

## The Mayo Clinic World War II Short Course and Its Effect on Anesthesiology

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WORLD War II changed American medicine. Physicians were recruited in unprecedented numbers because the armed services needed specialists to care for the troops both in and out of combat. The need for physicians who were able to administer anesthetics to injured soldiers was of paramount concern. To accelerate training, the armed services created postgraduate courses to teach the fundamentals of the specialty. These courses were set up across the United States in places like the University of Wisconsin in Madison, Wisconsin; Bellevue Hospital in New York City, New York; Harvard University in Boston, Massachusetts; and the Mayo Clinic in Rochester, Minnesota. These trainees returned to civilian medicine after the hostilities ceased.<sup>1</sup> How were these courses set up? Did the graduates continue to practice anesthesia after the war? Were these physicians responsible for the tremendous postwar growth of anesthesiology, as has often been theorized?

### The Short Courses

In the 1930s, the New York Society of Anesthetists, which transformed itself into the American Society of Anesthetists (ASA), helped to create an infrastructure for the specialty. The American Board of Anesthesiology (ABA) was incorporated in 1938 and held the first written examination in 1939.<sup>2</sup> At this time, there were two ways to become board certified. The first, and most familiar to the modern reader, was 3 yr of postgraduate training in an accepted residency, although there were no written requirements to define acceptable *versus* unacceptable training. The second method was to have been in the exclusive practice of the specialty for 7½ yr with proof of administration of more than 2,500 anesthetics. There were a number of physicians who practiced less than full-time anesthesia and thus were not eligible for board certification. However, there were insufficient numbers of physician anesthetists to give

anesthesia in every operating room in the United States, a situation no different than the present day.

In World War I, American Forces Medical Corps were unprepared for the massive casualties that resulted. At the declaration of war in 1917, there were no physician specialists in uniform. Most likely as a consequence of the lack of expertise, there were limited equipment and personnel available for the administration of anesthetics. Coupled with the lack of rank by American physician anesthetists, anesthesia was not administered at a level consistent with the best practice possible. This lesson was brought home by James Gwathmey, M.D. (physician specialist in anesthesia in New York City, New York, and first President of the Associated Anesthetists of America), Paluel Flagg (New York City physician anesthetist, creator of the Flagg Can for ether administration, and Founder of the Society for the Prevention of Asphyxial Death), and others.<sup>3</sup> In 1940, the ASA was unwilling to let this problem recur as evidenced by the cooperation of the ASA leadership with the National Research Council.||

The National Research Council developed a subcommittee on anesthesia chaired by Ralph Waters, M.D. (Chairman), and consisting of Emery Rovenstine, M.D. (Secretary), John S. Lundy, M.D., Henry Ruth, M.D., Henry K. Beecher, M.D., Paul M. Wood, M.D., Ralph Tovell, M.D., and Lewis S. Booth, M.D.<sup>1</sup> The subcommittee did two interesting things. First, they developed an accelerated anesthesia training program. Second, they canvassed the current resources of American anesthesiologists.

The scope and breadth of the committee speaks to the difficult task they were chartered to accomplish. Waters (1884-1979) was Professor and Chair of the Department of Anesthesiology at the University of Wisconsin in Madison, Wisconsin, and ASA President in 1945. He was a member of the ABA Board of Directors (ABABOD). Rovenstine (1895-1960) was Professor in the Department of Anesthesiology, New York University, in New York City, New York, a member of the ABABOD, and ASA President 1943 and 1944. Lundy (1894-1973) was Professor and Head of the Section of Anesthesiology at Mayo Clinic in Rochester, Minnesota, and a member of the ABABOD and founder of the Anesthetists Travel Club. Ruth (1899-1956) was the first Editor-in-Chief of ANESTHESIOLOGY. Beecher (1904-1976) was the Henry I. Dorr Professor of Anesthesiology, Harvard Medical School, and Anesthetist-in-Chief at the Massachusetts General Hospital, Boston, Massachusetts. Wood (1894-1963) was the Secretary-Treasurer of the ASA, a World War I combat veteran, and a member of the ABABOD. Tovell (1901-

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|| Medical preparedness. ASA Newsletter 1941; 4(1):2.

**Table 1. Grading of Anesthetists on the Basis of Known Clinical Ability**

Class 1	Poor anesthetist	Does some clinical anesthesia, uses limited number of techniques
Class 2	Fair anesthetist	Is capable of inhalation techniques for ordinary surgical procedures
Class 3	Good anesthetist	Satisfactory clinical anesthetist, employs all methods
Class 4	Excellent anesthetist	Uses all agents and methods with well-developed skill

Classification and definitions of anesthesiologists from a letter from E.A. Rovenstine to the Subcommittee on Anesthesia, Division of Medical Sciences, National Research Council, November 27, 1940.

1967) was the chair of the Department of Anesthesiology at Hartford Hospital, Hartford, Connecticut, had trained with Lundy at the Mayo Clinic, was a member of the ABABOD, was ASA President in 1941, and was soon to be activated by the US Army. Booth (1885-?) was an attending Physician Anesthetist at the Roosevelt and Doctor's Hospital, New York City, New York.

The courses were to be offered only at Flexner class A medical schools with established departments of anesthesia and with a chairman who was certified by the ABA. Certain military hospitals handling a large volume with adequate staff were also included.<sup>#</sup> Interestingly, the Mayo Clinic at the time did not have a medical school but had a collaborative agreement with the University of Minnesota School of Medicine in Minneapolis.<sup>4</sup>

The committee delineated the ideal staffing for the course. There was to be a professor of anesthesia or hospital department director and one staff instructor for every two or three students. Equally ambitious was the proposed curriculum. Although the committee felt that 2 yr was the necessary training period for a fully competent anesthesiologist, they realized that increasing the intensity of the experience could shorten the time. They made two proposals, one for 6 months and another for 6 weeks. The latter contained a distilled curriculum that could not be abridged if any level of competence was to be assured. The curriculum stipulated that students were to spend 6 h daily in the operating room, round on their patients preoperatively and postoperatively, attend didactic sessions, and take quizzes. In addition, they were to attend all hospital meetings and spend 24 h on the consultation service for pain relief concerns and respiratory and circulation problems. All forms of anesthesia were taught, including general and regional anesthesia.<sup>#</sup> The final curriculum was published twice, in 1942 and 1944, in a book entitled *Fundamentals of Anesthesia*.<sup>5</sup> The book was intended as a reference for those dealing with wounded soldiers in a state of circulatory or respiratory collapse. Published by the American Medical Association, it demonstrates the multiple roles

physicians on the committee played. The ABA at that time had an intimate relationship with the American Medical Association, and the founding members of the ABA were likewise ASA officers because they negotiated with the American Medical Association over the foundation of the board less than 4 yr before developing the short courses for the armed forces.

### Who Should Teach?

Second, the committee rated all of the known anesthesiologists across the country on a subjective scale (table 1). Although the method used to evaluate these specialists was not recorded, it can be surmised that the members of the committee relied on personal knowledge and reputation. All members of the committee, except Beecher, were members of the Anesthetists Travel Club. This organization held meetings across the country where clinical demonstrations were the main focus. Thus members of the Travel Club would have seen anesthesiologists working in their "home" practices. Physicians were further defined as having either teaching or executive ability or both.|| The course directors and teaching staff were drawn from the pool of anesthesiologists who had both teaching and executive ability. Ansel Caine, essentially a private practice anesthesiologist from New Orleans, Louisiana (1882-1961), serves as an example. Ralph Waters, the committee chair and an old friend of Caine's from the Anesthetists' Travel Club, sent him a telegram on October 6, 1940. Waters inquired whether Caine and his partner could arrange for a course of instruction teaching all phases of anesthesia that was both 6 weeks' and 6 months' duration. Caine replied that he would.\*\* Rated as a class 3 anesthesiologist, he was noted to have considerable teaching experience.

By early 1942, a revision to the subcommittee's curriculum was circulated to the National Research Council. As a compromise, the course was changed to 12 weeks for physicians "without previous experience in anesthesia."†† Students were still expected to work in the operating room for 6 h a day, round on their patients, and attend all didactic sessions. The course was intense and included a weekly review of the current anesthesia literature, thus assuring that the students were studying the most current information.††

<sup>#</sup> Letter from E. A. Rovenstine to the Subcommittee on Anesthesia, Division of Medical Sciences, National Research Council, November 27, 1940. Collected Papers of Henry Ruth, M.D., Wood Library-Museum of Anesthesiology, Park Ridge, Illinois.

\*\* Telegram from Ralph Waters to Ansel Caine, October 6, 1940. The Collected Papers of Ansel Caine, courtesy of Curtis Caine, New Orleans, Louisiana.

†† Revision of Proposed Plan for Training Officers of Medical Corps in Anesthesiology in the Present Emergency (March 1942). The Collected Papers of John Lundy, Mayo Foundation Archive, Rochester, Minnesota.

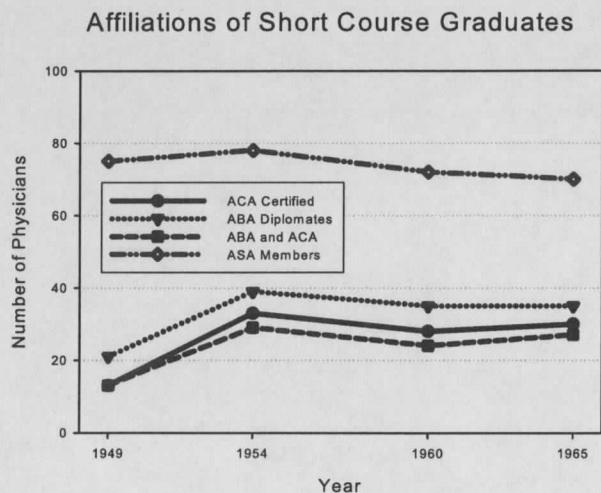


Fig. 1. This graph shows how many of the 184 Mayo Clinic graduates of the World War II short courses in anesthesia subsequently joined the American Society of Anesthesiologists (ASA). Also shown is the number of graduates who were certified by the American College of Anesthetists (ACA), the American Board of Anesthesiology (ABA), or both.

### The Mayo Experience

One of the first sites to be activated for this type of training was the Mayo Clinic in Rochester, Minnesota. The Clinic trained a multitude of medical officers in all disciplines.†† John Lundy, the chair of the section, headed the anesthesiology course. As a member of the subcommittee, Lundy helped to develop the curriculum and developed a textbook, published in 1942.<sup>6</sup> The index of the text follows the course outline developed by the committee almost identically. In the preface to his book, Lundy wrote, "Recently, because of the present emergency, I was asked to modify the arrangement of the material in this book, to make it useful for military as well as civil use." Lundy also edited *The Anlet A.A.*, a newsletter composed of letters written to the course directors from the course graduates in the field, explaining practice conditions and suggesting changes in the course.§§

The Mayo Foundation kept records of all physicians who trained during World War II. Importantly, the grading sheets were kept as well. These sheets recorded the progress of the officer through the course with four gradations: unsatisfactory, satisfactory, good, and excel-

†† Courses of Instruction under the auspices of the Mayo Foundation for Medical Education and Research, University of Minnesota, for Officers of US Army, US Navy, US Public Health Service and the Air Force, Assignments for July 5, 1942. Mayo Foundation Archive, Rochester, Minnesota.

§§ The Collected Issues of the *Anlet A.A.* Edited by Lundy JS. Wood Library-Museum of Anesthesiology Collection, Park Ridge, Illinois.

||| Grading sheets for the Anesthesia Course 1942-1945. Mayo Foundation Archives, Rochester, Minnesota.

## Data from the Directory of members, American Society of Anesthesiologists, 1949, 1954, 1960, 1965. Wood Library-Museum Collection, Park Ridge, Illinois.

lent. Personal comments on each candidate were sent to the war department as well. The comments range from "I believe that he can carry on a department of anesthesia for a small hospital and by small I mean 500 beds" to "This man should not be assigned to anesthesia. He has been kept for the whole course in the hope that we might get an average result. I have failed completely."|||

Of the 184 physicians who finished the course at Mayo, only 3 were rated as unsatisfactory. This low failure rate of 2% leads to the conclusion that these students must have been quite motivated. One reason that these physicians may have been highly motivated stems from the fact that their successful certification as a specialist physician would allow them to practice further from the front, *i.e.*, not in a battalion aid station, and in larger medical units, in safer and more pleasant locations. For others, this was their first exposure to a new discipline in medicine, which may have heightened their interest. However, as Lundy notes in his grading sheets, some of the candidates had significant anesthesia experience, including some candidates with postgraduate training in the specialty.||||

### After the War: The Mayo Graduates

Of the 184 short course anesthesia graduates from the Mayo Clinic, how many entered a career in anesthesiology? The answer cannot be ascertained directly, but the directories of the ASA may well hold the key to determining an answer. The list of physicians who completed the anesthesia short course was compared to the 1949, 1954, 1960, and 1965 ASA Directories. The directories were chosen for two reasons. First, to be listed, the physician had to be a dues-paying member of the ASA. Although the cost of dues may have inhibited some physicians practicing anesthesia from joining the ASA, these directories remain the best way historically of delineating who was interested in the field and what certifications they may have obtained. Therefore, it is highly unlikely that a physician uninterested in the field would pay to be a member. Seventy-five (41%) of the Mayo trainees became ASA members by 1949, with a high of 78 (42%) in 1954 (fig. 1).##

Second, the ASA directory lists certain qualifications in anesthesiology such as being certified by either the ABA or the American College of Anesthetists. By 1949, 13 students had become certified by both the College and the Board, whereas a total of 21 of these physicians were ABA certified. By 1954, 33 were certified by the College, 39 were certified by the ABA, and 33 held both certifications (fig. 1). This growth in the number of graduates recognized by the ABA parallels the total growth of all ABA diplomats after World War II (fig. 2). In the ensuing years, the numbers slowly decreased as these physicians retired, left the field, or died.



## ABA Diplomates

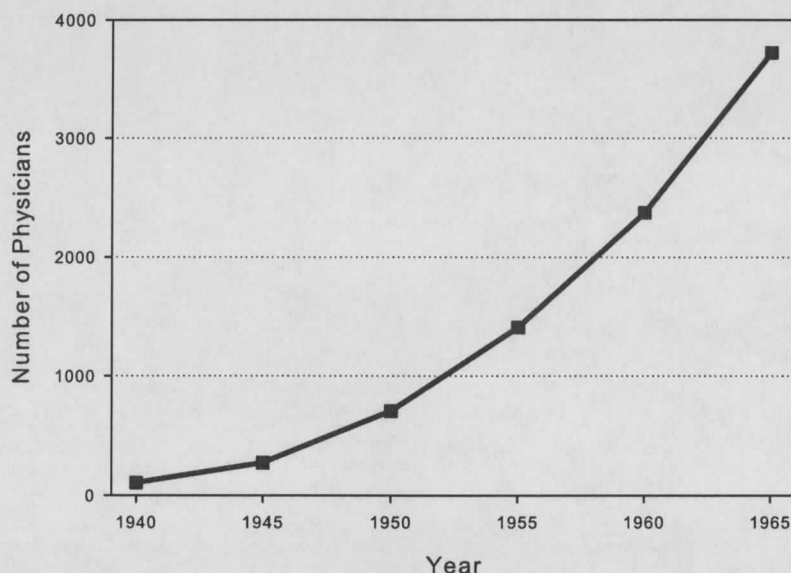


Fig. 2. This figure shows the number of physicians certified by the American Board of Anesthesiology (ABA) from 1940 to 1965, the period when the short course graduates entered the field. Data were provided by the ABA.

### How the 90-Day Graduates Changed Anesthesiology

How did the short courses change the specialty? They trained more physicians in total number, and more quickly, than in civilian practice before the war to provide anesthesia. They trained different physicians, ones who were assigned to anesthesia and might not have chosen anesthesia as a career in civilian life. They taught them a different curriculum, emphasizing regional anesthesia. These changes set in motion a revolution in modern American anesthesiology. The demographic "anesthetist boom" may have longer reaching implications in workforce staffing, perhaps even to the present day.

When these physicians returned from the military, two interesting changes occurred. First, many of the physicians sought further residency training. They had a tremendous clinical experience; what they lacked was the scientific underpinnings of the specialty. There were so many candidates that residency slots were difficult to obtain. It was common to postpone residency a year or two doing research or another clinical activity as these physicians waited for a position to become available in the desired training program (Richard Ament, M.D. World War II physician, postwar anesthesia resident, and 1977 ASA President; 1919-1998; personal communication, May 24, 1993).

Second, Rovenstine created a meeting to accommodate the unique needs of the returning veterans. Dubbed "The Post Graduate Assembly" or "The PGA," it was a meeting where a topic was covered in depth from cutting-edge basic science to its clinical implications. The returning short course graduates had a tremendous clinical experience, but the course did not permit them time

to learn the basic science underpinning the clinical art. The Post Graduate Assembly was an attempt to bridge this gap. Because of the desire these young men had to learn their newly chosen field, the meeting was, and has remained, a great success.<sup>7</sup>

Finally, one of us (A.D.S.) on scanning the list of Mayo graduates recalled meeting at least 10 of these individuals early in his career—including several whose names may be recognized even today (at least in Minnesota). Examples include Albert Faulconer, Robert Hingson, James Flautt, James Crowley, and John Osborn.

### Conclusions

The World War II short courses were an important step in exposing young physicians to the intricacies of anesthesiology. Being taught both regional and general anesthesia, and associated techniques such as tracheal intubation, these veterans helped to foster the tremendous postwar growth in the specialty. Forty percent of the physicians trained at the Mayo Clinic short courses became practicing anesthesiologists and ASA members; half became diplomates of the ABA, whereas 55% held either ABA or American College of Anesthetists certification. It is reasonable to speculate that similar courses conducted at other institutions, such as Bellevue Hospital in New York City, The University of Wisconsin in Madison, and the Massachusetts General Hospital, contributed similarly to the tremendous postwar growth in anesthesiology.

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