

The Clinicopathological Conferences (CPCs)

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THE INTRODUCTION OF THE Clinicopathological Conferences (CPCs), later to become the Case Records of the Massachusetts General Hospital (MGH) in the *New England Journal of Medicine (NEJM)*, initiated a revolutionary change in the teaching of medicine to students and practitioners early in the twentieth century (1, 2). They have continued as robust and highly popular teaching exercises to the present day. This chapter traces their history from the beginnings through 2010.

THE CABOT ERA (1908–1935)

Three men, each of whom was an intellectual with a zeal to improve the lot of mankind, were mainly responsible for the development of the CPCs: Walter Bradford Cannon (1871–1945), Charles W. Eliot (1834–1926), and Richard C. Cabot (1868–1939) (figure 24.1). In 1898 Walter B. Cannon, a fourth-year Harvard Medical School (HMS) student, later to become the world-renowned Higginson Professor of Physiology at HMS, was rooming with a second-year student at Harvard Law School who was excited by the use of the case-history method of teaching law that had been introduced by Professor Christopher C. Langdell. In January 1900 Cannon proposed a similar type of teaching for medical students in the *Boston Medical and Surgical Journal*, a precursor to the *NEJM* (3). In his paper he wrote that he considered the then-current four hours

of continuous lecturing on various diseases from two to six o'clock five days a week “a dreary and benumbing process.” In contrast, he remarked, “The study of case histories can, and indeed have been shown in a small number of neurological cases to arouse great enthusiasm and excitement among groups of students.” It did so by giving them an opportunity to review and debate among themselves the differential diagnosis, prognosis, and treatment of a patient as described in a printed protocol, and then to attend a conference with an instructor, who thoroughly discussed the students’ conclusions with them.

Cannon was the only son of well-educated parents in Prairie du Chien, Wisconsin. He graduated from Harvard College summa cum laude. Shortly after entering HMS, he began research on the introduction of opaque materials, including barium, into the gastrointestinal tract to study its motility radiologically. He investigated the results of stress on the body, including the sympathetic and parasympathetic nervous systems and the adrenal glands, as well as other organs, such as the stomach and heart. He wrote many books expounding his scientific findings, as well as an inspiring autobiography, *The Way of an Investigator*. Cannon was severely criticized by Sir William Osler, who opposed the inductive method of teaching. The great humanist and medical historian preferred to shower his students with his medical knowledge and musings

on medical history. William Welch and most of the Hopkins faculty, as well as professors at other leading medical schools, however, supported Cannon's approach.

Two months after Cannon's proposal was published, Charles William Eliot, President of Harvard University from 1869 to 1909 and one of the great medical education reformers of his era, authored an article strongly supportive of Cannon in the same journal (4). Eliot, a chemist and mathematician, began his reform of medical and other types of education at Harvard four years before the famous Flexner Report was issued. According to Oliver Wendell Holmes, Eliot had "turned the whole university over like a flapjack" (5). He eliminated the long-cherished requirement of ancient Greek for entry to Harvard and introduced in its place a strict examination formulated by a commission of educators. He also made extensive changes in the curriculum. He fought powerful enemies, such as the renowned MGH surgeon Dr. Jacob Bigelow, who advocated the apprentice system of training for surgeons, stating that surgeons are born and not made. Eliot was strongly supported, however, by the pathologist-clinician Dr. Calvin W. Ellis (chapter 1), at that time Dean of HMS, as well as others on the faculty. Eliot believed that the university should reflect its presence in a new country rather than be modeled after much older European universities. He introduced the elective system and sought to satisfy the appetite of the country for scientists as well as for "thoughtful men and civilizing scholarship." During his tenure he increased the number of courses from 73 to 400, and the faculty from 32 to 169.

Dr. Richard C. Cabot was the fifth of seven sons of James Elliot Cabot and Elizabeth Dwight (6). His father was a philosopher and a friend and biographer of Ralph Waldo Emerson, and his mother was a deeply religious woman. Cabot graduated from Harvard College summa cum laude, with a degree in philosophy, in 1889. He had been planning to become either a Unitarian

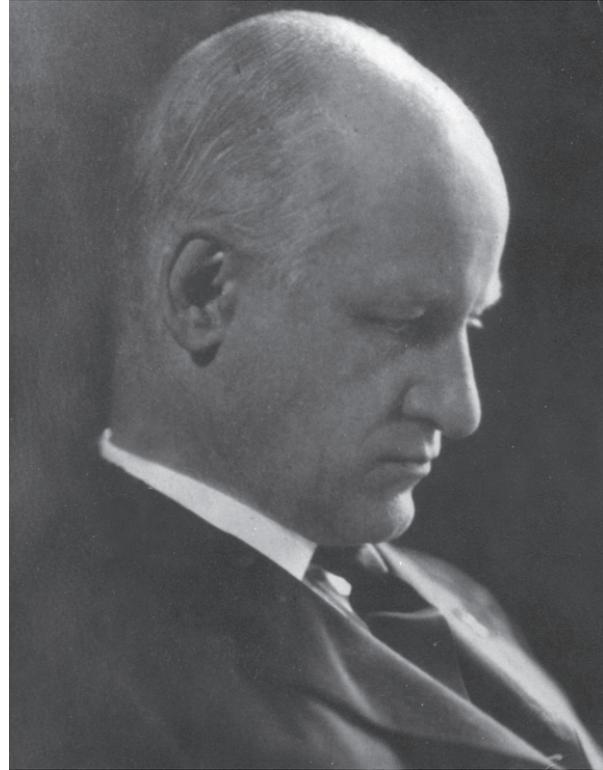


Figure 24.1 Richard Cabot

minister or a professor of philosophy until his senior year, when he began to wonder whether he could profit mankind more by becoming a physician. While vacationing with his family in their summer home near Saranac, New York, he met Dr. Edward Livingston Trudeau, the head of a tuberculosis sanatorium. There the latter convinced him that he should become a physician. He graduated from HMS in 1892 and served his country in both the Spanish-American War and World War I.

Dr. Cabot's major activities during his career were preventing disease and teaching physicians, social workers, and others the management of patients with consideration of both their psychosocial and religious backgrounds. He became Physician at the MGH in 1898, Chief of the West Medical Service in 1912, and Clinical Professor of Medicine at HMS in 1918. In 1912 he was disappointed that Dr. David Edsall was chosen instead of him as Jackson Professor of Medicine, but

he nonetheless gave Dr. Edsall his unwavering support.

In addition to participating in CPCs, Dr. Cabot had a private practice. After a year of research in hematology, he became an expert in that area (chapter 20). In 1896 he wrote his first book, *A Guide to the Clinical Examination of the Blood for Diagnostic Purposes*, probably the first book of its type in English. It became a standard text in America. With Ida Cannon (one of Walter B. Cannon's three sisters) Dr. Cabot founded the Social Service Department at the MGH. During and after his tenure as Editor of the CPCs, he also served as Professor of Social Ethics at Harvard College from 1931 until the time of his death from coronary heart disease in 1939, at the age of 71.

Dr. Cabot began experimenting with the case history method of teaching in 1895; he used it with third-year HMS students in 1900. In 1906 he authored a number of books on differential

diagnosis in which he was the "discussant." Two other books documented the percentages of correct clinical diagnoses for a number of diseases detected on postmortem examination and the prevalence of various fatal diseases diagnosed at autopsy. A book on differential diagnosis by Dr. Cabot and F. Dennette Adams, a talented and personable younger physician, was still being recommended for third- and fourth-year students in the 1940s.

In 1908, Dr. Cabot began to invite MGH pathologists and a radiologist to participate in the exercises. In 1915 he obtained permission from the hospital to mail the printed case records (including the clinical record, the discussion of the case, and the diagnosis) to a list of physicians in the United States, Europe, Asia, and Australia for \$1.75 or its equivalent per annum. These cases were numbered 1 to 9430 (figure 24.2). Dr. Cabot discussed 80 percent of the cases, and the remainder were handled by his younger brother, Hugh,

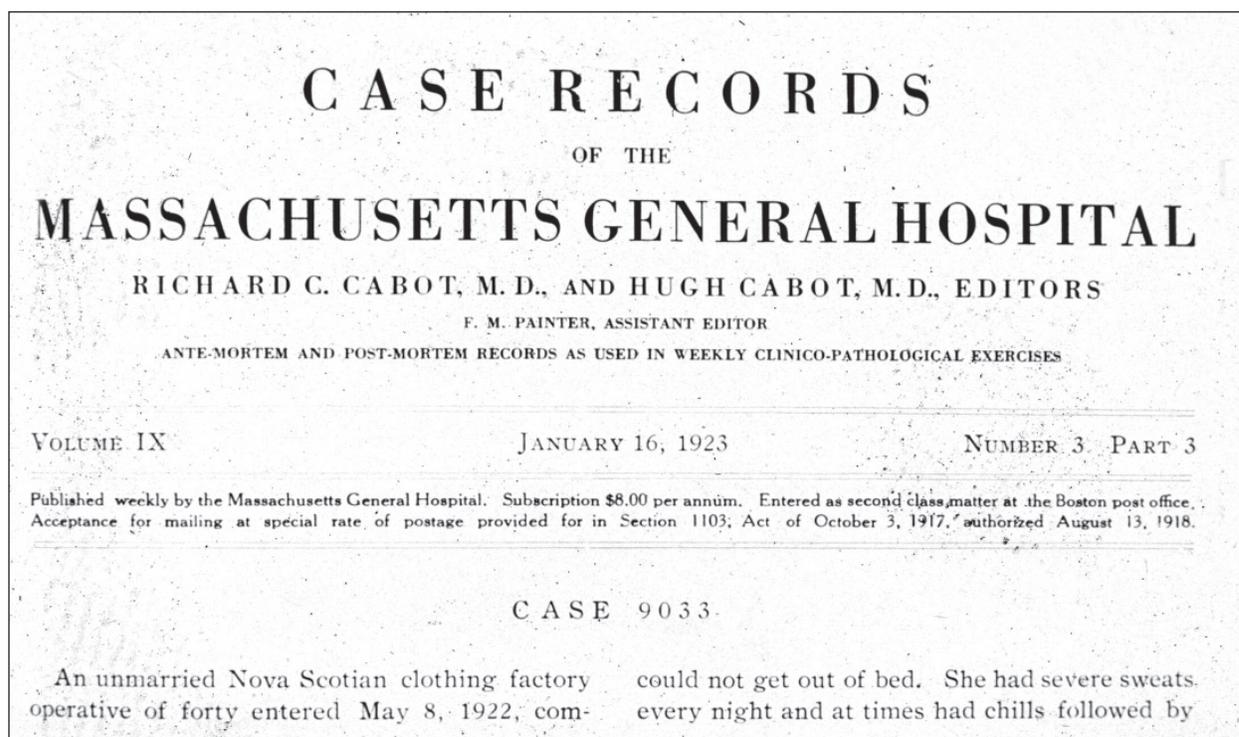


Figure 24.2 One of the early CPC publications, before they were printed in the New England Journal of Medicine



Figure 24.3 An early CPC in the Allen Street Amphitheatre: Hugh Cabot is standing, and Oscar Richardson is seated at the table.

a surgeon, and Edward L. Young Jr., a urologist, neither of whom had any knowledge of the final diagnosis.

When the cases were conducted for physicians at the MGH in 1923, they were held every Thursday at noon after Grand Rounds. A stream of clinicians would leave the Domestic Building and traverse a roadway used by undertakers and suppliers of various goods to enter the autopsy amphitheater in the Allen Street Building (figure 24.3). If an autopsy was in progress, the corpse was hurriedly returned to the morgue and the primitive autopsy table covered with a white sheet. The amphitheater accommodated 130 persons and was often filled with MGH physicians as well as others who had traveled from adjoining New

England states to attend both Grand Rounds and the CPC. On the stage at various times were the discussant of the case, the radiologist, the pathologist, and the Assistant Editor. The pathologists included Dr. James Homer Wright (chapter 4), but more often Dr. Oscar Richardson (chapter 3; figure 24.3) or Dr. Harry F. Hartwell (chapters 3 and 5). There was audience participation.

The first Case Records of the Massachusetts General Hospital to appear in the medical literature was in the October 25, 1923, issue of the *Boston Medical and Surgical Journal*, in which three cases (9431–9433) were published. The Editors were Richard and Hugh Cabot (figure 24.3); the Assistant Editor was Florence M. Painter. The “Editors” were not editors in the strict sense of

the term. They did not correct the English, but sent the manuscript unexpurgated to the Journal. In one exercise, the following sequence took place: “Would you mind repeating the question, Doctor! I couldn’t hear you”; the question was repeated. Faulty English grammar and slang appeared occasionally. Apparently none of the participants was upset when his expressions of ignorance or mistakes were published for much of the medical world to see. For example, in one case, a medical student asked Dr. Richard Cabot if he had considered the diagnosis of rheumatic pneumonia. He replied, “That’s a good idea. I never thought of it.” Lower on the page was the pathologist’s diagnosis, “rheumatic pneumonia.” Three cases continued to be published in each issue of the *Journal* (and then *NEJM*) throughout most of Cabot’s tenure as Editor. References to the medical literature were not provided at this time.

**THE TRANSITION TO PATHOLOGY:
THE MALLORY ERA (1935–1951)**

When Dr. Cabot decided to retire from his clinical professorship, he concluded that a pathologist would be best qualified to identify cases that presented a diagnostic challenge. He continued to edit the Case Records until Dr. Tracy B. Mallory (chapter 6) accepted the editorship in 1935, nine years after having been appointed Chief of Pathology at MGH. He proved to be a wise choice. Unlike his father, Dr. Frank Burr Mallory, who concentrated on the identification and classification of diseases, Tracy Mallory focused on the effect of the pathological diagnosis on the care of the patient. Instead of using only a few clinical discussants, he chose a number of the young internists and surgeons who were becoming specialized in the departments of David Edsall (Medicine) and Edward

D. Churchill (Surgery). The proceedings were transcribed in shorthand and typed later by Dr. Mallory’s secretary, Edith Parris. Occasional references from the literature appeared, and the published versions occupied four or five pages in the *NEJM* (figure 24.4).

Because of the greater expertise of the clinical discussants and Dr. Mallory’s discerning expositions on what was known and what was unknown about diseases, the popularity of the CPCs soared (figure 24.5). Dr. Mallory accepted numerous offers from medical and pathological societies to demonstrate the exercises. He traveled to many cities in North America, as well as to the Caribbean and Panama, and his conduct of the CPCs was a model for future editors to emulate.

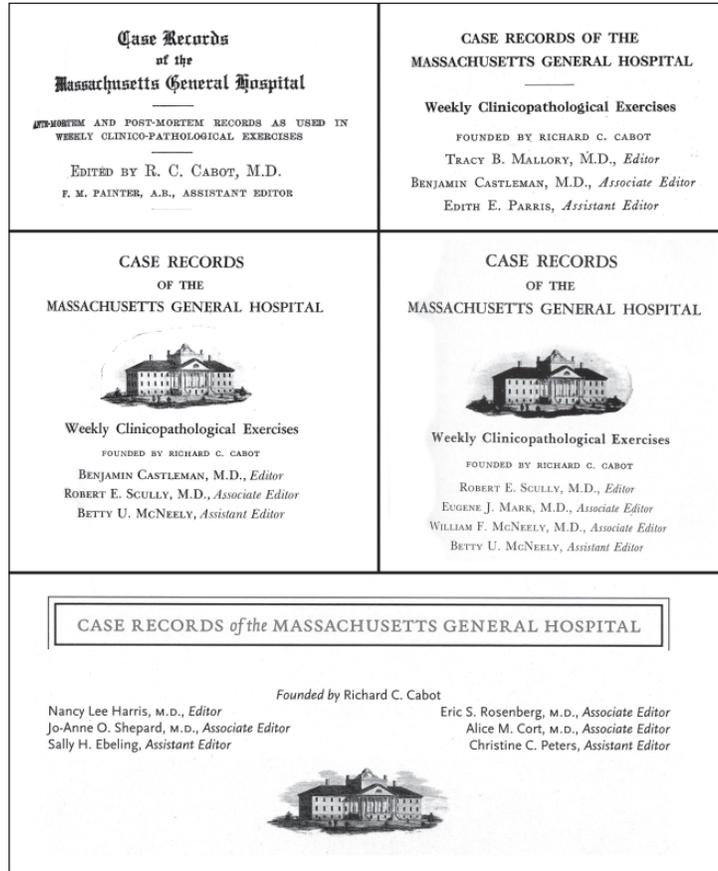


Figure 24.4 Representative mastheads over the years: top left, 1928; top right, 1949; middle left, 1973; middle right, 1987; bottom, 2008

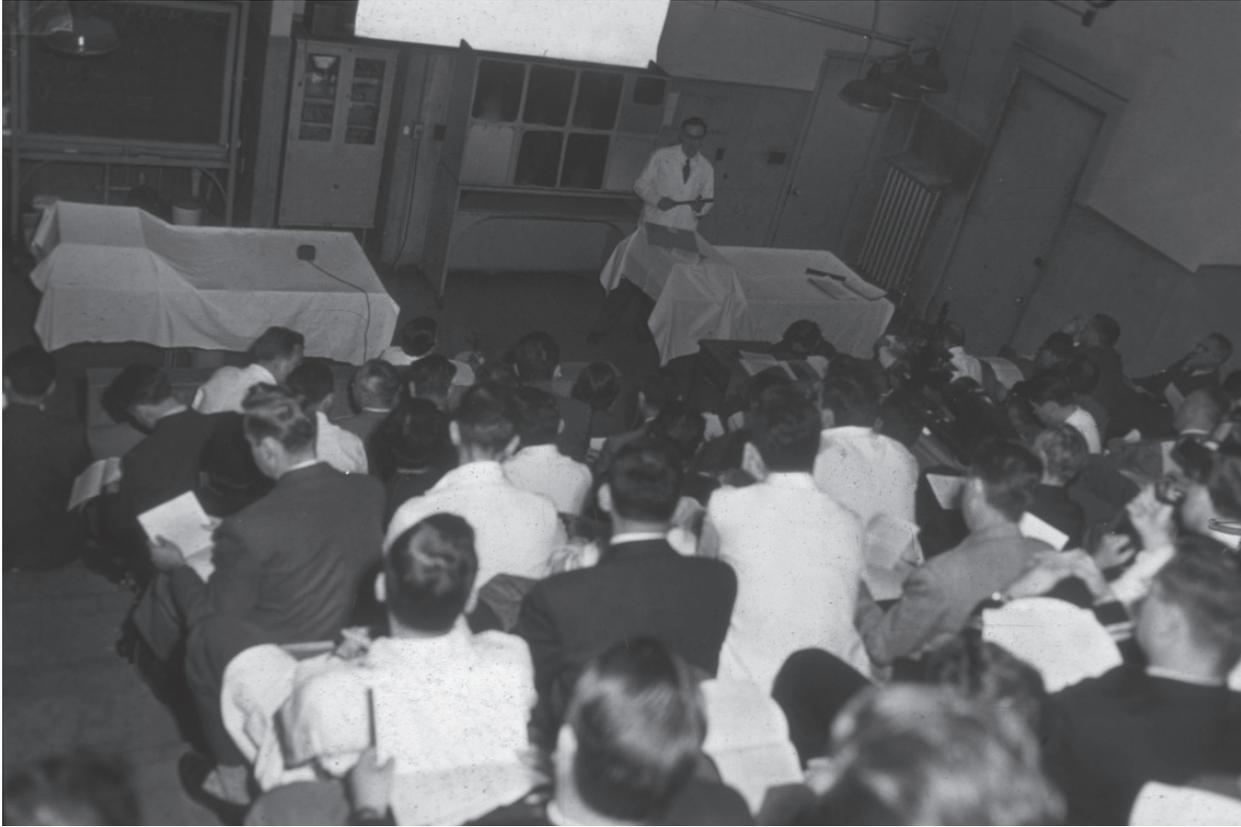


Figure 24.5 A later CPC, possibly in the Allen Street Amphitheater

THE CASTLEMAN ERA (1951–1974)

The CPCs rose to an even higher level of popularity under the next Chief of Pathology and Editor of the CPCs, Dr. Benjamin Castleman (figure 24.6; chapter 8), who has been justifiably called “Champion of the CPCs” (7, 8), which he edited for 24 years. His zeal to promote the CPCs throughout the world became evident in the mid-1940s, after he strove unsuccessfully to join Dr. Mallory, who was then in the Mediterranean theater as Chief of the Pathology Section of the 15th Medical General Laboratory. Dr. Castleman was rejected by the U.S. Army because he had recently suffered recurrent attacks of rheumatic fever complicated by symptoms of heart disease. Disappointed, he seized the opportunity to help the medical corps maintain their continuing education by obtaining a grant from the Rockefeller Foundation to distribute CPCs to the medical

pathology laboratories of all nine military commands. He also received grants from the U.S. Agency for International Development, the Eli Lilly Company, and the Rockefeller Foundation to travel throughout the world to promote the unique value of the CPC as a teaching tool.

In the early years of Dr. Castleman’s tenure as Editor, the CPCs were held at MGH on Thursdays at noon and consisted of a single long case or two “short cases” (those in which the diagnosis was made by an operation or laboratory procedure). Shortly after becoming Editor in 1951, Dr. Castleman moved most of them into the Ether Dome in the Bulfinch Building, although surgical cases were often discussed in the Bigelow Amphitheater in the recently constructed White Building. At that time the clinical protocol was prepared by the Pathology resident who had performed the autopsy or handled the surgical

specimen. The protocol was then sent to the various physicians who were involved in the patient's care for additions or corrections. The final protocol was given to a carefully chosen clinician three or four days before the exercise. After his or her discussion, a fourth-year HMS student presented the diagnoses of his group of 10 students. Their diagnoses had been made both before and after reviewing the case with their tutor, a senior medical resident. The pathologist for the case, usually Dr. Castleman, then presented the gross and microscopic findings and correlated them with the clinical symptoms and signs. After answering questions, he called on various physicians, including those who had participated in the patient's care, for their opinions. The entire proceedings were recorded and notes were taken by Dr. Castleman's secretary, Virginia Towne. The proceedings were typed within a day or two and sent to the participants for editing and corrections. After their revisions were returned, the manuscript was re-edited and retyped before being sent to the *NEJM*. The cases were reviewed again at the



Figure 24.6 Benjamin Castleman reviewing a chart for a CPC

MGH in galley and page-proof forms, and all versions were then rushed to the offices of the *NEJM* by taxi to meet the deadlines. Each exercise was a time-consuming task for the Editor.

In 1953 Dr. Castleman was invited to discuss the Clinicopathological Conferences at the First World Conference on Medical Education (9). In his presentation, which was well received by the participants of the conference, the history of the CPCs and the several ways in which they were then being used at the MGH were presented. Dr. Castleman emphasized that the ideal CPC was one in which the speaker gives a reasoned discussion without fretting about whether he might be missing the final diagnosis. He also pointed out the increasing difficulty in finding cases that were suitable for selection. In the early days, for example, only skilled physicians could diagnose subacute bacterial endocarditis, and, consequently, almost every case proved to be an excellent choice for a CPC. As that disease became increasingly easy to diagnose for most *NEJM* readers, however, only occasional cases in which the disorder had unusual manifestations could be selected.

In addition to the main CPC, Dr. Castleman conducted several others for HMS students. He used them for second-year students when they were studying anatomic or clinical pathology, matching the case with the subject being covered in the lecture material of the day and demonstrating how the lecture information could be used in the management of a patient's disease. During the clinical years, the CPCs were used to teach the students the natural history of a disease, which may not have been evident during a single contact with the patient. For these CPCs each student received the clinical protocols one week before the CPC and submitted a differential diagnosis in writing at the conference. An internist who had not received the clinical protocol was selected to discuss the case with the students step-by-step. For students who were taking an elective course in surgery, Dr. Castleman brought a number of refrigerated gross specimens associated with

interesting clinical histories. He gave each history and showed pertinent X-ray films to the students for their discussion and then correlated their diagnoses with features of the gross specimen and the microscopical findings of the case.

In his early years as Editor, Dr. Castleman had become aware that more and better-trained personnel were essential to upgrade the CPCs as they appeared in the *NEJM*. For example, the following question had recently ended one case: Dr. Jacob Lerner: "What did the spleen show?" There was no answer. In 1956 responsibility for preparing the CPC protocols was transferred from the resident most closely related to each case to a junior faculty member, Dr. Leonard Atkins, and Betty U. Kibbee (later McNeely) (figure 24.7), a very bright woman who had gained experience in medical editing by working with Dr. Stanley J. Robbins at Boston City Hospital, was hired. In 1970 Dr. William F. McNeely, an excellent clinician who had become Betty Kibbee's husband, replaced the overburdened Dr. Atkins. In 1974 the talented Sally H. Ebeling became a secretary to Betty McNeely, and more assistants were added later.

After 1951, Dr. Castleman had begun to travel extensively, initially to Cuba, Mexico, Central America, the Caribbean Islands, and South America, and finally to Asia. During most of these trips, he conducted CPCs and gave pathology lectures. He did not visit Africa, but the Eli Lilly Company included African as well as other underdeveloped countries in their distribution of cases. Dr. Castleman's enthusiasm and showmanship were such that his audiences were greatly impressed by his presentations. In early 1961 he was a guest speaker at the fiftieth anniversary of the Japan Society of Pathologists, along with Erich Letterer of Tübingen, Germany (for whom Letterer-Siwe disease was named). While there, Dr. Castleman visited six Japanese medical schools to present CPCs. Later that year he received a grant from the Rockefeller Foundation to spend four months at the All India Institute



Figure 24.7 Robert Scully and Betty McNeely

of Medical Sciences in New Delhi, which was directed by Dr. Vulimiri Ramalingaswami. He presented CPCs at hospitals in most of India's large cities and traveled to many neighboring countries for the same purpose. Because of his long absence, Dr. Castleman appointed Dr. Robert E. Scully as unofficial Acting Editor of the CPCs until his return.

In 1960, Dr. Castleman began to senior-author five books that revisited older cases, which were considered unusually valuable for teaching purposes. He appointed as coauthors pathologists or clinicians who would either reinterpret the case in the light of contemporary knowledge or, if they agreed with the diagnosis, would update progress made on the disease; occasionally the original discussant redid the case. Each book featured selected cases relating to medical, surgical, neurologic, cardiac, or bone and joint pathology.

The first major criticism of the CPCs occurred in 1971, after Dr. Castleman had selected a case in which a patient had complex clinical problems, particularly gastrointestinal, cardiac, and cerebral. The clinical discussant was Dr. Stephen E. Goldfinger, an Assistant Physician at MGH and an Assistant Professor at HMS. He considered the data presented inadequate to support any diagnosis, and he converted his discussion to one referred to as "problem-oriented," comparing his

step-by-step approach to the case to that of the patient's primary physician. Several other physicians on the MGH staff, as well as senior medical residents, stated at the exercise that they were also using the problem-oriented approach with their students.

The *NEJM*, then edited by Dr. Franz J. Ingelfinger, delayed publication of the CPC until an invited editorial written by Dr. Lawrence L. Weed, a medical educator at Case-Western Reserve University and a staunch supporter of the problem-oriented CPC, was ready to be published (10). Dr. Castleman did not reply to Dr. Weed's editorial despite the presence of several contestable opinions among the latter's remarks. For example, Dr. Weed stated that he relied on the pathologist to analyze the clinical record and prepare the protocol for the discussion, after making the determination whether the X-rays that had been taken were superfluous and incorporating the input of "social workers, psychiatrists and physical medicine 'people' into the protocol." Such a complete protocol would have been impossible for the MGH, with its small CPC budget, to produce, and for the *NEJM*, with its limited space, to publish.

THE SCULLY ERA (1974–2002)

Following Dr. Castleman's decision to retire as Chief of Pathology at MGH and Editor of the Case Records in 1972, Dr. Robert E. Scully (figure 24.7; chapter 10) became Associate Editor of the Case Records. Two years later, he became Editor, under the new Chief of Pathology, Dr. Robert T. McCluskey (chapter 14). Dr. Scully agreed to choose the cases and edit them, but he changed the format by having the participating pathologist (rather than the Editor, as had happened under Drs. Castleman and Mallory) present the diagnostic procedure and discuss the clinicopathological correlations. Dr. Scully personally edited almost every case, often going to the hospital library to check on the accuracy of literature citations. Like Dr. Castleman, he was

eager to spread the popularity of the CPCs, and he gave them at other hospitals and (in the last five years of his tenure) at HMS for second-year students, where they were highly rated.

By the time Dr. Scully had become Editor, there had been a gradually developing distaste for CPCs on the part of many leading members of the medical staff. Some of these physicians preferred to publish or allow their fellows to publish case reports of patients that could have become excellent CPCs if available. (*NEJM* had always refused republication of CPC cases that had appeared or were expected to appear in the literature as case reports.) Other leading members of the staff stated that they were too busy with their research to participate in CPCs. Fortunately, some staff members continued to value these predominantly diagnostic exercises by either suggesting possible cases for use, agreeing to discuss CPCs, or both. Despite these problems, Dr. Scully was able to identify CPCs during the 27 years of his tenure as Editor. He had the indispensable help of enthusiastic clinicians, neuropathologists, and (from 1981 to 2002) Associate Editor Dr. Eugene J. Mark. Dr. Mark, with his grasp of the literature on bronchopulmonary and dermatologic diseases, identified approximately one-third of the cases and also assisted in editing them.

A second major criticism of the CPCs appeared in the "Sounding Board" section of the *NEJM* in 1979, during Dr. Arnold S. Relman's tenure as Editor. Dr. Mark Lipkin, an authority on patient care from the National Humanities Center, Research Triangle Park, North Carolina, was the "antagonist," and Dr. Scully was the defender of the exercises in their form at the time. The discussion reflected the continued problem of critics pleading for more information to be included in the CPCs. Dr. Lipkin's letter had been prompted by a case in which a patient had a clinical course complicated by multiple psychological and financial issues. There had been careful consideration of those factors in the decisions that had been made by the patient's physicians. Dr. Lipkin

objected to the absence of such information in the published case; Dr. Scully informed him that inclusion of these factors in the protocol would have made the CPC far too long to be published by the *NEJM*. The “Sounding Board” debate had an encouraging message for Dr. Scully. A poll of *NEJM* subscribers disclosed that 56 percent of them read at least three CPCs per month, and only 5 percent never read them. Also, over 200 hospitals throughout the world subscribed to the “lantern slides” of the CPCs and reenacted each CPC at their own institutions. In a later issue of the *NEJM*, Dr. Relman published six of the most interesting letters to the editor regarding the Sounding Board, along with replies to them by Drs. Lipkin and Scully (11). Dr. Relman also stated that “the great majority” of the more than 40 writers favored retention of the CPCs in their current format.

Dr. Scully’s tenure as Editor was marked by a continuation of his predecessors’ emphasis on differential diagnosis. Toward the end of his career, he reviewed at random about one-third of the CPCs that he had edited during the two-year period 1998–2000. Almost all the diagnoses had been easy for the expert discussants, most of whom had been from other hospitals in Massachusetts. In 10 percent of cases, an origin in or a visit to a foreign country was the major diagnostic clue. In about 30 percent of cases, the diagnosis was judged to be esoteric, but the discussants included a wide differential and long bibliography, which made them valuable to the general readership. Notably, in only about 20 percent of these cases did autopsies provide the end-point of the exercise, the majority now being provided by other diagnostic means. Although the paucity of autopsies had forced Dr. Scully to resort to the so-called short cases that Dr. Castleman had used extensively, those cases now almost invariably explained the patient’s signs and symptoms, thanks largely to advances in medical imaging and other diagnostic tests, as well as progress in understanding many diseases. Treatment of the

diagnostic entity was discussed in most of the cases when it was appropriate to do so. Dr. Scully concluded that the majority of the cases that he had selected were educational for general clinicians and supervised medical students.

The most entertaining CPC published during Scully’s tenure appeared in the *NEJM* on December 16, 1976 (12). The subject was the third patient admitted to the hospital, in the Bulfinch Building, a 30-year-old male saddler who had acquired a syphilitic chancre in New York City in 1819. He was referred to the MGH with widespread disease caused by tertiary syphilis and the ineffectual therapy of that era. A prominent symptom on entry was his coughing up of necrotic fragments of bone from the nose and throat. No laboratory tests were performed. (Microscopes were generally not used in the United States until the middle of the century; therefore, even primitive laboratory observations could not be made.) The clinical discussant was the scholarly Professor of Pathology and notable medical historian Dr. Guido Majno of the University of Massachusetts Medical School. He began by commenting that the patient’s referral to MGH proved that the hospital had been considered a medical mecca even at the time of its founding. He added, however, that the treatment rendered at the hospital



Figure 24.8 Robert Scully at the podium in the Ether Dome, moderating a CPC

was so poor that he would “perform an autopsy on [its] ancient clinicians.” He criticized the oral administration of mercury, which was not only useless therapy for syphilis, but a poison that caused vomiting, diarrhea, and polyneuritis. The patient died after an unpleasant seven months in the hospital. Dr. Scully presented the findings of an unsigned “autopsy,” which was limited to an examination of the neck area and was probably performed by one of the patient’s physicians, who usually did limited autopsies before the hospital had its first pathologist (chapter 1). The gross examination revealed no more about the neck than was evident clinically, but it apparently satisfied the curiosity of its prosecutor. The case presentation, described by a local newspaper as a mixture of tragedy and black comedy, was warmly received by the audience.

In 2002, Dr. Scully resigned as the longest-serving Editor of the Case Records (figure 24.8). During his career he had been warmly praised in this role by Dr. Castleman, who had chosen him as his successor, as well as by the subsequent Chiefs of MGH Pathology, Drs. McCluskey and Colvin.

THE HARRIS ERA (2002–PRESENT)

A search process led by the Chief of Pathology, Dr. Robert Colvin, selected Dr. Nancy Lee Harris (figure 24.9; chapter 16), as the new Editor. Dr. Harris had discussed the pathology of 38 cases during her first decade at MGH and had long seen the CPCs as a unique vehicle for educating both clinicians and pathologists regarding the contributions of pathologists to patient care and education. In fact, she had cited the CPCs as an important factor in her decision to remain on staff at MGH after her fellowship. After discussions between Drs. Colvin and Jeffrey M. Drazen, Editor in Chief of the *NEJM*, and commitments of support from MGH leadership, she was appointed Editor of the Case Records in January 2002 and also became a part-time Deputy Editor at the *NEJM*.



Figure 24.9 Nancy Harris at the podium in the Ether Dome, a typical venue for a CPC

At the time the CPCs had a number of ongoing challenges, including identifying suitable cases and discussants, attendance at the conference, reader interest at the *NEJM*, and financial support. By the late twentieth century, advances in diagnostic techniques decreased the number of cases that were real diagnostic mysteries. Advances in treatment modalities meant that physicians often spent more of their efforts on formulating appropriate treatment plans than on differential diagnosis. These changes in practice made it increasingly difficult to find suitable cases for the traditional CPCs, and the cases became more and more esoteric and specialized. This further meant that they were of less interest to generalists or to specialists in other areas, whether they were practicing at MGH or reading the *NEJM*. In addition, the *NEJM* had decreased the frequency of publication of the Case Records from 52 to 40 per year in the late 1990s.

The challenge for Dr. Harris as the new Editor was twofold: to ensure the ongoing support of

MGH and the *NEJM* for these exercises; and to reformat the CPCs to meet the changing needs of both MGH physicians and the readers of the *NEJM* (13). Dr. Harris was successful in arguing to MGH and *NEJM* administration that additional financial resources would be needed for the CPC budget, which resulted in a substantial infusion of funding for the production of the Case Records. To tailor the scope of the discussions more closely to current practice, she included many more cases that emphasized problems in management. For these cases the format follows that of most modern clinical working conferences, with a clinical history, presentation of relevant imaging studies, discussion of the pathologic diagnosis that focuses on new diagnostic techniques, new information about classification or pathophysiology, and prognostic or predictive factors. The clinical discussion focuses on timely or controversial issues in prevention, diagnosis, prognosis, or therapy. After the discussion is concluded, the treatment chosen and the patient's outcome are presented.

Cases that illustrate differential diagnostic problems are still conducted in the more traditional, diagnostic mystery format. Other cases, however, are discussed by the physicians who cared for the patient and who discuss their diagnostic thought processes. In still other cases, the discussant is an expert who did not see the patient but is told the diagnosis beforehand so that she or he can usually give a more thorough discussion of the disease than would be possible when assigned an unknown case. With this last approach, newly recognized diseases, such as West Nile Virus encephalitis and H1N1 influenza A virus infection (14) have been highlighted. In many cases there are interesting issues in both diagnosis and management, and both can be emphasized in the same Case Record.

Another category of case has been that of "hot topics." Cases that illustrate issues of current interest, or that complement original articles running in the same issue of the *NEJM*, are identified

when possible. Examples have included a woman burned in the Station nightclub fire in Rhode Island (presented at Surgery Grand Rounds and published on the anniversary of the fire) (15); a young woman with a brain abscess after being swept up in the Indonesian tsunami who was treated by MGH physicians aboard the USNS *Mercy* (presented at Medicine Grand Rounds, with a video link to physicians still on the ship, and published on the day the *Mercy* returned to port) (16); a case of highly drug-resistant tuberculosis in a South African woman (presented at the Conference on AIDS and Tuberculosis in Durban, South Africa, and published in an issue of the *NEJM* highlighting the global AIDS and TB epidemics) (17); a highly publicized case of intestinal anthrax (18); and a case of wrong-site surgery (19).

The CPCs have traditionally highlighted the contributions of pathologists—both anatomic and clinical—to patient care, and cases are still preferred in which pathologists make key contributions to clinical diagnosis. There are nonetheless many fascinating and instructive cases in which physical findings and clinical judgment have outweighed any laboratory test or imaging study in determining the diagnosis, treatment, and outcome of the patient, and some of these have been included as CPCs, despite the lack of a pathological diagnosis. In this era, imaging techniques are also sometimes critical; for this reason, radiologists and cardiologists who make contributions to the cases are given equal billing with the pathologists and clinicians as coauthors.

Finally, to broaden the participation of the hospital community in the CPCs and to ensure an audience of interested physicians, the free-standing CPC was changed to sessions that are rotated among the various departmental Grand Rounds and subspecialty conferences. To provide help in finding cases and discussants and to ensure that the CPCs will be clinically relevant, a clinical advisory committee was formed, composed of representatives of the different clinical



Figure 24.10 Current members of the CPC team. Left to right: Alice Cort, Nancy Lee Harris, Eric Rosenberg, Sally Ebeling. Not pictured: Jo-Anne Shepard and Christine Peters

specialties. Each major contributing department (Medicine, Surgery, Pediatrics, and Neurology) now has a separate committee to support the CPCs. Moreover, a policy on authorship was developed together with the *NEJM* so that discussants are listed in Medline (in contrast to the old system, in which there were either no authors listed or only the editors): authors must have a speaking role at the conference and prepare text, references, and images (as appropriate), and clinical discussants must be faculty members, not trainees, because of the authoritative nature of the CPCs. Trainees are invited to present the case history and follow-up and are named in the body of the published Case Record. As a result of these changes, the clinical departments have become more active in proposing cases for discussion, and the mix of cases has become more varied.

In addition to changes in the format of the CPCs, there have been changes in personnel under Dr. Harris. Dr. William F. McNeely, who

had written the clinical case histories for over 30 years, retired in 2004, and this role was taken over by Dr. Alice M. Cort, an internist who had been preparing some of the histories since 2002 and who became an Associate Editor in 2006. Dr. Eric S. Rosenberg, Codirector of the Microbiology Laboratory and an infectious diseases physician, was also recruited as Associate Editor in 2006, with responsibility for organizing and editing some of the CPCs. Dr. Jo-Anne O. Shepard continued as the Associate Editor for Radiology, assisted by the subspecialty heads; she identified radiologists for specific cases. Invaluable assistance is provided by two Assistant Editors, Sally H. Ebeling and Christine C. Peters, who organize the conferences, transcribe and initially edit the proceedings, and assist in handling revisions, galleys, and page proofs, as well as letters to the editor (figure 24.10); by Stephen Conley and Michelle Forrestall Lee of the Pathology Photography Laboratory; and by the Radiology Educational and Media Services.

Today the CPCs remain popular at MGH, well attended by both practitioners and trainees in most departments. One conference a month occurs at the Medicine Case Conference, attended by Medicine house staff and teaching faculty; this audience comes the closest to the original one for the CPCs. The Medicine Service also now regularly schedules CPCs on internship interview days, when applicants can attend, on the assumption that their attendance at the CPCs improves recruitment. In addition to their popularity at the MGH, *NEJM* readers consider them an important component of the journal. The *NEJM* Web site tallies the hits on each feature, and the CPCs have generally been in the top 3 during the week after their publication, averaging about 30,000 views (more than for many original articles).

CONCLUSION

The Case Records have had an illustrious history in medical education around the world. They are

a forum in which experienced clinicians, radiologists, and pathologists demonstrate the application of recent medical advances to the diagnosis and management of an individual patient's disease. Over the course of their history, the mission and the format of the CPC have been reevaluated, in response to changes in the practice of medicine and the needs of medical practitioners and trainees. The current mission of the CPC remains an update to Richard Cabot's original concept: to educate physicians in new approaches to the diagnosis, classification, and treatment of disease, and in how to use this information for determining patient management, using "the study of actual cases of disease" (3). In this way, the CPCs should continue to have an ongoing influence on the practice of medicine around the world.

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