The Origins of Modern Anesthesia throughout the American Experience Spanning the World Wars

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This paper was the recipient of the first prize award in the 1998 AHA Resident Essay Contest presented by the Anesthesia History Association.

Warfare throughout the last century has often influenced the speed and manner in which advances in many scientific fields have been practically applied. A dynamic relationship has existed between the conduct of warfare and concurrent scientific progress whereby one has been invariably influenced by the other. The requirements of strategic and tactical military operations that have dictated how armed conflict is planned and concluded have also affected the processes by which civilian services were modified to meet the specific needs of a wartime army. The field of anesthesiology benefits from this phenomenon, and during the course of the United States' participation in the first two global wars, significant developments changed the practice of anesthesiology and contributed to the recognition of the field as a distinct specialty.

Although the maturation of anesthesiology as an individual medical specialty had begun prior to the United States' mobilization for the second world war, the inclusion of anesthesiologists among the medical corps organization proved pivotal for the discipline's postwar growth. Throughout the Second World War, the demands of mass-casualty treatment prompted an expansion of the anesthesiologist as a forward-area physician increasingly responsible for many aspects of trauma care. Advancements in anesthetic techniques, equipment and medications were mirrored and refined in civilian practices. Many physicians received their first exposure to the field of anesthesiology during the Second World War, and their collective interest prompted them to seek positions in postwar residency programs. This influx of physicians seeking specialty training in anesthesiology signaled a new era for the discipline. Indeed, the advent of modern anesthesiology was marked by the increasing numbers of physicians who had benefited from specialty training and were responsible for the broadening scope of perioperative care, including patient assessment and resuscitation, airway management and artificial ventilation, pain management and the use of multiple techniques to achieve an effective anesthetic while preserving patient safety. The potential of the anesthesiologist was first glimpsed during the Great War, but awaited the organizational and technical evolution of the specialty which had achieved a critical mass by the close of the Second World War and thereby provided an essential framework for the modern practice of anesthesiology.

The American Experience in World War One

The changes experienced within the field of anesthesiology may only be fully appreciated when one has considered the technological and organizational status of the specialty at the time American forces were deployed into Europe during World War One. The first national organization, the American Association of Anesthetists, was founded just prior to the outbreak of hostilities among the European nations. The group first convened in Minneapolis during the annual American Medical Association meeting of 1913, with James T. Gwathmey serving as its first president. When the United States military was dispatched abroad, Gwathmey was called into service and commissioned as a medical officer. He remained one of a handful of anesthesiologists to serve with the Medical Corps and his observations and contributions as Chief Anesthetist of the European Theater would later encourage the military's recognition of anesthesiology as a distinct and indispensable specialty.

At this time, the practice of anesthesia was viewed as little more than an ancillary service for surgeons and there were few physicians who chose to devote their clinical expertise to the study and advancement of this field. However, attitudes towards the importance of specialty training in anesthesiology had begun to improve. A visible result of this change was the publication of the first Quarterly Supplement of Anesthesia and Analgesia by the American Journal of Surgery in 1914. Despite this progress, the United States Army and the War Department were slow to acknowledge anesthesiology as anything more than a service which could be adequately administered by personnel with minimal training.

The casualties of the American Expeditionary Force were infused into a medical care system which possessed only a handful of anesthetic specialists. Anesthesia was often provided by the most junior medical officer, which appeared to be a common practice among all the armies of the time. The U.S. Army did not award anesthetic specialists with a formal rank comparable to their surgical colleagues. While many of their allied counterparts were commissioned as captains or even major, the American physician anesthetists served as second and first lieutenants. This inequity was a reflection of the low priority given to the specialty by the United States military.

Despite this handicap, it was difficult to dismiss the contributions of some physician anesthetists. James Gwathmey had acquired a reputation as an organizational activist and clinical scientist before World War One. As Chief Anesthetist of the European Theater, he secured the gas-oxygen-ether machine as a standard piece of equipment for the American Expeditionary Force. Another noted
**AHA/HAS 1999 Joint Meeting**

The Anesthesia History Association (U.S.A.) and the History of Anaesthesia Society (G.B.) are proud to announce the first joint meeting of the two groups to be held in Bristol, England, May 13-15, 1999. A third sponsor is the Society of Anaesthetists of South Western Region (G.B.). This meeting will celebrate the bicentennial of the nitrous oxide work done by Humphry Davy, Dr. Thomas Beddoes, and others in Bristol in 1799 and 1800.

The meeting will be held at the Watershed Conference Center in Bristol. Next door is the conference hotel: Swallow Royal Hotel, College Green Bristol BS1 STA, England. 011-44-117-925-5200 (voice), 011-44-117-925-1515 (fax).

More information can be obtained from the following individuals: George Bause, M.D., P.O. Box 43100, Cleveland, OH 44143 U.S.A. (440) 446-0120 (voice), (440) 605-9455 (fax); or Dr. J.A. Bennett, F.R.C.A., Honorary Secretary, HAS; Millards,itchington, Alveston; S Glos, BRISTOL BS35 3TQ; England. 01454 419264 (voice), 01454 281679 (fax).

Further announcements will be made as details for the program develop.

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**Call for Abstracts**

**AHA/HAS Joint Meeting: May 1999**

The Anesthesia History Association (United States) and the History of Anaesthesia Society (Great Britain) will hold their first-ever joint meeting May 13-15, 1999, in Bristol, England. A third sponsor for this meeting is the Society of Anaesthetists of South Western Region (Great Britain). This event will be a celebration of the bicentennial of the nitrous oxide experiments conducted by Dr. Thomas Beddoes, Humphry Davy and others at the Pneumatic Institute in Bristol in 1799 and 1800. The meeting will be held at the Watershed Conference Center, next door to the conference hotel, the Swallow Royal.

The Anesthesia History Association invites the submission of abstracts for papers on its portion of the program (probably 8-10 papers). Presentations should be 20 minutes in length and relate in some way to the history of nitrous oxide anesthesia. Abstracts should be no longer than what can fit on one 8½" by 11" sheet of paper. If possible, abstracts should indicate the research problem, sources and methodological approach used and may contain no more than 10 references. Abstracts may be submitted by mail, fax or e-mail. Disc submission in Word-compatible format is also permitted. All accepted abstracts will be distributed in some form to all meeting registrants. Individuals who wish to organize a paper session around a theme should contact us as soon as possible.

Abstracts should be submitted by January 31, 1999 to: George Bause, M.D., P.O. Box 43100, Cleveland, OH 44143 U.S.A. (440) 446-0120 (voice), (440) 605-9455 (fax), gbause@pol.net


Registration materials for the meeting will be mailed in February, 1999.

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**Anesthesia History Association Fourth Annual Resident Essay Contest, 1999**

This award will be presented at the AHA's annual dinner meeting held in conjunction with the American Society of Anesthesiologists' October, 1999, annual meeting in Dallas, Texas. A 1,500-3,000 word essay related to the history of anesthesia, pain management or critical care should be submitted to: Doris K. Cope, M.D., Clinical Director, UPMC Pain Medicine, 5200 Centre Avenue, Suite 415, Pittsburgh, PA 15232 U.S.A.

The entrant must have written the essay either during his/her residency or Fellowship, or within one year of completion of training. Residents in any nation are eligible, but the essay MUST be submitted in English.

The recipient of the Resident Essay Award will receive a $500.00 honorarium and the manuscript will be presented at the Spring, 2000, meeting of the Anesthesia History Association and subsequently published in the Bulletin of Anesthesia History.

Entries must be received on or before August 15, 1999.

The 1998 First Place Winner is Thomas Romanelli, M.D., Fellow, Children's Hospital of Pittsburgh. The title of his submission is "The Origins of Modern Anesthesia throughout the American Experience Spanning the World Wars."

A complete list of past winners/published entries can be found at: Anesthesia History Association Resident Essays, http://www.anes.uab.edu/aneshist/ahaessays.htm

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**Addendum to the Selection Process for the WLM Laureate of the History of Anesthesia**

(Approved as amended, by the Board of Trustees of the Wood Library-Museum of the ASA, October 17, 1998)

The Laureate award shall not be conferred in memoriam upon a nominee who died during or before final voting of candidates by the Laureate Committee. If an individual who has been declared Laureate dies in the year between announcement of his/her award and the subsequent investment, the investiture shall be carried out with an in memoriam talk by a WLM Trustee and his/her name shall appear in the records with an asterisk signifying "deceased." Another voting will not be initiated to replace such a deceased Laureate.

The medal and honorarium that would have been presented to the deceased will be presented to a member of his/her family (who will be invited by the WLM to the investiture).

An individual whose nomination was not successful the first time can be re-nominated for a second consideration if the original nominator brings up to date the original nomination. This means that any individual nominated for this award can be re-nominated without repeating the entire nomination process with the addition of updated curriculum vitae.

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Manuscripts may be submitted on disk using Word for Windows or other PC text program. Please save files in RICH TEXT FORMAT (.rtf) if possible and submit a hard copy printout in addition to the disk. All illustrations/photos MUST be submitted as original hard copy, not electronically. Photographs should be original glossy prints, NOT photocopies or slides.
IN MEMORIAM

Gwenifer C.M. Wilson, MD, MBBS, DA (Syd), FANZCA

WLM Laureate of the History of Anesthesia

by Nicholas M. Greene, M.D.
New Haven, Connecticut

Dr. Gwenifer Wilson, named in 1996 as the first Laureate of the History of Anesthesia, died on October 31, 1998, after a long illness in Sydney, Australia.

Dr. Wilson was born in October, 1916, at Broken Hill, New South Wales, Australia. Following graduation from the University of Sydney Medical School in 1939, Dr. Wilson started her clinical training at the Balmain Hospital in suburban Sydney. It was there that she also started her training in anesthesia. Her first teachers included an elderly expert in regional anesthesia and a urologist equally enthusiastic about regional anesthesia.

In 1944 the first diploma course in Australia was started at University of Sydney, a course that Dr. Wilson entered in 1945. Despite widespread ignorance at that time amongst physicians and laity alike of the importance of anesthesia as a clinical discipline, and despite the multitude of obstacles in medicine confronting women, Dr. Wilson persisted in her dedication to anesthesia and her growing family. She not only became a member of the Australian Society of Anaesthetists but also became the first woman to gain an Australian Diploma in anesthesia.

When, after serving for 12 years at two suburban hospitals, she was denied promotion because she was a woman, she transferred in 1956 to Sydney Hospital and to St. George Hospital where she served as Honorary Anaesthetist from 1956 to 1968.

It was in 1961 that Dr. Wilson started her study of the history of anesthesia by probing deeply into the fascinating story about how the news of anesthesia got to Australia in 1847. This led her, pari passu, to become an authority in Australian maritime history. She also found during her review of early Australian medical journals, the first of which appeared in 1846, that the word “anesthesia” never appeared in any of the early indices of medical literature. This she compensated for by reading, page by page, every early Australian medical journal, which in turn led to her creation of her own index, later published, of all citations in all those medical journals dealing with anesthesia and anything related to it. The result of all these studies was that she developed a unique wealth of information and a deep insight into the development of anesthesia in the context of much of the rest of the practice of medicine at that time.

Eventually and inevitably, of course, she became so involved in the history of anesthesia as to retire from clinical practice. In the subsequent course of her career, she presented 42 invited lectures, published 43 articles on the history of anesthesia, and for many years provided a striking visual history of anesthesia in the form of a series of pictures of equipment, people, and places that appeared on the outside front cover of the Australian anesthesia journal, Anesthesia and Intensive Care. The culmination of her studies and her work over the years was publication of her magnum opus, the 690-page One Grand Chain, A History of Anesthesia in Australia, 1846-1962. One is hard pressed to find elsewhere such complete, such clearly expressed and such well-organized accounts of the introduction and development of anesthesia in Australia and the concurrent medical, scientific, social, political, economic, and maritime events and changes taking place over the same 150-year span. Anesthesia never developed all by itself in a vacuum. Its development was and is ultimately governed by the society in which it exists. One Grand Chain shows this beautifully. This is the way the grand sweep of the history of medicine—or anesthesia—should be viewed. Not only that, however. Dr. Wilson was so thorough, so meticulous, and so complete in reporting all of the Australian anesthesia history, that future anesthesia historian scholars need not spend tedious hours searching through past literature. All they need is Dr. Wilson’s book as a starting point. It’s all there.

In her career, Dr. Wilson was afforded many richly deserved honors and occupied many important positions in anesthesia and related organizations. These include a Doctorate of Medicine postgraduate degree (the equivalent of a Ph.D. in the U.S.A.) awarded by the University of Sydney in 1995 for her thesis on the History of the Australian Society of Anaesthetists 1934-1984 and her “Bibliography of References to Anesthesia and Related Subjects” in Australasian Medical Publications 1846-1962. Her M.D. was the first postgraduate Doctorate of Medicine degree awarded in Australia for medical history. She was a Founding Member of the Faculty of Anaesthetists of The Royal Australasian College of Surgeons (MFARACS) in 1952; became a Fellow of the Faulty of Anaesthetists, Royal Australasian College of Surgeons (FFARACS) in 1956, and a Fellow of the Australian and New Zealand College of Anaesthetists (FANZCA) in 1992.

Dr. Wilson also served as Secretary of the Australian Society of Anaesthetists (1954-56), as a member of the Executive Committee of the Australian Society of Anaesthetists (1951-56), as Honorary Historian of the Faculty of Anaesthetists, Royal Australasian College of Surgeons (1966-92), and as Honorary Historian and then the Historian Emeritus of the Australian and New Zealand College of Anaesthetists. As if all this were not enough, Dr. Wilson served as Postgraduate Lecturer in the history of anaesthesia in the Nuffield Department of Anaesthetics of the University of Sydney, from 1962 to 1982.

Dr. Wilson’s career reflects the thoroughness, the scholarship, the meticulousness and the dedication of time and effort needed to produce definitive studies of the history of anesthesia. She provides us with an example to which we can aspire. We are thankful for the environment in which she worked, an environment with facilities and outlook permitting and even facilitating the development of such scholarly talent. We thank her for the contributions to our specialty in historical fact, as well as for the intellectual and academic example she set.
heat bottles applied to the body became common practice during the course of an anesthetic. It was observed that gastrointestinal motility was greatly diminished at the time of injury and this knowledge was instrumental in identifying patients at risk of pulmonary aspiration and developing methods to avoid the potential consequences of aspiration pneumonia.

Guidelines for the resuscitation of the trauma patient were expanded and modified. Remarkably, intravenous fluids were used sparingly at field hospitals. Instead, the wounded soldier received up to three pints of saline subcutaneously, which often had erratic absorption due to diminished peripheral circulation and were of dubious benefit. As physicians attained a better understanding of the pathophysiology of shock, intravenous fluids were given more frequently. Intravenous fluid therapy was facilitated by the introduction of a semi-closed system to administer 0.9 per cent sodium chloride. There were also efforts to employ colloidal solutions, such as gum acacia, as a means of intravascular volume replacement. Captain Oswald H. Robertson, an army surgeon, demonstrated that donor blood mixed with sodium citrate could be preserved for one week in an icebox. Although important in its implications, transfusion medicine did not receive widespread clinical acceptance in the European Theater.

After the Armistice
The American experience during the First World War provided invaluable technological advances and an increasing comprehension of the physiologic mechanisms pertaining to shock. However, it was only after the war that organizational anesthesiology began a period of rapid growth. Organizational advancement, complemented by the clinical lessons of the European Theater, elevated the practice of anesthesiology, the prestige of the evolving medical specialty.

Technological advancements continued during the period preceding the Second World War and coincided with the specialty's organizational maturity. Endotracheal intubation was a concept predating the Great War but its clinical application awaited the studies conducted by E.S. Rowbotham and Sir Ivan Magill who collaborated to produce a single-lumen, rubber endotracheal tube. By 1921, they were able to report more than 3,000 cases of endotracheal anesthesia, and in 1928, the Magill tube was modified with a distal occlusive cuff by Arthur E. Guedel and Ralph Waters. Waters also contributed a system for carbon-dioxide absorption based on soda-lime which led to the introduction of the circle breathing system. Used with a closed breathing circuit, all gases could now be contained and this decreased the fire hazard and cost as a benefit of reduced gas wastage. Together, these new techniques allowed the application of positive-pressure ventilation and improved control of respiratory function.

Perhaps the strongest impetus for this period of development was the establishment of several departments devoted solely to the study and practice of anesthesiology. An increasing number of post-graduate candidates sought out specialty training at these educational centers. Arising in different parts of the United States, these notable "schools" included those of Ralph M. Waters in Wisconsin, John S. Lundy at the Mayo Clinic and Henry K. Beecher at Harvard. Under the collective guidance of these influential leaders, anesthesiology continued to evolve as a distinct specialty.

In 1937, the American Board of Anesthesiology was founded and received official recognition by the American Medical Association. Two years later, the Surgeon General's Office also recognized anesthesiology as a distinct medical specialty and began including trained anesthesiologists within its organization and operations. By 1940 the United States began preparations for foreign and domestic military operations and a Subcommittee on Anesthesia of the National Research Council was formed to advise the War Department and Public Health Service.

Preparing for the Second World War
Ralph M. Tovell, then chief of the anesthesiology department in Hartford, participated in these meetings and according to his initial recommendations, anesthesiologists were to be posted at the larger medical facilities in station and general hospitals while the delivery of anesthetics at field hospitals would continue to be performed by nurse anesthetists or other trained medical personnel. Avoiding a mistake of specialists in the First World War, Tovell requested and received full status as a consultant in anesthesiology. This action represented a significant change in unit organization since prior to that time anesthesia in all military and most civilian practices was considered a subdivision of surgery. Subsequently, Lieutenant Colonel Tovell served as the Senior Consultant in Anesthesia to the Office of the Chief Surgeon in the European Theater of Operations.

To meet the projected needs of the Medical Corps to accomplish its mission of mass-casualty treatment in several theaters of operation, the War Department and Department of the Army made arrangements to provide anesthesiology specialty training for its medical officers. The first course in anesthesiology was organized by Major Stevens J. Martin and
conducted by the United States Army at Tilton General Hospital in July of 1941. Soon thereafter, a separate school of anesthesia was authorized by the War Department. Medical officers from the army and navy were also trained at civilian institutions. Among these were the School of Medicine at Bellevue Hospital in New York, Hahnemann University in Pennsylvania and the Mayo Clinic under the direction of John S. Lundy.

Appointed as the Henry Isiah Dorr Professor of Research in Anesthesia in 1941, Henry K. Beecher became the first physician in the world to occupy an endowed chair of anesthesia. Throughout the Second World War, this distinguished physician helped establish anesthetic and resuscitation principles governing the management of casualties and was awarded the Legion of Merit for his accomplishments. Colonel Beecher served as an anesthesiologist during the North African and Sicilian campaigns and was credited with assisting in the integration of the specialty into the military's infrastructure.

Influential teachers such as Drs. Beecher, Lundy and Waters had laid the foundation of the modern practice of anesthesiology through their individual and collective contributions to the advancement of the specialty. Although this was a significant accomplishment, modern anesthesia remained in its infancy in 1941. It is difficult to predict how the specialty would have developed had the renewed outbreak of hostilities not prompted a return to Europe by the United States' armed forces. The Medical Corps bore the onus to provide services to the many casualties in the European, Pacific and other operational theaters and the anesthesiologist quickly became indispensable to this medical care delivery system. If the First World War was a demonstration of the specialty's unrealized potential, then the Second World War provided an opportunity to solidify and advance the modern practice of anesthesia.

A New Era of Warfare

Having recognized the importance of anesthesiology, the United States Medical Corps appointed anesthesiologists in a group which included Henry Beecher and Ralph Tovell to facilitate the assignment of these specialty-trained physicians to medical units and facilities where their talents would be most effective. As the war progressed and more anesthesiologists became available, these physicians were increasingly deployed closer to the front. The Medical Corps was also confronted by the dramatic changes in which strategic and tactical military operations were conducted. Therefore, it became vital to integrate the anesthesiologist and other medical personnel within the delivery system designed to accommodate this new era of warfare.

Modern warfare had become dependent upon the mobility of large armored and mechanized units and the necessity for infrastructure to maintain adequate supply routes to forward areas. This was a fundamental change from the static-line trench warfare encountered during the First World War, as proven by the repeated successes of the German armed forces as they conducted blitzkrieg maneuvers. The battlefield had become a fluid environment, and the facilities to provide treatment for casualties would, by necessity, be required to maintain pace with an advancing front.

Methods for the rapid evaluation and evacuation of casualties to forward medical facilities were reviewed and refined. Casualty evacuation was performed based upon the "three-point forward" system which included a casualty classification post, a "number-one" hospital for the treatment of severe, life-threatening wounds and a "number-two" hospital where less urgent cases were managed. "Number-one" hospitals were designated to treat massive hemorrhage, abdominal trauma, thoracic injuries, head wounds and cases of gross tissue destruction caused by traumatic amputations and burns. "Number-two" hospitals, located farther from the front, dealt with less severe injuries in which patients could tolerate longer transportation times. These facilities were supplemented by several mobile surgical detachments, the predecessor of the M.A.S.H. unit, and a sophisticated triage evaluation plan. The system was created for the evacuation and treatment of most casualties within five hours after injuries had been sustained. Although operating under different designations, almost all of the medical facilities had some degree of mobility which allowed them to maintain contact with combat units.

The anesthesia machines issued by the Army were the portable Heidbrink and Mackesson type which were commonly used in civilian hospitals. Although effective, Henry Beecher improved the design for specific military needs, and modified the machines to deliver positive-pressure ventilation. Previous studies had indicated the high mortality from thoracic wounds received during the First World War, and the Beecher machine was designed to allow early surgical treatment of these injuries. The machine contained a foot-bellows, reservoir bag, reduction valve permitting the use of compressed gas sources, an ether vaporizing bottle and soda-lime filter (Walter's-type).

Plans for medical unit organization were limited by military requirements unlike civilian delivery of patient care. The battlefield imposed some unique restrictions upon personnel and equipment. Cumbersome machines were disadvantageous because of the frequent moves made by the army units during combat operations. Complicated anesthetic apparatus was difficult to maintain under harsh working conditions and the availability of spare parts was dependent upon secure supply lines. Shortages of appropriate medical personnel meant that a standardized treatment of various wound types was needed so that an anesthetic could be delivered with reasonable safety. This decision reflected the fact that casualties were often treated by several officers in different units during the chain of evacuation. Patient safety was predicated upon a principle of continuous and consistent treatment, which would not have been achieved if medical decisions were not guided by a comprehensive treatment protocol.

By July of 1941, the United States military discovered new-found importance in the practice of anesthesiology. In stark contrast to the experience of the Great War, anesthesiologists were now included in the order of battle. The task of these physicians to provide services to casualties and train or supervise anesthetic personnel was a monumental one.

Anesthesia in the Second World War

The medical infrastructure for mass-casualty treatment as designed by the Office of the Surgeon General and Medical Corps had not been fully functioning at the beginning of the North African campaign. Shortages of supplies, equipment and personnel limited the choice of anesthetic techniques available for the treatment of casualties. Many of the personnel called upon to deliver anesthesia were surgeons, nurses, dentists or other medical assistants. Only 10 of the 77 designated "anesthetic specialists" were certified by the American Board of Anesthesiology. Fifteen percent of the remaining 67 anesthesiasts had been trained in courses lasting less than three months and 20 percent had no formalized training except for those skills acquired in the field or during a surgical residency. The initial approach of the Army to satisfy patient care requirements in the presence of insufficient staffing was to standardize anesthetic techniques to allow the consistent delivery of a safe but effective anesthetic by personnel with limited training.

Intravenous agents such as sodium evipal (hexobarbital) and sodium pentothal provided many of the desirable characteristics of an anesthetic agent suitable for military use. The barbiturates could be mass-produced and were therefore readily available. They were compact and required no special storage procedures. No specialized equip-
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tment was needed for their administration and induction was smooth and rapid. In fact, the casual acceptance of pentothal's utility by inexperienced anesthetic personnel was compounded by a failure to fully appreciate the drug's side-effects and resulted in a number of anesthetic mortalities.

Sodium pentothal had previously been used to treat the casualties that followed the Japanese attack on Pearl Harbor. Many of the wounded suffered extensive surface-area burns or were hypovolemic due to severe hemorrhage. The patients who received sodium pentothal as the primary anesthetic experienced an unusually high mortality which was attributed solely to the anesthetic agent.25,26,27 These anesthetic deaths prompted the Medical Corps to reconsider the issue of providing pentothal in the field. However, suitable alternatives were not available at the commencement of the North African campaign in 1942. Pentothal was used again as a primary agent and anesthetic mortalities among the severely wounded were comparable to those observed at Pearl Harbor. A comprehensive survey of anesthetics delivered during the North African campaign was commissioned by the Medical Corps and completed in September of 1943. At one field hospital which performed 2,672 operations of multiple types using pentothal, six fatalities were attributed to the anesthetic alone.

An analysis of the medical records revealed two factors which contributed to pentothal's morbidity. The anesthetic deaths in question had received full induction doses of the agent in the presence of intravascular volume depletion. The resultant cardiovascular collapse could otherwise have been avoided or at least greatly attenuated had the dose of agent been reduced. Another significant factor was that pentothal was so ubiquitous that it had been used for patients in whom it was clearly contraindicated including patients with severe dehydration, impaired ventilation and sepsis. These findings prompted the establishment of guidelines for the administration of pentothal and this technique was eventually standardized among medical units in all theaters of operation.

The protocol stated that pentothal was to be administered as a 2.5% solution by the anesthetist with supplemental oxygen and vital signs and ventilatory patterns were to be frequently evaluated and recorded. Atropine was given as a premedicant and the concomitant use of morphine was individualized to the patient's overall clinical status. In September of 1944, the second theater-wide survey of anesthetics was completed and revealed only two anesthetic mortalities during the course of 11,136 operations, following the standardization of pentothal administration. Mortality from this agent declined by two-thirds despite being used four times as frequently.28 Hence, sodium pentothal remained an important element in the field hospital pharmacologic armamentarium.

The inhalational agents nitrous oxide, ether and chloroform all presented advantages and disadvantages for the treatment of casualties. Nitrous oxide was in short supply and its availability was limited to larger hospitals in the rear. Nitrous oxide also had to be delivered with oxygen to prevent hypoxic mixtures and usually required supplemental anesthesia (in the form of blocks or sodium pentothal boluses). Ether delivery by the open-drop or closed method produced good muscular relaxation, and induction with this agent was relatively uncomplicated. Even the severely wounded tolerated a potent ether anesthetic. However, ether also had undesirable properties, including a prolonged induction and mucous membrane irritation. Adequate oxygenation could be maintained in the presence of ether or chloroform. Although chloroform provided many of the beneficial qualities of ether, it could result in profound circulatory depression and in some instances, hepatic necrosis. Cyclopropane was briefly used but discontinued secondary to its arhythmogenicity and flammability.

Premedication with morphine was inconsistently tolerated by the severely wounded and was used with caution because of its potential for respiratory depression. It was administered as a ½ grain (approximately 30 mg.) in 15 cc of Morphine tartrate by a specially-designed syrette. The injection was given via the subcutaneous route and in the presence of reduced peripheral circulation encountered with shock, its absorption was unpredictable. Furthermore, soldiers may have been given repeated doses of the drug as they were treated throughout the evacuation process. The restoration of an adequate circulating volume could then result in the release of significant quantities of the morphine from "tissue sinks" and cause respiratory arrest.28,29 One method to identify "morphined" soldiers was to attach the syrette needle to the patient's tunic, alerting others to the fact that additional doses of morphine should be avoided or administered only with close supervision thereafter.

Local anesthetics had their applications and limitations in the treatment of the wounded soldier. They were most often indicated for injuries of the extremities in the form of blocks, or for use in neurosurgical and maxillofacial procedures where a general anesthetic could result in serious respiratory compromise. Intercostal and paravertebral blocks were performed for post-operative pain management and for improvement in respiratory function. Local anesthetics such as procaine hydrochloride and other agents had limited use for infiltration of multiple wounds because the volume required to achieve analgesia would exceed toxic blood levels.

As noted during the First World War, cardiovascular collapse was a serious risk if a spinal anesthetic was inappropriately administered. Although vasomotor agents were available to counter hemodynamic compromise, the response to these drugs in the presence of an already maximized sympathetically outflow was variable. In addition, the stability of the technique could be violated at field hospitals with dire consequences. These problems were not as pronounced at station or general hospitals and therefore regional anesthesia was performed more frequently at those facilities.

Hospital settings also influenced the extent of care that could be provided. Battalion aid stations were equipped and staffed only to provide emergency treatments and were not suitable locations for major surgery. Casualties were treated and either returned to the front as effective combatants or resuscitation efforts were continued in preparation for transport to the field hospital.30 One of the most important functions of the battalion aid station was the treatment of pain. This was usually accomplished with morphine, but soldiers were also treated with local anesthetic field blocks. General anesthetics could not be safely administered until the patient reached the field hospital level. The injured soldier was cared for at facilities an increasing distance from the front, the stability of his condition and greater access to equipment allowed for a broader selection of anesthetic techniques. Station and general hospitals, well toward the rear, performed higher percentages of regional anesthetics.

Upon arrival at the field hospital, the wounded were first evaluated and treated in the "shock ward." Fluid resuscitation was continued with whole blood, plasma, or saline solutions to stabilize the patient prior to surgery. Intraoperatively, blood transfusions were administered by direct (donor present) and indirect (pooled, citrated blood) methods with little morbidity. Autologous blood rescue and autotransfusions were also conducted with few complications in the field.

Endotracheal intubation for general surgery was performed at the field hospital level for intracranial, maxillofacial, major abdominal and thoracic injuries. The Beecher anesthetic machine was capable of positive-pressure ventilation and utilized compressed gas sources. This allowed the delivery of an
effective anesthetic and ventilatory support in forward areas where early surgical intervention for these injuries was crucial for patient survival.

Postoperatively, the surgical patient was monitored in a recovery area for respiratory depression or cardiovascular compromise. These areas were equipped with oxygen sources, airways, vasopressor agents, and suctioning devices for the treatment of common post-operative complications. These facilities paralleled the concept and practice of anesthetic recovery units in civilian hospitals.

Medical units in all operational theaters continued to benefit from the presence of military anesthesiologists until the war's end. Following the defeat of German and Japanese forces in 1945, the allied armies began an extensive demobilization. After their discharge, anesthesiologists applied the lessons learned in wartime to their civilian duties while other physicians who had been introduced to the specialty during the war returned stateside and swelled the ranks of anesthesia residencies.

Conclusion
The value of the anesthesiologist was clearly demonstrated during the First World War. Technological and organizational developments which followed the Armistice had increased to the specialty during the war. These physicians would return to the United States and over the next several years would become the nucleus of the next generation of consultant anesthesiologists. Under their collective guidance, the specialty was transformed into modern practice, assured of continued progress in academic, clinical, educational and research quarters.

In an address before his peers at a Macy Conference, a forum held in May, 1967, to discuss the educational objectives of anesthesiology, E.M. Papper reflected on the contributions of the Second World War. He stated:

Many of the men assigned to anesthesiology became very interested in the specialty and at the end of the war sought formal training. This was the beginning of many young men's interest in the field, and was responsible for the tremendous influx into the residency programs in anesthesiology in the immediate postwar period, for the great increase in training numbers and training possibilities, and for the feeling of exultation—almost a heady feeling of triumph, in a way—that trainees and trainers had in 1946 and 1947. Many people sitting in this room were associated with the men who experienced this type of stimulation, or its consequences, later in civilian life. That was the legacy of the anesthesiologist's presence throughout the world wars.

References
Anesthesiology in California: The Early Years

by Selma Harrison Calmes, M.D.
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Presented in part at the Annual Leffingwell Lecture in San Francisco, May 1998, on the occasion of the Fiftieth Anniversary of the founding of the California Society of Anesthesiologists.

This article briefly reviews the early history of anesthesia in California. Much of the history of anesthesia in California has not been completely documented yet and is complex due to the large size of the state. What follows is the most current historical information, and some essential references for further reading.

How did the news of anesthesia get from Boston to California? The first successful demonstration of surgical anesthesia occurred in Boston on October 16, 1846. Within a year, the news of anesthesia had spread to the major cities of the world—but not to California. California was not a part of the United States either geographically or politically at the time of the ether demonstration. Travel to California was difficult, taking a minimum of six months from the East Coast. There was no mail service. And, there was little reason for the news to get here. There were only five trained physicians and two Army surgeons in the state; there were no hospitals, no medical schools, no medical societies, no medical journals and no pharmacies.

This isolation changed with the discovery of gold near Coloma in January, 1848. Because of the travel difficulties, the news of gold did not reach the East Coast until September and was not widely known until December, 1848. When it did become known, people from around the world rushed to the state, seeking “to strike it rich.” The ‘49ers included an estimated 1,300-1,500 physicians. These physicians came to get rich quickly and only practiced medicine after failing at that, as did most ‘49ers. These physicians probably brought the knowledge of anesthesia and anesthetics with them. One likely example was Dr. Edward Willis, an English surgeon, a graduate of Edinburgh and London, who found his way to the tiny Gold Rush town of Placerville. In his canvas tent “office,” he displayed his microscope, a stethoscope, splints of various kinds, a huge jar of leeches and surgical instruments. His blue sign with gold letters declared, “Dr. Edward Willis, MRCS. Surgery and Physic in all branches. Sets bones, draws teeth painlessly, bleeds, advice gratis.” As an Edinburgh graduate, he would be familiar with anesthetics, and we can presume he brought anesthetic agents with him since he brought his microscope, stethoscope and leeches. His promise to “draw teeth painlessly” strongly suggests he used anesthetics for this painful procedure, and most likely for others as well.

What happened next? Ten years after the Boston demonstration, anesthesia was well established in California. The state’s first medical journal began in 1856. Anesthesia was mentioned on the first page of the first issue, in a report of a discussion at a Sacramento County Medical Society meeting. The case presented discussed the possible additive effects of morphine and chloroform.

Thirteen operations were reported in that volume. There was no mention of anesthesia in four of these.

There is also strong evidence that anesthesia was not always used to relieve surgical pain. The 1850 Fee Bill (“Aviso”) for Los Angeles physicians, the first in the state, did not include a charge for anesthesia. Later medical journal reports clearly record that no anesthesia was given, even in painful operations. This reflects the selective use of anesthesia everywhere in the U.S. at this time, common practice until the last quarter of the 19th century. Generally, women, children and wealthy people were thought to deserve pain relief. Men needed to experience surgical pain to help them become “manly,” and poor people did not deserve anesthesia.

The first charges for anesthesia service were published in the state in 1874. The Alameda County Medical Society “Fee Bill” (comparable to the present day Relative Value Guide) stated, “Administration of anesthesia in any case $5-25.” Operations in contrast, were paid $100-$500 for major, $25-$100 for secondary operations and minor procedures were paid $5-$25. Mortality from anesthesia was estimated in 1883 as deaths were thought to occur once in every 2,800 anesthetics. This article ended with a plea for professional anesthetists: “When the administration of anesthetics becomes an isolated profession, and shall become the business of men who shall do nothing else (an example of which is the celebrated Dr. Clover in London), then it is probable that the mortality will fall much under that above given.”

Surprising for the time, there was also research going on. San Francisco physicians P. Dudley Tait and Guido E. Caglieri studied possible therapeutic uses of lumbar puncture in both cadavers and animals and performed the first spinal anesthetic in the U.S. on October 26, 1899. Their report of 11 cases of spinal anesthesia using cocaine was the second report of spinal anesthesia in America. The first instance was the surgeon Rudolph Matas of New Orleans who reported a single case just before Tait and Caglieri.

First Professional Physician Anesthetist

Dr. Mary Botsford (1865-1939) of San Francisco was the first Californian to dedicate her practice solely to anesthesia, beginning in 1897. She can also be considered the first professional anesthetist in the U.S. Dr. Isabella Herb of Chicago (1869-1943) entered anesthesia earlier, in 1893, but Herb detoured to pathology from 1905-1908. Botsford focused continually on anesthesia and should be considered the first American professional anesthetist. For comparison, Ralph Waters began his interest in anesthesia in 1913 while doing general practice. Arthur Guedel gave anesthetics beginning in 1909. In contrast, English physicians devoted themselves to anesthesia practice as early as 1858.

Dr. Botsford was born in San Francisco, married a physician and entered medicine after his death. She graduated from the University of California Medical School at San Francisco (UCSF) in 1896, began a private practice and worked at the Children’s Hospital of San Francisco (CHSF). This hospital was founded by women physicians in 1875 to provide practice opportunities for women doctors. The University of California had a commitment...
MaJY Botsford, M.D., first physician to specialize in anesthesiology in California and probably in the U.S. to equal education for the sexes from its beginning, and the medical school generated comparatively large numbers of women physicians, who then faced few opportunities for practice and hospital training. This was where all the women physicians of San Francisco practiced because they could not use other hospitals and it was where nearly all women medical graduates on the West Coast interned.

Botsford decided to enter anesthesia after seeing how sick patients became after anesthesia and surgery. But, then, it was not possible to make a living doing only anesthesia. Few operations were done at the time, and there was little reimbursement. She had an office practice in the afternoon and earned no income from anesthesia during the first two years. The combination of practicing anesthesia but also having another practice was common for many years throughout the country.

Self-taught by necessity, she soon began teaching CHSF interns, who were required to rotate on anesthesia. Botsford was charismatic and dynamic and soon attracted some of these women interns to enter anesthesia. At least 46 women physicians were trained by Botsford. These young doctors covered many Bay Area hospitals and also practiced in Southern California. At some point, Botsford began work at the UCSF hospital as its first faculty member in anesthesia and chief of the department. In 1931, she was appointed Clinical Professor of Anesthesia at UCSF, the first to hold this title. She was paid a small salary from the hospital but this was not supplemented by the university. To support herself, Botsford had an active private practice among San Francisco’s elite at the Dante Sanitarium, a luxury hospital-hotel. The university surgeons objected to her "excessive" fees for these patients, but it was common at the time to charge based on the patient’s wealth.

Botsford led the efforts to get a Section on Anesthesia in the California Medical Association (CMA), which became the first state-wide anesthesia organization and the first such section in the United States. Also, she was instrumental in the passing of the first state law requiring that anesthesia be taught in the state’s medical schools, another first in the U.S. She was the first president of the CMA Section on Anesthesia, the organization from which the California Society of Anesthesiologists (CSA) evolved. She also was recognized nationally, serving as president of the Associated Anesthetists of the United States and Canada that year. She published many clinical and scientific papers and did research with Arthur Guedel and Chauncy Leake at UCSF. Dedicated completely to anesthesia and a high degree of professionalism, she set advanced standards for the practice of anesthesia in the state and provided essential early leadership.

Subsequent Contributors
The early history of anesthesia in the state is complex and not yet completely documented. A chronological annotated list of many of the important early physician anesthetists follows. One pharmacologist is included because of his important role in the specialty.

Eleanor Seymour was the daughter of a Los Angeles physician. She was a 1903 USC Medical School graduate who interned at CHSF. She became an associate professor of surgery (anesthesia) and chief of anesthesia at Lane Hospital, which later became the Stanford Hospital. She retired when William Neff was appointed the chair of anesthesia at Stanford in 1937.

Dorothy Wood graduated in 1919 from Stanford Medical School and also interned at CHSF. She became an instructor in anesthesia at the University of California and succeeded Dr. Botsford, when she retired due to age, as chief of anesthesia at UCSF.

Arthur Guedel has been noted for his many innovative contributions to anesthesia. In fact, Dr. Guedel can be considered the state’s most noted anesthesiologist. He is commemorated by the CSA-sponsored Guedel Memorial Center in San Francisco.

Dr. Guedel began medical practice in 1909 in Indianapolis and gave anesthesia occasionally. During his Army service as an anesthetist in World War I, he made many anesthesia innovations. After the war, he became a close friend of Ralph Waters who was developing the nation’s first and most influential academic anesthesia department at the University of Wisconsin. With Dr. Waters, he developed the cuffed endotracheal tube and

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improved endotracheal tube quality.

In mid-1929 Arthur Guedel moved to Los Angeles for health reasons. Although well known nationally, he had great difficulty getting established in Los Angeles. He was thought to be a “trick” anesthetist because of his use of endotracheal tubes. In addition, in the middle of the Depression there was severe economic competition. While in Los Angeles, he developed the Guedel airway, which is still in use today; published his classic texts *Introductory Outline to Anesthesia* (1935) and *Inhalation Anesthesia, A Fundamental Guide* (MacMillan, NY, 1937, second edition 1951); and held Wednesday afternoon teaching sessions in his garage where the Guedel airway, among other items, was first machined. These sessions were well attended and well loved by local and visiting anesthesiologists. He also went to San Francisco periodically and conducted research on CO₂ with Drs. Chauncey Leake and Mary Botsford. He was head of the section of anesthesia at the Mayo Clinic under Lundy in 1925-26, then stayed on from 1925-33. He came to Los Angeles in 1933, one of the best-trained anesthesiologists in town. He was an associate professor at the College of Medical Evangelists (CME) from 1933-39 and then became the chair of anesthesia at USC in 1939, remaining until 1958. He was elected the first president of the CSA in 1948 and, a few months later, also was elected as the president of the ASA. He received the ASA’s Distinguished Service Award in 1953.

Bruce Anderson was the person who stimulated the CSA’s founding in 1948. As a Stanford medical student, he was exposed to anesthesia by Caroline Palmer. Anesthesia training was at the Mayo Clinic. He practiced at the Merritt Hospital in Oakland.

Chauncey Leake, Ph.D., was a UCSF pharmacologist with a great interest in anesthesia due to his previous experiences at the University of Wisconsin, where he worked with Ralph Waters. He was a close friend of Arthur Guedel. He agreed with Waters that anesthesia was clinical physiology and pharmacology. He was recruited to UCSF in 1928, and he continually supported the UCSF anesthesia department in research and academic matters and contributed to many anesthesia research projects. His medical student pharmacology course was influential in the development of many future anesthesiologists.

Hugh Hathaway, often called “Hatch,” was trained at the University of Wisconsin under Waters, where he was a close friend of Virginia Apgar. Because of difficulty with interpersonal relations, Waters did not think Hathaway was ready when influential San Francisco neurosurgeon Howard Nafziger, then chair of surgery at UCSF, insisted on having a Waters-trained anesthesiologist to be chair of the UCSF department. Hathaway was the only possible candidate at the time. Waters postponed as long as possible, but Nafziger argued and pressured him. “Hatch” finally came to UCSF in 1940. Problems soon appeared related to drug use and patient deaths. He lasted only a few years. His drug rehabilitation treatment was paid for by his previous colleagues at Wisconsin. He was replaced by a non-academic anesthesiologist, Frank Murphy.

William Neff was appointed chair of anesthesia at Stanford to replace Dr. Caroline Palmer, a Botsford trainee, in 1937. A 1930 graduate of Hahnemann Medical School in Philadelphia, he trained with Ralph Waters from 1932-34. He made important contributions to thoracic anesthesia and helped found the CSA. He was the founder and the energetic force behind the Guedel Memorial Center in San Francisco.

Forrest Leffingwell was a 1933 graduate of the College of Medical Evangelists in Los Angeles. He completed anesthesia training at the Glendale Sanitarium and Hospital.
which is now Glendale Adventist Hospital. He became a clinical instructor at White Memorial in 1941 but was called for Army service. He spent most of World War II in the Pacific, serving as chief of anesthesia in several large facilities. On his return, he became chair of anesthesia at White Memorial and also an attending anesthesiologist at Los Angeles County General Hospital. He then was professor and chair of anesthesia at Loma Linda. He was president of the CSA in 1950-51, speaker of the ASNs House of Delegates from 1953-60, and ASA president in 1962.

He received the ASNs Distinguished Service Award posthumously in 1969.23

Organizing the State

Local Organizations: By 1919, both San Francisco and Los Angeles had active local organizations, the Northern California Society of Anesthetists and the Southern California Society of Anesthetists. There is no information on what was happening in San Diego. The exact dates when the San Francisco organization began and ended are unknown. Evidence for it exists only in the Minutes Book of the Southern California group, which records frequent communication back and forth between the two groups, and one announcement of a meeting.27 It was organized in 1940 by William Neff, the chair at Stanford; Hugh Hathaway, the new chair at UCSF; and Bruce Anderson.28

The Los Angeles organization began in 1919 and was led by its secretary, Eleanor Seymour. It very aggressively worked to eliminate nurse anesthetists by lobbying surgeons and hospitals; by getting various medical organizations to pass resolutions against nurse anesthesia; and by attempting to get legislation against nurse anesthetists.29 In 1934, the group, now the Anesthesia Section of the Los Angeles County Medical Society, sued a local nurse anesthetist and the hospital which employed her. The physician group lost, including an appeal to the State Supreme Court.30 This loss led to much less physician activity in the south.

Competition!

By 1919 when anesthesia societies were formed in both Northern and Southern California, nurse anesthesia was a clear threat. This threat was even a primary cause for the southern group's formation. Little information is available regarding the formation of the northern group, but clearly the organization's activities were centered on the fight against nurses. However, because of manpower problems, physician anesthetists could not cover all operations, especially emergencies and obstetrics. Physicians even wrote that nurses could do emergencies and obstetrics, casting the die for the preservation of nurse anesthesia.

A final blow was the 1934 court decision, Chalmers-Francis v. Nelson, Los Angeles Supreme Court, 1934. The case was initiated by the Anesthesia Section of the Los Angeles County Medical Association, which sued a local nurse anesthetist and the hospital, St. Vincent's, which employed her. A bitter battle pitted old-time surgeons, many from the Mayo Clinic, where nurse anesthesia practice was active in spite of the presence of John Lundy, against younger physician anesthetists. The practice of nurses versus physicians was compared and found to be similar, due to the few agents and techniques then available.34 The decision was in favor of nurses as the court ruled that surgeons were supervising nurse anesthetists, so the nurses were not practicing medicine without a license. This ruling had enormous influence locally and nationally and continues to be cited today.35

In the south, the Los Angeles County General Hospital, now "Big County" or LAC/USC Medical Center, had professional physician anesthetists along with the usual interns from 1919 until World War II. Interns assigned to the service did most of the work. When World War II began, severe manpower shortages forced the hospital to hire nurse anesthetists in 1943.26 By the end of World War II, nurse anesthetists had established themselves permanently in many areas of the state.

In comparison, nurse anesthetists in the state organized officially in February, 1930.31 Surgeons organized earlier, no doubt due to their larger numbers. The Los Angeles County Surgical Society first met in 1916.32 The Pacific Coast Association of Surgeons, still an active group, was formed in 1925.33

The Pacific Coast Association of Anesthetists (PCAA): This group began in 1921 through the united efforts of the Southern and Northern California societies, stimulated by Dr. Frank McMechan's efforts to organize anesthesia throughout the entire United States. Membership was open to "all licensed and qualified members of the medical and dental profession, as well as research workers interested in advancing the specialty of anesthesia." The entire Pacific Coast and Rocky Mountain states were included.34 The first meeting was held jointly with the CMA Section on Anesthesia in 1922. George Waller of Los Angeles was elected the first president; Mary Botsford was elected vice president; and Eleanor Seymour was elected secretary.35

The CMA Section on Anesthesia: In response to the many threats against physician anesthesia around 1920, there was great need for a state organization. As was common at the time, this was linked to organized medicine. Drs. Botsford and Seymour were both well placed in organized medicine and the effort to organize the Anesthesia Section of the CMA, which began in 1921. This was the first anesthesia section in any state medical society in the United States. It meets annually for a scientific session, during CMA

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California... Continued from Page 11

meetings. Botsford was the first president and Seymour was secretary.

**The California Society of Anesthesiologists**: This organization evolved from the CMA Section on Anesthesiology. The impetus was based on the need for a political as well as educational organization and a remark by the new ASA (a group just evolving from the New York Society and the American Society of Anesthetists) executive director to some Bay area anesthesiologists at a University of Utah meeting. Due to the size by then of the state’s anesthesia community, California was an immediate political power. Charles McCuskey of Los Angeles was the first CSA president; he was also elected ASA president the same year, 1948. The ASA assumed its present configuration with a House of Delegates from districts that year.

**Training**: The first training courses were for interns, as anesthesia residencies did not exist until the late 1930s. Apparently, hospital administrators objected to these on economic grounds. The Minutes Book of the Southern California Society recorded on November 31, 1919,

> The Management of the University Hospital has objected to the giving of the usual 3 months course of practical work to interns as such interns would occupy a room which in a year’s time would bring in so many dollars return to the Hospital, should it be given over to the use of Patients! However, interns at the Children’s are still having this course—although it is elective and irregular at the University Hospital and some interns are going there without practical training in anesthesia.

Due to the efforts of the local anesthesia organizations, 10 hours of training in anesthesia was required by the state for interns; this increased to 25 hours in 1920, and the groups were asking for 32 hours in 1921.

The state’s first post-graduate course on anesthesia began in January, 1919, and seems most modern. It accepted four students. Lectures and demonstrations would be in the afternoons. There would be clinical practice in the morning and the student would give anesthesia while the supervising officers would give anesthesia under the supervision of one of the teachers. Instructors were Dr. Botsford and her trainers, Drs. Mary Kavanaugh, Henrietta Duggan and Mary Turnbull Murphy. The announcement noted, “It is also a striking sign of the times that this course should be entirely under the control of a group of noted women physician anesthetists of San Francisco.” This was short lived, however. The Minutes Book of the Southern California Society of Anesthetists noted on September 2, 1919,

> Dr. Seymour reported anesthesia conditions in and around San Francisco to be in deplorable condition. The course in Anesthesiology has been dropped from the University of California Medical Department and lay persons generally substituted in the University and other hospitals.

The Minutes Book also reported attempts at a commercial course of anesthesia in Los Angeles at the Angeles Clinic.

**Summary**

All these events and many people led to modest anesthesia accomplishments in the state with some national firsts, until World War II. However, California was still behind the East in training programs and organizations. The first generation of physician anesthetists here had ended. Only the CMA Section on Anesthesia was in place organizationally. Stanford had the sole residency. A disastrous experience with academic anesthesia was beginning at UCSF. USC would not have a residency until 1946. UCLA did not even exist at this time and didn’t have a residency until 1951. Health insurance with guaranteed reimbursement and the exposure of hundreds of physicians in World War II to anesthesia who would then choose anesthesia as a specialty, as well as the establishment of the current state organization, were still to come.

**References**

1. This section, unless otherwise referenced, is taken from Calmes SH. Anesthesia in early California, *The History of Anesthesia*, Atkinson RS and TB Boulton, eds., London: The Royal Society of Medicine Services, 1989, p. 129-133. This contains specific references.
10. Olive View-UCLA Medical Center Archives, Sylmar, CA.
23. No author. DSA awarded posthumously to Forrest E. Leffingwell, MD. *ASA Newsletter* Dec. 1969, 4-5; Biographical sketch of members of the ASA, no date.
24. Calmes SH. Anesthesia practice in Los Angeles, 1934: A contributor to the legal ruling nurses

Continued on Page 20
Book Review
by Donald Caton, M.D.
University of Florida, Gainesville, Florida

The History of Pain
by Roselyne Rey, translated by L.E. Wallace, J.A. Cadden and S.W. Cadden

Although published in 1995, The History of Pain, by Roselyne Rey, has largely been overlooked by anesthesiologists. The author, who died before the English translation of the text was published, had been a research fellow at the Centre National de la Recherche Scientifique in Paris. The book, a comprehensive review of pain from ancient to modern times, deals with theories of the biology of pain, its treatment, and to a lesser extent, social implications of pain and suffering in western civilization.

The history of anesthesia appears in one of the later chapters. It contains familiar stories of Davy, Beddoes, Jackson, Wells, Morton and others. Of greater importance is the review of the response of French scientists and physicians to the “great discoveries” of the nineteenth century. Here the reader may learn of the work of Megendie, Bernard, Velpeau, and other French physicians and scientists who made significant contributions to the science and treatment of pain. This literature, less familiar to those of us who do not read French, is no less important to our history. In 1846, French physicians and scientists led the world in the development of modern medical science. Many of the surgeons present for Morton’s first successful demonstration of ether anesthesia, had either trained in France or been influenced by someone else who had. Their work during the nineteenth century had great influence elsewhere.

To imply, however, that this book deals primarily with the history of anesthesia, misleads. The primary subject is pain itself. In this regard, the author has done a magnificent job reviewing development of pain concepts, starting with Aristotle, who classified pain as an affective state, akin to pleasure, rather than as a sensation, like temperature or touch. She proceeds quickly through the Middle Ages to the Enlightenment, when physicians began to reclassify pain and speculate about some of its biological properties. The best section of the book, perhaps, deals with the scientific developments of the nineteenth century. Here the reader may learn about the work of Megendie and Bell, the impact of Müller’s theory of specific nerve energies, the use of August Waller’s studies of nerve degeneration to elucidate sensory pathways, and the influence of Brown-Séquard’s studies of crossed transmission within the spinal cord—to name but a few of the subjects covered in the text.

From the author’s presentation, three points emerge. First is the extent to which development of pain concepts grew from studies of sensation and the function of the nervous system. Second is the close historical relationship between biological concepts of pain and philosophical concepts of awareness and the nature of the soul. Lastly comes how modern methods for the treatment of pain, the isolation of morphine from opium, the discovery of the anesthetic properties of cocaine, and the development of inhalation anesthesia were parallel with, but independent of basic studies of the anatomy and physiology of pain.

I enjoyed the book and learned a great deal from it. This translation by L.E. Wallace, J.A. Cadden and S.W. Cadden, appears to be good. It is not light reading, however. I had to concentrate on the text and read some passages several times to absorb the implications of the material.
Anesthesia History Association
Annual Meeting and Dinner
October 19, 1998
Orlando, Florida
All Photos by Miguel Colón-Morales
On Monday, October 17, 1998, the Wood Library-Museum sponsored a "Meet the Authors" and Book Signing, featuring the authors whose work appears in the two-volume Careers in Anesthesiology: Autobiographical Memoirs (below). Above, left to right, are Drs. Selma Calmes, Joseph Artusio, Jr., Eli Brown, William Hamilton, and E.M. Papper. Below left is Dr. C. Ronald Stephen and right is Dr. Albert M. Betcher.

Susan Schipper-Smith, Drs. Doug Bacon and Elliott Miller

Dr. Edward Johnson (left) and Dr. and Mrs. Leslie Rendell-Baker

Mrs. and Dr. Lucien Morris and Dr. Burdett Dunbar

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Annual Meeting... Continued from Page 14

Claire Johnson (left) and Dr. George Edwards (right)

Drs. Nicholas Green and Doris Cape

Dr. and Mrs. Nacienceno Valencia and Dr. and Mrs. Miguel Colón-Morales

Dr. Maurice Albin

Dr. Ingrid Hollinger and Dr. and Mrs. Carlos Parsloe

Dr. and Mrs. Clyde Jones (foreground)
From the Literature

by A. J. Wright, MLS—Department of Anesthesiology Library, School of Medicine, University of Alabama at Birmingham


Bacon DR. Editor’s page: the Sphere is fifty? NYSSA Sphere 50(2):5-6, April-June 1998 (reproduction of first newsletter issue pp 7-8).


Bacon DR. Unsung heroes: the pediatric cardiac anesthesia story. ASA Newsletter 62(9):9-10, September 1998 (3 portraits; 3 refs.).


Cousin MJ. Saint-Louis Hospital, Tuesday, 15 December 1846...the introduction of surgical anesthesia in France. Caha Anesthesiol 45(3):73-78, 1997 (French).


McKechnie FB. Development of rectal an-
Year 2000 Laureate of the History of Anesthesia
by Nicholas M. Greene, M.D.

Nominations are invited for the person to be named the second Wood Library-Museum Laureate of the History of Anesthesia in the year 2000.

The Wood Library-Museum Program, established in 1994, has as its purpose creation of increased recognition of the richness and importance of the history of our specialty by recognition of the work of scholars who have made singular contributions to the field. The honor is awarded every four years by the WLM Laureate Committee to an individual who has a demonstrable record of contributing by Nicholas M. Greene, M.D.

The first Laureate, Dr. Gwenefer Wilson of Sydney, Australia was honored in 1996.

The Laureate Program is international. Nominations for the award are sought by physicians, not just anesthesiologists, as well as medical historians regardless of where they live. All nominations must include one hard copy of each of five sets of materials. These include:

1. An English language copy of the nominee's curriculum vitae;
2. A copy of the nominee's bibliography;
3. A letter of nomination in English providing a detailed assessment of the value and merit of the nominee's scholarly achievements in the field of the history of anesthesia, (this letter will be an important determinant in the selection of the Laureate);
4. A letter signed by the nominee stating that his/her permission has been given for submission of his/her name as a candidate for consideration (without such a letter, the nomination cannot be considered); and
5. A copy of what the nominee regards as his/her most important single publication on the history of anesthesia. If this publication is considered to be a monograph, complete data shall be provided about whether the monograph is still in print, on its cost and where the monograph may be obtained. If the publication is no longer in print, the nomination shall include a copy of each of not less than four reviews of the monograph that appeared in contemporaneous, peer-reviewed journals.

Supporting letters from individuals who know a nominee offered by someone else are helpful but not required.

Nominations offered for the 1996 Laureate can be renewed and will be considered for the year 2000 by sending to the WLM an update of the candidate's curriculum vitae, together with updated letters of support.

The name of the individual selected by the Laureate Committee to be the year 2000 Laureate will be announced in October, 1999, in order to assure that the honoree will be free of other commitments in October, 2000, during the annual meeting of the American Society of Anesthesiologists in San Francisco. At this time the honoree will be given a suitably inscribed medal, an appropriate certificate for framing, and an honorarium of $3,000. The proceedings do not include a lecture by the newly inducted Laureate, though a 3-4 minute acceptance speech would be in order. The honoree and spouse will be provided a round-trip tourist class airfare from their home. A $175 per diem for 3 days in San Francisco will be provided.

Though the post of Laureate is not associated with prescribed duties, it carries with it the WLM Trustees' expectation that the Laureate will remain active in publication of historical materials and will continue to contribute to the education of anesthesiologists and others through lectures and participation in appropriate panels and seminars.

Additional information regarding the Laureate Program may be obtained by contacting, by mail only, the WLM Laureate Committee at the Wood Library-Museum, 520 N. Northwest Highway, Park Ridge, Illinois 60068-2573. Faxes will not be accepted.

Literature . . . Continued from Page 17


Stephen CR.M. Digby Leigh, M.D., pioneer pediatric anesthesiologist.ASA Newsletter 62(9): 17-18, September 1998 (1 portrait; 1 illus.).

Walker AE. Genesis of Neuroscience. American Association of Neurological Surgeons, 1998 (includes chapter "Manifestations of Cerebral Disorders: Headache, Epilepsy, ... ").


IN MEMORIAM: Donald P. Todd, M.D.

by Daniel B. Carr, M.D.

Donald P. Todd, M.D., died suddenly at age 80 on August 24, 1998, of complications from pancreatic cancer. He had learned of this diagnosis several months before his death but it had not dimmed his continually helpful and good-natured spirit nor caused him disabling pain.

The impact of Don's five-decade long career in anesthesiology with its major emphasis upon pain and regional anesthesia is nearly unique. Don was not simply an innovative, intuitive, empathetic, knowledgeable and highly intelligent clinician. Beyond these enviable attributes, Don comported himself with a self-effacing dignity and patience that calls to mind the phrase "gentleman of the old school." Those privileged to work with Don understand that although he never boasted of his own achievements, the sustained high level of his professional skill and personal attributes during five decades of practice at the Massachusetts General Hospital resulted in his having a remarkable impact upon thousands of anesthesiologists, pain specialists and many other health professionals—not to speak of countless numbers of grateful and devoted patients. These patients recognized in Don a wise and humble physician whose goal at all times was to reduce their suffering and pain-related distress.

Not only did lay persons seek Don's counsel but so did a large number of physicians, nurses and other health professionals, for Don was a "doctor's doctor" to whom fellow professionals referred themselves or their families or came for counsel on difficult cases or administrative issues. Donald had been the senior administrative officer of the Department of Anesthesia under Henry K. Beecher, its first chief, and his successor; Richard Kitz. Donald's tenure in the Department began in the 1940s. Indeed, a caption in the famous text Pain and the Neurosurgeon by White and Sweet describes a stellate block performed in 1949 by Donald P. Todd. Reflecting on this caption for a photo of a hand severely afflicted by what now term "complex regional pain syndrome," one realizes that by 1949 Don had not only perfected his own technique, but had developed a referral practice for patients in pain such that reference to a block having been done by Don guaranteed that it was done properly, in an unhurried fashion and with verification of its success.

Having joined Don in the pain clinic directly from my residency, I initially was often impatient with the time that Donald spent with each patient and in each block—that frequently resulted in running far behind schedule many afternoons. Yet as my own practice matured I recognized that the essence of Don's practice was his total focus upon the needs of each patient and his characterologic inability to brush aside in the name of schedule or efficiency the demands of the patient before him. When Donald was with a patient in the office or in the operating room, little else mattered. This view, were it to be adopted more widely, would go a long way to improving patient safety and decreasing our interactions with the legal profession. Patient safety was one of several areas in which Donald made his mark. He co-authored as a protégé of Beecher a remarkable study of complications associated with anesthesia based upon a survey of 500,000 anesthetics.

The endpoint in this survey was death of the patients. It was a landmark study that placed patient safety issues on the map of clinical anesthesia practice. I recall asking Don why he had selected death as an endpoint, as it seemed fairly extreme. Don replied with his usual chuckle that it was the only endpoint whose definition he could get all collaborating sites to agree upon!

Donald was an integral part of the first team to implant an epidural catheter for morphine delivery, in a self-contained subcutaneous system to provide what later became popularized as patient-controlled epidural opioid analgesia. Donald also contributed to the techniques of continuous catheter blockade of the stellate or lumbar sympathetic chains. I recall Don's great patience in carefully placing such catheters and in replacing them on the all-too-frequent occasions when they would migrate or kink. Thinking back to the pioneering efforts of Don and like-minded colleagues during the 1940s and 1950s, to whom all anesthesiologists owe an enormous debt, one recalls Pliny: "The care and diligence of the investigators of old deserve the utmost admiration, for they examined everything and left nothing untried."

Donald's insights were often expressed in terse fashion. Once, amidst the enthusiastic reception of an early study of pre-emptive analgesia with local anesthetic blockade, that described a lengthening of time to the first request for analgesia after orthopedic surgery, Donald pointed out that there was likely lingering sympathetic or somatic nerve block achieved by local anesthesia that accounted for this delay in the "pre-emptive" group—a healthy skepticism that remains shared by many in this controversial area.

Donald's stamina was amazing. He worked on a daily basis through age 75 and only began to lighten his schedule during the last few years of his life. Not only did Donald provide operating room anesthesia (indeed he ran the operating room one day a week when I first joined him in the 1980s) but over three decades he provided anesthesia for over 10,000 electroconvulsive therapy treatments at McLean Hospital. The latter began because he used to live near McLean; owing to his expertise and the confidence of his psychiatrist colleagues in his anesthetic skills, he continued to hold this responsibility even after he moved far away. All of Don's colleagues had a great sense of confidence that if one could not figure out how to get the needle in a specific foramen or how to achieve suitable clinical management in an emergent or crisis situation, Don knew, and would quickly relate how to solve the problem. Donald's instinctive, immediate grasp also encompassed the psyche of applicants for positions, patients, administrators, surgeons and trainees. It is a treat to read Don's lapidary style in his interview notes for applicants who later became staff anesthesiologists, or even chairmen.

I do not recall Donald ever making a personal demand to shorten his work day or cut any corners although he was surrounded by individuals who frequently did so. Donald communicated a remarkable sense of inner peace. His longevity, continued productivity and exemplary comportment as a physician and family man led to his being a standout role model in an institution and a city replete with medical talent. The inaugural speaker for a Boston-wide dinner address to fellows in pain management, Don gave a witty, first-hand account of the development of the specialty from humble origins to a high state of refinement. Donald held a standing-room only crowd spellbound for two hours. No one else could have given that lecture.

From the perspective of a friend and former student, I marvel at the strength, dignity and humor with which Donald and Mary faced his final illness. I did not have the privilege to know his first family but remember well when, in response to a patient's query as to whether Donald had any children and if so what their ages were, Donald replied "yes" and "four through forty-four!" From what I have seen of his son Gordon, he is a remarkable young man who is well suited to follow in his father's footsteps. Literally thousands of Donald's colleagues extend their best wishes and condolences to Mary, Gordon and Donald's other children. Don's passing is a watershed for many changes (not all for the better) in the practice of medicine.
Friends of the Wood Library-Museum: An Open Invitation
by Doris K. Cope, M.D., Trustee
Wood Library-Museum of Anesthesiology

The Board of Trustees of the Wood Library-Museum of Anesthesiology (WLM) invites all ASA members and supporters to become a Friend of the Wood Library-Museum. This Fall began the second year since the inception of this group. The purpose of the group is to support the mission of the WLM in preserving our professional heritage and to join in activities that support the educational and academic mission of the library and museum. Currently, we have more than 100 members, including senior anesthesiologists from the United States and abroad, residents and fellows in anesthesiology, members of the ASA Board of Directors and anesthesiologists in private practice and in academia from around the country.

Each year for the Friends begins with the Friends Appreciation Tea at the WLM exhibit during the ASA Annual Meeting, held in conjunction with the book-signing event by authors of the autobiographical series published by the WLM known as Careers in Anesthesiology. This festive event is a time to meet old and new friends, obtain an autographed book of memoirs written by pioneers in anesthesiology and to have a respite after the E.A. Ravenstine Memorial Lecture. Special discounts are also offered throughout the year for the WLM Friends, such as last year’s “Sale of the Century” with significant discounts on WLM books.

As a special “thank you” to our Friends who renew their membership or become new members this year, a commemorative paperweight, replica of the memento presented by Paul M. Wood, M.D., to the first Friends group of the WLM 50 years ago, has been produced in limited quantity. These commemorative paperweights will be presented to Friends whose memberships are current in this academic year. The annual membership contribution is $40.

To become a Friend of the WLM, contact Patrick Sim, Librarian, Wood Library-Museum of Anesthesiology, 520 N. Northwest Highway, Park Ridge, IL 60068-2573 U.S.A., or e-mail <p.sim@asahq.org>.

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