical Pathology at Fox Chase Cancer Center in Philadelphia.

Current faculty doing pulmonary pathology in addition to Dr. Mark are Drs. Richard Kradin and Mari Mino-Kenudson. Dr. Kradin trained in medicine at the University of Pennsylvania, and then as a pulmonary fellow at MGH. He worked with Dr. Robert McCluskey on immunopathology, including immunopathology of the lung. He has edited a recent textbook, *Diagnostic Pathology of Infectious Disease*. Dr. Mino-Kenudson trained as a pulmonologist in Kyoto, Japan, and then studied with Dr. Mark. Her research focuses on molecular aspects of carcinomas of the lung and pancreas, the latter related to her practice in gastrointestinal pathology.

Urologic Pathology

Until 1996 urologic pathology was not separately subspecialized and fell within the domain of general surgical pathology. There had in previous years been individuals with special expertise in this area of pathology, however, including Drs. Ronald Sniffen and Robert Scully, who both wrote on the pathology of the testis (see above and chapter 10). Dr. Austin Vickery also had a significant interest in urologic pathology and wrote a number of important papers on prostate pathology.

Dr. James J. Daly (1938–), originally from Dublin, Ireland, trained at the MGH from 1965 to 1972, and then served on the faculty from 1973 to 1978 and as a consultant until 1995. Dr. Daly

had a great interest in urological pathology and worked closely with the urologists, collaborating on studies of pathologic and biologic aspects of bladder cancer with Dr. George Prout, the Chief of Urology at the time.

Dr. Robert H. Young is now the leader of this group and has authored the third series AFIP fascicle, *Tumors of the Prostate Gland, Seminal Vesicles, Male Urethra, and Penis*, and has written widely on nonneoplastic bladder lesions, variants of bladder cancer, and testicular tumors. The other faculty in the group currently are Drs. Esther Oliva, Peter Sadow, and Chin-Lee Wu, who runs a research laboratory in Urology studying the biology of prostate cancer.

CONCLUSION

The surgical pathology group at MGH has been at the vanguard of the specialty, aided by a large volume of cases, referrals of complex cases from

around the world, the diverse academic origins and training of its faculty, the excellence of the clinicians in the hospital for clinicopathological collaborations, the efficiency engendered by specialization, the far-flung distribution of its accomplished alumni, and the benefits accruing to the department by its plethora of postgraduate courses. The future of surgical pathology depends on maintenance of its traditions of clinicopathological correlation and careful gross and microscopic evaluation, coupled with techniques such as immunopathology and molecular pathology that can bring powerful new tools to decipher the pathological features of surgically sampled human tissues.

Note: Many of the MGH surgical pathology faculty and alumni have published excellent textbooks, but space limitations prevent our listing what would be a long and probably incomplete list.