

The McCluskey Era (1974–1991)

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DR. ROBERT T. MCCLUSKEY (chapter 14) was appointed Chief of Pathology in July 1974, but he continued his role as Pathologist-in-Chief at Children's Hospital in Boston until January 1975. Dr. McCluskey was a quiet individual who had clear ideas about pathology and its future. Although he did not have as many day-to-day interactions with the clinical groups as Dr. Benjamin Castleman had, he brought new expertise in basic science to departmental leadership. He guided the department with deliberate care and foresight, and his tenure was characterized by both growth and change.

The McCluskey years witnessed growth in the department in many ways: the number of faculty increased nearly fourfold, from 15 in 1973 to 57 (17 of whom were involved primarily in research) in 1991, and research funding increased fourfold as well. The number of surgical pathology specimens increased substantially, reaching more than 40,000 by 1991. Most significantly, the later years of Dr. McCluskey's tenure saw the incorporation of most of the clinical laboratories back into Pathology, which markedly increased the scope of the departmental clinical activities.

Dr. McCluskey felt differently from Dr. Castleman in terms of the clinical laboratories and the Blood Bank, in that he saw the need for pathologists to lead these laboratories. In 1980 he wrote, "Our department—unlike most departments of pathology—does not supervise the clinical laboratories and we, therefore, cannot

draw directly on this abundant source of funds." Moreover, national regulatory guidelines in the 1970s and 1980s, particularly the Clinical Laboratory Improvement Act (CLIA) regulations of 1988, provided powerful incentives for laboratory centralization in order to standardize procedures and ensure quality in clinical laboratory testing. Given these developments, Dr. McCluskey, with the help of hospital administration, guided the initial administrative incorporation of the clinical laboratories back into Pathology—a critical step in the history of diagnostic laboratories at the MGH.

Another major change Dr. McCluskey effected was the creation of the physician practice organization, Pathology Associates, to manage professional billing. Before 1983, MGH pathologists received their salaries directly from the hospital. Dr. McCluskey, responding to national trends that encouraged such shifts and to similar changes occurring in other MGH departments, worked through the late 1970s to set up a legal and financial structure to enable professional billing by the pathologists. Dr. W. Stephen Black-Schaffer played a role in developing this system and, over the next few decades, became a national authority on the financial and regulatory aspects of pathology practice. Also involved in the creation of the system was Jonathan Richman, an outside adviser who remained a consultant to the department for decades. Independent billing began on October 1, 1983. This development

proved to be of considerable importance to the department because, in addition to giving the department more control over compensation, it created central funds that were under the department's control. Over the years such funds were used extensively and creatively to foster the academic missions of the department.

Information technology also grew in the laboratories during the McCluskey years. MGH Pathology was a pioneer in this emerging field, thanks largely to the foresight of particular faculty (such as Dr. Stanley Robboy) and the MGH Laboratory for Computer Sciences (directed by Dr. G. Octo Barnett). Examples of homegrown laboratory information systems included the seminal MUMPS (MGH Utility Multi-Programming System) in the clinical laboratories (begun in 1968, during Dr. Castleman's tenure) and CAPER (Computer Assisted Pathology Encoding and Reporting System) in Surgical Pathology, begun in 1976. MUMPS went on to define how laboratory information systems were constructed over the next 20 years, and it is still in use in some large systems today. In 1987 and 1990 the Surgical Pathology group changed systems; the CoPath system, activated in 1990, incorporated Cytopathology and Autopsy Pathology in addition to Surgical Pathology, and it remained in the department for more than a decade.

It is also important to note the maturation of another component of the department during this time: administration. The growing size and complexity of the clinical, teaching, and research operations necessitated dedicated, full-time administrators. In 1974 Delanson Y. Hopkins began to provide overall administrative guidance to the department, coordinating the group during major physical renovations and reorganization. In August 1978 Myle J. Holley III, who had been Director of Diagnostic Support Services, assumed this role, and Hopkins continued as Director of Operations. Faculty administrative roles also grew at a department level; Dr. Black-Schaffer became Assistant Chief of Pathology in

1987, in recognition of his administrative abilities and his knowledge of the financial, regulatory, and billing aspects of pathology practice.

THE LABORATORIES

Dr. McCluskey spent a considerable amount of time, even before coming to the hospital full-time in January 1975, in planning renovations for the department. The hospital administration assigned additional space on the fifth and eighth floors of the Cox Building to Pathology. The fifth floor would be dedicated to research as well as electron microscopy and immunofluorescence, and it was planned under the directions of Drs. Harold Dvorak, Atul Bhan, Ann Dvorak, Elizabeth Hammond, and Martin Mihm. The eighth floor would be for animal facilities and would be shared by Pathology, Surgical Oncology, and Medical Oncology. Construction of the fifth-floor laboratories was completed in early 1976, and the Edwin S. Webster Laboratories were rechristened in that space. The eighth-floor laboratories were completed in April 1977.

The hospital administration assigned additional space in the Warren Building, and extensive remodeling of the much of this space was also planned. Drs. Austin Vickery, Robert Scully, James Galdabini, and Edgar Taft were closely involved in the planning. The initial changes in the Warren Building, notably moving the research laboratories from the first floor and acquisition of space on the third floor, were completed in 1976. More extensive remodeling of the Warren Building, including new laboratories for Surgical and Autopsy Histology, Cytopathology, and Neuropathology, followed. Most of the remodeling of Cytopathology and Histology on Warren 1, as well as the Bone and Joint Laboratory and the Special Stains Laboratory, were completed in 1977. Renovation of Warren 2 and Warren 3, of the resident areas and staff offices, was finished in 1978. In addition, a new conference room was built in the Warren basement, and eventually named after Dr. Putschar,

in 1984. By 1975 the Frozen Section Laboratory was established on Gray 3, immediately adjacent to the main operating rooms; this resulted in an increase in intraoperative consultations and frozen sections. Nonetheless, sensing the rapid expansion of the department, McCluskey wrote in 1978, "I believe the need for further expansion and renovation will become pressing within the next several years."

New equipment, primarily for research purposes, also arrived. In 1979 a fluorescence activated cell sorter (FACS) was purchased with funds from the Arthur D. Little Company. This had many uses in immunological research, but it also formed the basis of a large clinical laboratory that was based on flow cytometry (see below). In addition, a freeze fracture apparatus was purchased with funding provided by the Fannie E. Rippel Foundation, which enabled important studies using the electron microscopes.

Most notably, the incorporation of the clinical laboratories, Microbiology, and Blood Bank into Pathology at the end of Dr. McCluskey's tenure brought large laboratories under Pathology and made Pathology responsible for planning those spaces. These laboratories were dispersed across the hospital, although they were primarily found within the Gray and Jackson Buildings. Because of funding constraints, the renovation of these laboratories proceeded slowly over the years following Dr. McCluskey's tenure (chapters 20, 21, 22, and 25).

THE PATHOLOGISTS

As noted above, Dr. McCluskey oversaw great expansion of the faculty (figures 13.1, 13.2, and 13.3). As of 1972, there had been 15 faculty, but by 1980, there were 31 full-time staff pathologists and 12 part-time staff. Some faculty present when Dr. McCluskey became Chief or who were recruited by him spent most or all of their entire careers in the department. These included Drs. Eugene Mark (pulmonary and autopsy pathology); Wanda Szyfelbein (cytopathology); Max

L. Goodman and Ben Z. Pilch (ENT pathology); Atul Bhan (immunopathology); Robert H. Young (gynecological and genitourinary pathology); W. Stephen Black-Schaffer (cytopathology, gynecological pathology, and administration); Nancy Lee Harris (hematopathology); Richard L. Kradin (pulmonary and infectious disease pathology); Eveline E. Schneeberger (renal pathology, experimental electron microscopy, pulmonary biology); Frederick C. ("Fritz") Koerner (breast pathology); Frederic I. Pfeffer (flow cytometry); Judith A. Ferry (hematopathology); and John H. Eichhorn (gynecological pathology and cytopathology).

Others spent considerable amounts of time at MGH but moved to other institutions later in their careers, including Drs. Alan L. Schiller (bone and autopsy pathology; to chair Pathology at Mount Sinai, New York); Jaime Prat (gynecological pathology; to Barcelona); A. Jane Lingenman (dermatopathology; Boston area); John ("Jay") T. Fallon (cardiac pathology; to Mount Sinai and then to chair Pathology at New York Medical College); Ann Dvorak (electron microscopy and pediatric pathology; to Beth Israel Hospital); Thomas Aretz (cardiac pathology; to Lahey Clinic and New England Deaconess, then returned to MGH before engaging full-time in international medical education); Debra A. Bell (gynecological and cytopathology; to Mayo Clinic); W. Dwayne Lawrence (to Detroit and then Brown University); James Southern (autopsy and cardiac pathology; to Wisconsin); Carolyn C. Compton (gastrointestinal pathology; to chair Pathology at McGill and then to NIH/National Cancer Institute); Ann Thor (cytopathology, fine needle aspiration, breast pathology research; to chair Pathology at the University of Oklahoma and then the University of Colorado). One pathologist returned to the department and spent the remainder of his successful career there: Dr. G. Richard Dickersin, who had trained in the 1950s, came back in 1976 to head the Electron Microscopy Unit.



Figure 13.1 MGH Pathology, 1976. First row, left to right: Kilmer McCully, Austin Vickery, Robert Scully, Edgar Taft, Robert McCluskey, Walter Putschar, Martin Mihm, G. Richard Dickersin, Stanley Robboy. Second row: Max Goodman, Alan Schiller, Eugene Mark, Wanda Szyfelbein, Priscilla Taft, Robert Trelstad, Karl Proppe, John Long, Atul Bhan, Michel Prade. Third row: William Welch, John Fallon, Neil Orenstein, Pacita Keh, Joan Kumar, Andrea Fleishman, Robert Sandstrom, Erika Whitmore, Walter Jung, George Kleinman. Fourth row: Michael Briselli, Marc Sternberg, Richard Geller, Katherine Kosinski, Terence Harrist, Roy Apter, Peter Boyd, Erna Pettersen, Clive Hall. Fifth row: unidentified, Richard Bradley, Michael Gallagher, Ronald Sirota, Walter Richardson, Peter Dervan, Benjamin Pilch, Chris Murla.

Other faculty pathologists spent time at MGH after their training but moved to careers at other Boston-area and New England hospitals. These included Karl Proppe (Chief of Pathology at Salem Hospital); William R. Welch (Brigham and Women's Hospital); Richard Geller (Emerson Hospital), Jettie V. Hunt (Bridgeport, Connecticut); David L. Gang (University of Massachusetts, then Baystate Medical Center); Katherine S. Kosinski, Rebecca Osgood, and John Grabbe (Cambridge Hospital, see below); and Erika L. Whitmore (St. Elizabeth's Hospital).

Neuropathology (chapter 17) expanded markedly in terms of faculty members during the McCluskey years. Before 1978 Dr. E. P. Richardson Jr. did all the staff-level work by himself.

In 1978 he was joined by Dr. George M. Kleinman, but Dr. Kleinman left in 1981, spending most of his subsequent career at Mount Sinai in New York. The major recruit was Dr. E. Tessa Hedley-Whyte, who came in 1981 from New England Deaconess Hospital; she went on to direct the MGH Pathology Residency Program as well as the Neuropathology Service and Fellowship. Other faculty who joined Neuropathology during these years include Drs. Jean Paul Vonsattel, Raymond A. Sobel, Suzanne de la Monte, and Ann McKee; all went on to successful academic neuropathology careers, first at MGH and then at other institutions (Columbia, Stanford, Brown, and Boston universities, respectively).

Dermatopathology (chapter 18) grew, initially



Figure 13.2 MGH Pathology, 1985. Front row, left to right: Leonard Atkins, Austin Vickery, Robert Fienberg, Walter Putschar, E. P. Richardson Jr., Robert McCluskey, Robert Scully, Wanda Szyfelbein, Nancy Harris, Atul Bhan, Max Goodman. Second row: Katherine Kosinski, Stephen Black-Schaffer, Alan Schiller, Benjamin Bronstein, David Gang, Robert Young, Frederick Koerner, Dwayne Lawrence, Debra Bell, Raymond Sobel, Eveline Schneeberger. Third row: Jean Paul Vonsattel, Eugene Mark, Andrew Rosenberg, Alain Marion, Randall Margolis, G. Richard Dickersin, Thomas Flotte, Benjamin Pilch, unidentified, Ilana Inbar. Fourth row: Clayton Carr, Edward Gutman, unidentified, Jana Sullinger, Judith Ferry, Mary Sunday, Stephanie Horowitz, unidentified, Jean Maguire, unidentified. Fifth row: Paul Googe, unidentified, Michael Talbert, Richard Reimersma, Gary Stone, Suzanne de la Monte, Steve Tahan, Walter Lamar, James Kurnick, unidentified. Sixth row: Richard Kradin, Martin Mihm, unidentified, Lewis Hassell.

under Martin Mihm's leadership. A number of dermatopathologists spent years in the group, including Drs. Terence J. Harrist, A. Jane Lingenman, Ben Bronstein, Randall Margolis, Michael Imber, Raymond Barnhill, and H. Randolph Byers. Dr. Thomas Flotte joined the MGH as a dermatopathology fellow in 1982 and became a staff dermatopathologist in 1984. When Dr. Mihm left the department temporarily for Albany Medical College, Dr. Flotte became the head of Dermatopathology—a position he would hold until he left for the Mayo Clinic in 2007.

The clinical laboratories (chapter 20),

Microbiology (chapters 21) and Blood Transfusion Service (chapter 22) remained outside Pathology for much of Dr. McCluskey's tenure, but notable appointments that involved Pathology included Drs. Joan R. Kumar, Rita Addison, Robert Kenney, and Christopher Stowell in the Blood Transfusion Service and Dr. Mary Jane Ferraro in Microbiology. Dr. Stowell directed the Blood Transfusion Service after 1991, and Dr. Ferraro oversaw Microbiology—both continue in those roles to the present day. Most notable of the clinical laboratory appointments, however, was that of Dr. Michael Laposata (see below),

who created a division of Laboratory Medicine within Pathology.

In the research laboratories, first in the Cox Building and subsequently in Charlestown, a number of physician-scientists filled exclusively or primarily research positions. One such faculty member was Dr. Stephen J. Galli, who, after finishing his training at the MGH in 1977, joined the Immunopathology Unit (chapter 23) before moving to Beth Israel Hospital with Dr. Harold Dvorak in early 1980. Dr. Galli went on to do

seminal immunology research and eventually to chair the department of Pathology at Stanford. Dr. Galli wrote to Dr. McCluskey, upon leaving MGH: “I have enjoyed tremendously my work at the MGH and my association with you and the other members of the staff; associations I hope will continue to be maintained.” Other researchers included Drs. Neil S. Orenstein, James Kurnick, Lynn Baird, Mary Sunday, John Smith, Ivan Stamenkovic, Dennis Brown, Man-Sun Sy, and Giuseppe Andres.



Figure 13.3 MGH Pathology, 1990. Front row, left to right: Eugene Mark, Atul Bhan, Austin Vickery, Robert Scully, Robert McCluskey, Max Goodman, Eveline Schneeberger, Tessa Hedley-Whyte. Second row: Randolph Byers, Judith Ferry, Thomas Flotte, Debra Bell, Robert Young, Nancy Harris (partially obscured), Ann Thor, Benjamin Pilch. Third row: unidentified, unidentified, Fiona Graeme-Cook, Barbara Centeno, Deborah Fleischhacker, Franco Pandulfi, Ivan Stamenkovic. Fourth row: unidentified, Michael Pins, Lawrence Zukerberg, unidentified, Ramnik Xavier. Fifth row: Georgina Pastorfide, Takafumi Etoh, Stephen Wilz, Horatio Maluf, Danielle Bouffard, Gerald Kuhn, Volker Nicleit. Sixth row: Martha Pitman, Paulina Arriagada, Peter Lapis, Jana Sullinger, Mark Kaplan, John Lee, Dennis Sgroi, John O'Connell, Anthony Mattia, Jeffrey Golden, Michael Laposata.

CLINICAL SERVICE

Surgical Pathology

In 1975 Drs. Austin Vickery and Robert Scully were appointed Codirectors of Surgical Pathology, positions that they held for ten years. In 1985 Nancy Lee Harris took over as Director of Surgical Pathology, which she held through the remainder of Dr. McCluskey's tenure. Overall, surgical pathology specimens grew in numbers at a significant pace, from approximately 23,000 in 1974 to over 30,000 in 1981 and over 40,000 by 1991. In the first two years after the new Frozen Section Laboratory was opened on Gray 3, the volume of intraoperative consultations grew by 34 percent.

In addition to overall growth and increasing subspecialization (chapter 16), other key advances occurred. For example, a major development was the tighter integration of Pathology at the Massachusetts Eye and Ear Infirmary (MEEI), under the direction of Dr. Max Goodman; a contract enabled essentially all MEEI pathology functions (excluding eye pathology) to be carried out at MGH. Another significant advance was the work of Dr. Stanley Robboy with the Laboratory of Computer Science, when Pathology introduced CAPER in 1976 for use in surgical pathology—reported to be the first comprehensive computer system developed for a pathology department, at least for surgical pathology. The system recorded, for each specimen, the patient's medical record number, information on different specimens from the same patient, and reporting status. It was replaced by new systems in 1987 and in 1990, the latter after major input from surgical pathologists in the department, including Drs. Harris and Black-Schaffer.

In general, the trend toward subspecialization in surgical pathology was proceeding quickly, and its speed at the MGH caused growing pains. Dr. McCluskey wrote in 1980:

Surgical pathology, like other branches of medicine, has become increasingly subspecialized.

Almost all the staff have developed special expertise. There are several units to which surgical specimens are generally sent directly—dermatopathology, gynecologic pathology, neuropathology, immunopathology, renal pathology, and some bone and lung specimens. Other specimens are initially reviewed by the resident and the staff pathologist on sign-out rotation and then referred as indicated to the appropriate specialist. Despite increasing subspecialization, we have not found it feasible to establish autonomous units with individual cost centers, in large part because of the continued overlapping responsibilities of staff pathologists and also because of the reliance on common services, notably technical, secretarial, computer, and administrative functions. Moreover, the general surgical pathologists and residents have resisted further subdivision because of anticipated logistical difficulties and adverse effects on residency training.

By the end of the 1980s the Surgical Pathology group featured distinct units in Cytopathology (led by Stephen Black-Schaffer), Dermatopathology (Martin C. Mihm), ENT Pathology (Max Goodman), Electron Microscopy (Richard Dickersin), Flow Cytometry (Robert B. Colvin), Gynecological Pathology (Robert E. Scully), Hematopathology (Nancy L. Harris), Immunoperoxidase Service (Atul K. Bhan), and Neuropathology (E. Tessa Hedley-Whyte).

New modalities also grew in their application to surgical pathology, most notably electron microscopy and immunohistochemistry/immunofluorescence. With the opening of the Cox 5 laboratories in early 1976, the Diagnostic Electron Microscopy Laboratory was established, under the direction of Dr. Ann Dvorak and with the assistance of Dr. G. Richard Dickersin, who had returned to the MGH and was interested in the application of electron microscopy to tumor diagnosis. Dr. Robert Colvin oversaw the electron microscopic diagnosis of renal biopsies. In the first year of operation (October

1975–September 1976), the Diagnostic Electron Microscopy Laboratory processed 180 specimens. Soon a scanning electron microscope was added to the unit. The group was aided by Dr. Morris Karnovsky of Harvard Medical School, who joined the department as a consultant. Electron microscopic testing grew steadily during the McCluskey years, reaching about 200–300 cases per year in the early 1990s. In addition, Dr. Robert Trelstad established an electron microscopy laboratory at the Shriners Burns Institute, which was used primarily for research purposes, but which was made available for selected clinical specimens—notably orthopedic, cardiac, and pulmonary.

The Cox 5 space also saw the development of an expanded immunofluorescence and immunohistochemistry laboratory, run by Robert Colvin and A. Bernard Collins. Collins had joined the department with Dr. McCluskey when he had moved from Children's Hospital. Collins would remain in the department, running immunofluorescence and involved in research for more than three decades, even after the laboratory moved onto the fifth floor of the Warren Building. This laboratory would do diagnostic immunofluorescence studies on kidneys, skin, and other organs and would be active in research studies of renal biopsies as well. In 1978 the laboratory set up rapid immunofluorescence testing of brain biopsies for herpes simplex infection. By 1983 a dedicated immunoperoxidase laboratory had also opened, under the direction of Atul Bhan. Immunohistochemistry grew rapidly: it was performed on 5 percent of specimens by the early 1990s, increasing from about just under 2,000 per year in 1988 to about 2,500 per year in 1991.

Testing for antineutrophil cytoplasmic antibodies (ANCA) grew out of the immunopathology research of Dr. McCluskey and Dr. John Niles. They began offering clinical testing in 1988, when only a few cases were analyzed. The numbers jumped to about 500 in 1990 and over 1,500 in 1991. In 1990 Dr. McCluskey wrote that

such testing “*does* replace the need for biopsy under certain circumstances.” The widely recognized quality of MGH's ANCA testing led to the hospital's serving as a reference laboratory, which includes running tests for commercial laboratories, and ANCA testing has remained a significant activity of the Immunopathology Laboratory to the present day.

Cox 5 was also the site of the Flow Cytometry Laboratory, started by Dr. Colvin and directed by Dr. Fred Pfeffer since 1989. Clinical volumes in flow cytometry grew in the early 1990s, from 44 cases in 1990 to 116 in 1992; the technique was used initially in the evaluation of tumor ploidy as well as for detection of lymphocyte surface antigens for the diagnosis of hematopoietic malignancies and immunodeficiency states.

By the late 1980s in situ hybridization techniques were also beginning to be applied to surgical pathology specimens, primarily to detect infectious agents, and the value of Southern blotting had been explored for determining lymphocyte clonality. By 1990 Dr. Ivan Stamenkovic had begun to develop a molecular diagnostic facility in the new research laboratories in Charlestown; approaches included polymerase chain reaction (PCR) to detect infectious organisms in tissue sections.

Autopsy

Dr. Eugene Mark ran the Autopsy Service briefly from 1974 to 1975, followed by Dr. Alan Schiller from 1975 until 1985 and Dr. Fritz Koerner from 1985 until 1991. The number of autopsies declined during the McCluskey years, as it did at other hospitals. For example, in 1975, 718 autopsies were performed, but this had dropped to 474 cases by 1981. Between the 1950s and 1980, the rate of autopsies per patient deaths declined, but not as severely as it did at comparable teaching hospitals. This trend may have been partially related to the fact that hospital accrediting agencies no longer required a specified percentage of autopsies; it was also attributable to the growing

(albeit incorrect) sense that most information could be gathered premortem from diagnostic imaging studies and that postmortem findings could be used in malpractice cases. Over the 1980s the autopsy numbers continued to decline, one reason being changes in the policies of the Medical Examiner of Massachusetts that necessitated performing certain types of autopsies at the Medical Examiner's office rather than at the MGH. By the early 1990s the number of autopsies at MGH had declined to about 350 cases per year; of these, typically only 250 were MGH cases, the remainder coming from outside—the Medical Examiner's office, Cambridge Hospital, Shriners Burns Institute, and MEEI.

When the department upgraded its computer system in 1990, the Autopsy Service was incorporated into the new information system. Sadly, this transition necessitated a change in the numbering of autopsies: in the past, they had been numbered consecutively from 1 (in September 1896) through 46,054 (in the summer of 1990), but the computer system required them to be numbered by year (e.g., A90-1, for the first autopsy of 1990 under the new system). This ended a long tradition of consecutively numbered autopsies that had extended back nearly 100 years at the hospital.

Cytology

Volumes of exfoliative cytology specimens continued to grow, rising from approximately 23,000 in 1974 to a plateau of nearly 30,000 from 1977 to 1981, and to approximately 35,000 by 1991. The increases had already necessitated the appointment in 1974 of Wanda Szyfelbein, a second cytopathologist to help Dr. Taft. In 1983, Dr. Taft retired and Dr. Szyfelbein took over directing the unit, remaining director through 1989. Dr. Stephen Black-Schaffer was appointed to the cytopathology staff in 1983 and directed the unit from 1989 to 1991. Recruitment of additional cytotechnologists in 1989–1991 resulted in a substantial reduction in diagnostic turnaround times in cytopathology. In addition to the increase in

volume over the years, mention should be made of the introduction of fine needle aspirations (FNA), first offered in 1989, under Dr. Ann Thor. By mid-1991 Dr. Thor had established the FNA Service, staffed by herself, Martha B. Pitman (who later directed the FNA Service), and Teri Cooper (chapter 19).

Cytogenetics

At the start of the McCluskey years the Cytogenetics Laboratory was considered the “largest in the country” and was a leader in introducing new techniques to identify chromosomes. In 1977 the laboratory began to get specimens from the new prenatal diagnostic unit, which obtained and prepared amniotic fluid samples. This greatly increased volumes for the laboratory in the first six months of operation. For example, in 1978 the laboratory processed 1,272 specimens, of which 566 were amniotic fluid samples. In 1981 the volume was 1,876 cases and in 1982, 2,021—perhaps the largest in the country. Notably, however, as cytogenetics become more routine and commercial laboratories began to offer such analyses, the number of outside cases began to decline, and the lack of an obstetrical service at the MGH further contributed to the decline. (The Obstetrical Service at MGH reopened in the mid-1990s.) By 1987 over one-third of all specimens analyzed were from hematopoietic disorders, and many were related to evaluations of fragile X syndrome. By 1991 the number of cases per year was approximately 650.

Blood Transfusion Service

The Blood Transfusion Service remained under the direction of the Surgery Service for most of Dr. McCluskey's tenure. As mentioned above, however, Dr. McCluskey differed from Dr. Castleman regarding the clinical laboratories and the Blood Bank; he saw the need for pathologists to run these laboratories. When Dr. Castleman had been approached by pathology trainees interested in pursuing careers in clinical pathology, he had

dissuaded them and had not supported appointments for MGH pathologists in these disciplines (chapter 22). Dr. McCluskey, on the other hand, encouraged such appointments. In 1978 he appointed Dr. Joan Kumar, a pathologist, to be Assistant Director of the Blood Bank. She would also be involved in resident training for a year, but then left in June 1979 to work in the Blood Bank of the Walter Reed Hospital in Washington, D.C. With the recruitment of Dr. Christopher Stowell as director of the Blood Transfusion Service in 1991, after the death of the previous director, Dr. Charles Huggins, the Blood Bank would come under Pathology entirely and be directed by a pathologist.

Clinical Laboratories and Microbiology

The most significant change in clinical services during the McCluskey years was the incorporation of the Clinical Laboratories, including Microbiology, back into Pathology. As discussed in earlier chapters, the Chemistry and Hematology laboratories had begun to migrate away from Pathology as early as the second decade of the twentieth century, and Microbiology (then Bacteriology) had left Pathology in the early 1950s. The drive to reincorporate these laboratories was prompted by new regulations on clinical laboratory operations as well as considerations of efficiency and testing revenues.

The incorporation of the clinical laboratories into Pathology is dealt with in greater detail in chapter 20. It was a difficult transition, one in which a number of political battles were waged with the medical services, which had directed the various laboratories. In addition to Dr. McCluskey's pushing the agenda for laboratory centralization, there was clearly a need for a senior physician trained in laboratory medicine. In 1989, therefore, the hospital and Dr. McCluskey recruited Dr. Michael Laposata from the University of Pennsylvania to the MGH. Dr. Laposata revolutionized the direction of the clinical laboratories, as well as the related teaching programs

in Clinical Pathology (see below), and was responsible for the shape of the Clinical Laboratory group through 2006. This involved substantial organization of the administrative and operational structure of the clinical laboratories, as well as recruitment of key faculty dedicated to laboratory medicine. Initially, this included Dr. Kent B. Lewandrowski, who had trained at MGH in the late 1980s, and who went on to direct all Clinical Services in Pathology in 2006, once the divisions of Anatomic and Clinical Pathology were merged. Another important development was the creation of the Clinical Microbiology Laboratory—combining Bacteriology, Virology, and Parasitology—under the direction of Dr. Mary Jane Ferraro (chapter 21). Some clinical laboratories, however, remained administratively outside Pathology for various reasons, including Clinical Immunology and the Diabetes Laboratory, but these eventually became operationally supervised by Pathology over the next decade.

Other Institutions

In 1985 the MGH Pathology Service began to provide the pathology professional staffing for Cambridge Hospital; a series of MGH Pathology faculty and trainees eventually constituted the professional Pathology staff at Cambridge Hospital: Drs. Katherine Kosinski (as chief), John Grabbe, and Rebecca Osgood. The laboratories also provided services to Somerville Hospital and MIT Health Services. These pathologists have remained closely connected with MGH Pathology to the present day; this includes assisting with cytopathology coverage at MGH at various times. The clinical laboratory services also continued to provide services to other, nearby hospitals, including MEEI and Shriners Burns Institute—which further cemented the relationships of MGH Pathology to these nearby institutions.

TEACHING AND THE CPCs

Dr. McCluskey wrote in 1980, “The department can continue to say with pride that the MGH

program is considered one of the busiest—and one of the best—in the country.” The number of residents increased during his tenure as chief, from 21 in 1972 to 25 by the end of the McCluskey years and to 27 by 1992. Of the 25 residents each year toward the end of the McCluskey tenure, about two-thirds were usually in Anatomic Pathology only and the rest in Anatomic and Clinical Pathology. The overall residency program was directed by Dr. Austin Vickery until 1985 and by Dr. Tessa Hedley-Whyte from 1985 through 1996. Because of an increase in educational requirements from the American Board of Pathology, the department also increased the number of required rotations in Anatomic Pathology, such as forensic pathology, cytology, cytogenetics, neuropathology, immunopathology, and electron microscopy, as well as obstetrical and perinatal pathology.

There was, however, a need to improve training in Clinical Pathology. Dr. McCluskey commented in 1980, “Lately, an increasing percentage of residents have requested training in both clinical and anatomic pathology, which appears to reflect a growing reluctance of young pathologists to pursue a career in research or academic medicine. . . . The MGH department has responded to the aspirations of this . . . group by improving the training program for residents in clinical pathology. The staffs of the clinical laboratories have been most cooperative in this effort.”

In 1974, Dr. McCluskey had worked with Dr. Edgar Taft, who directed the Clinical Pathology training program, to develop a more formal training program, its major components being run by Drs. William Beck (Hematology), Lawrence Kunz (Bacteriology), Charles Huggins (Blood Bank), and Sidney Rieder (Clinical Chemistry). In 1977, Dr. McCluskey convened a committee to monitor and coordinate resident training in Clinical Pathology: Drs. Edgar Taft (chairman), William Beck, Leonard Ellman, Thomas Fuller, Charles Huggins, Lawrence Kunz, Robert Moel- lering, Karl Proppe, Sidney Rieder, Morton

Swartz, and Myle Holley. A series of weekly seminars in Clinical Pathology was begun, under the direction of Dr. Erika Whitmore, and was well attended. Dr. Taft was joined by Dr. Joan Kumar in supervising the program in 1978–1979, and then by Katherine Kosinski in 1979.

By 1977 Dr. Ronald Sirota (resident 1974–1977) could summarize a number of strengths and challenges in the CP training program:

The basic structure of the CP program is sound. In the first year of training each resident rotates through all the major laboratories, i.e., Hematology, Blood Bank, Chemistry and Microbiology, each for three months. During that time, the fundamentals necessary to practicing clinical pathology . . . can be adequately covered. The second year is devoted to specialization, i.e., acquiring expertise in a particular area or areas of clinical pathology. . . .

More didactic clinical pathology conferences are needed. . . . A fundamental difficulty with Clinical Pathology training at the Massachusetts General Hospital is that it affords the resident little in the way of useful, direct responsibility for medical matters relating to the laboratory. . . . In order to rectify the above situation, I propose that in each laboratory, after a suitable period of training in that laboratory, the Clinical Pathology resident be assigned specific sign-out responsibilities.

It was Dr. Michael Laposata who markedly redesigned and reinvigorated the Clinical Pathology training program after 1989. Dr. Laposata envisioned laboratory medicine as being dynamic, proactive, and consultative (along the lines mentioned at the end of Dr. Sirota’s comment), and he transformed the training program following this vision. As a result, over the 1990s the program became one of only a handful of leading ones in the country, and MGH Pathology quickly began to attract residents committed to “CP-only” residency slots and careers. Some of these trainees in the 1990s quickly went

on to highly successful academic careers as clinicians and as researchers, many of them in the department.

Fellowships in Pathology also thrived. In 1976, under Dr. Martin Mihm, the Dermatopathology Unit began a formal training program leading to certification in dermatopathology. The first trainees were Drs. Antoinette Hood and Theodore Kwan, and the Dermatopathology group went on to train many leaders in the field (chapter 18). Neuropathology training also thrived under Drs. Richardson and Hedley-Whyte, as a number of future leaders in neuropathology began their training during the McCluskey years (chapter 17). Following the seminal role played by the MGH in establishing the link between in utero diethylstilbestrol (DES) exposure and gynecological cancer, the American Cancer Society funded a prestigious fellowship in gynecological pathology from the mid-1970s under Dr. Scully. These fellows during the McCluskey years were Drs. Jaime Prat, William R. Welch, Robert H. Young, W. Dwayne Lawrence, Debra A. Bell, and Joanne Rutgers.

To foster research fellowships, a new T32 training grant was begun in 1977, focused on immunology and directed by Drs. Kurt Bloch of the Clinical Immunology Laboratory and Robert B. Colvin of Pathology. The grant initially had three fellows. Over the years, the grant was expanded to five and then to seven fellows, and it shifted its focus from immunology to tumor biology; it continues to provide an essential mechanism for support of research trainees, particularly Pathology residents going on to postdoctoral research training.

MGH Pathology faculty continued in the teaching of HMS students, including in the Health Sciences and Technology (HST) program, and an elective course for HMS students was started in MGH Pathology. Of note, Dr. Robert Colvin served as Master of the HMS Holmes Society for two years, and as Director of the Identity, Microbes and Defense course at

HMS. Dr. Carolyn Compton helped develop a laboratory for second-year HMS students. Neuropathology expanded its role in neuroanatomy teaching, primarily at HMS (but eventually in the 1990s and 2000s extending this role to run the HST neuroanatomy sections).

Department members also remained involved in postgraduate teaching in the United States and abroad, at national and international meetings and at academic institutions. In 1978 two new postgraduate courses were started: the first, “Gynecologic and Obstetric Pathology,” was directed by Drs. Stanley Robboy, Robert Scully, and Shirley Driscoll (of Boston Lying-In Hospital); the second, “Recent Advances in Surgical Pathology,” was directed by Drs. Robert McCluskey, Robert Scully, and Austin Vickery. Both were highly successful. The latter course involved the majority of the MGH Pathology faculty and went on to become the long-standing departmental postgraduate course entitled “Current Concepts in Surgical Pathology,” which continues as an extremely popular annual course to the present day. In 1980 Dr. Martin Mihm inaugurated a new postgraduate course in Dermatopathology, which also became a perennial success and continues today. In the mid-1980s a course in pulmonary pathology began under Dr. Eugene Mark and resumed after a hiatus of some years. Members of the department would also teach a two-day, biannual course on immunopathology at the U.S.–Canadian Division of the International Academy of Pathology.

The year 1980 saw the beginning of the ongoing annual Benjamin Castleman Award at the International Academy of Pathology (subsequently the United States and Canadian Academy of Pathology) (figure 13.4). Begun by Drs. Ronald S. Weinstein, David Freiman, S. Irwin Roth, and other Castleman trainees, this award is given each year to a pathologist under the age of 40 who has, during the previous year, published an excellent paper relevant to human pathology. Dr. Castleman was quite moved by the creation

of this award, and in his interview with Dr. Ron Weinstein recorded a little before Dr. Castleman's death in 1982, he commented that it was the honor of which he was most proud.

In 1984 the department inaugurated the annual Walter G. J. Putschar Lectureship, enabled by donations from Dr. Putschar's many colleagues and trainees in Pathology, as well as donations from the MGH departments of Radiology and Orthopedics. This successful lectureship became one of the highlights of the academic year; it featured a leading academic pathologist visiting the department for two days, presenting lectures and resident seminars, and attending a dinner for faculty and trainees. The speakers at this ongoing lecture series are catalogued in the Appendix.

The Case Records (chapter 24) also continued as instructive and widely recognized exercises and publications. Dr. Scully took over directing the Clinicopathological Conferences (CPCs) once Dr. Castleman stepped down, and he was helped initially by Dr. James Galdabini and then by Dr. Eugene Mark, with the assistance of Betty McNeely (who continued with the CPCs for several decades). By 1980 Dr. McCluskey wrote, "Despite extensive commitments in other areas, [Dr. Scully] consistently provides excellent selection (with the help of the chief resident) and editorial review of the cases." Indeed, for the chief resident, this would be a huge and intimidating obligation: to find a case every week that Dr. Scully would accept as suitable for a CPC.

A number of residents began their training during the late McCluskey years and then had successful faculty careers in the 1990s, including Drs. Kent B. Lewandrowski (Associate Chief of Pathology for Clinical Services at MGH); Martha Pitman (Director of Fine Needle Aspiration Service at MGH); Lawrence Zukerberg (Gastrointestinal Pathology and Hematopathology at MGH); Fiona Graeme-Cook (Gastrointestinal Pathology at MGH); David N. Louis (sixth Chief of Pathology at MGH); John M. Lee (Chair of Pathology and Dean at Loyola University);



Figure 13.4 Benjamin Castleman (right) and Robert McCluskey in the early 1980s

Jeffrey A. Golden (Chair of Pathology at Children's Hospital of Philadelphia); and Dennis Sgroi (Director of Breast Pathology at MGH).

RESEARCH

Dr. McCluskey was dedicated to building up the basic research component of MGH Pathology, in a way that distinguished his tenure from those of Drs. Wright, Mallory and Castleman. He focused research on the highly important area of immunopathology, building on the group started by Dr. Castleman but also building on his own interests and expertise. Dr. McCluskey was highly successful in this endeavor: research dollars grew fourfold during his tenure, reaching about \$1.5 million per year by 1981, and nearly \$5 million per year by 1991. The department provided a vibrant place for postdoctoral research fellowship as well. As of 1982–1983, there were 23 research fellows in departmental laboratories, seven of them supported by one of two NIH Training Grants.

During the McCluskey years the Immunopathology Unit on Cox 5 was the dominant research group in the department. In 1976 Dr.

Harold Dvorak was made Director of the unit in recognition of the growing importance of this laboratory for research, clinical testing, and education. Dr. Robert Colvin took over direction of the unit in 1979, when Dr. Dvorak left, and ran it through 1991. Research in the Immunopathology Unit naturally focused on immunology and its application to pathology. Researchers in the 1980s included Drs. Atul Bhan, Eveline Schneeberger (who also worked on pulmonary structure and function), Robert Colvin, Richard Kradin, James Kurnick, and Raymond Sobel, as well as individuals having connections with clinical services, John Niles (Renal), Johnson Wong and James MacLean (Clinical Immunology), and Gary Russell (Pediatric Gastroenterology). Over the years the unit focused on basic and applied research relating to immunological mechanisms of disease, with particular emphasis in diseases of the kidney, lung, skin, and brain, and relating to organ transplantation. The dominance and diversity of the unit, as well as its many successes, are covered in chapter 23.

Dr. Robert Trelstad took over the pathology research laboratories at the Shriners Burns Institute in 1975, when Dr. James Caulfield left. The Shriners laboratories focused on wound healing as well as cardiovascular pathology. Dr. Jay Fallon took over these laboratories in 1981, when Dr. Trelstad left to become the Chair of Pathology at Rutgers University/Robert Wood Johnson Medical School, and he remained in charge through 1992. Dr. Alan Schiller opened the Bone and Joint Pathology Laboratory for evaluation of metabolic parameters of bone.

Toward the end of Dr. McCluskey's tenure,

Pathology was assigned space in the new research laboratories in Charlestown, in Building 149. These laboratories were occupied by Pathology in 1988, initially by Drs. Ivan Stamenkovic, James Kurnick, Giuseppe Andres, Michael Bigby, H. Randolph Byers, and Man-Sun Sy. Cox 5 remained a dynamic site through 2000, when the remaining Immunopathology Unit (then primarily clinical in nature) moved to Warren 5.

THE END OF THE MCCLUSKEY ERA

Robert McCluskey retired on June 30, 1991, and Robert Colvin took over as Chief of Pathology on July 1, 1991. The McCluskey years had been successful ones for the department, ones of significant growth. As Dr. Colvin summarized in 1992: "During his [Dr. McCluskey's] 17 year tenure, the volume of surgical pathology specimens doubled, the Clinical Laboratories were consolidated into the Pathology Service, the Pathology staff increased from 15 to 57 (including an increase from 3 to 17 involved principally in research) and research funding for the Pathology Service increased four fold. Two new pathology research laboratories were opened, on the 5th floor of the Cox Building in 1976 and on the 7th floor of the Martin Laboratories in Charlestown in 1989."

Fortunately for the department, Dr. McCluskey continued as an active member of the department for many years following his retirement, until shortly before his death in 2006. He continued his funded research in the immunopathology of renal disease, his clinical work signing out kidney biopsies, and his active teaching of renal pathology. His later activities as a teacher of residents and fellows garnered much praise.