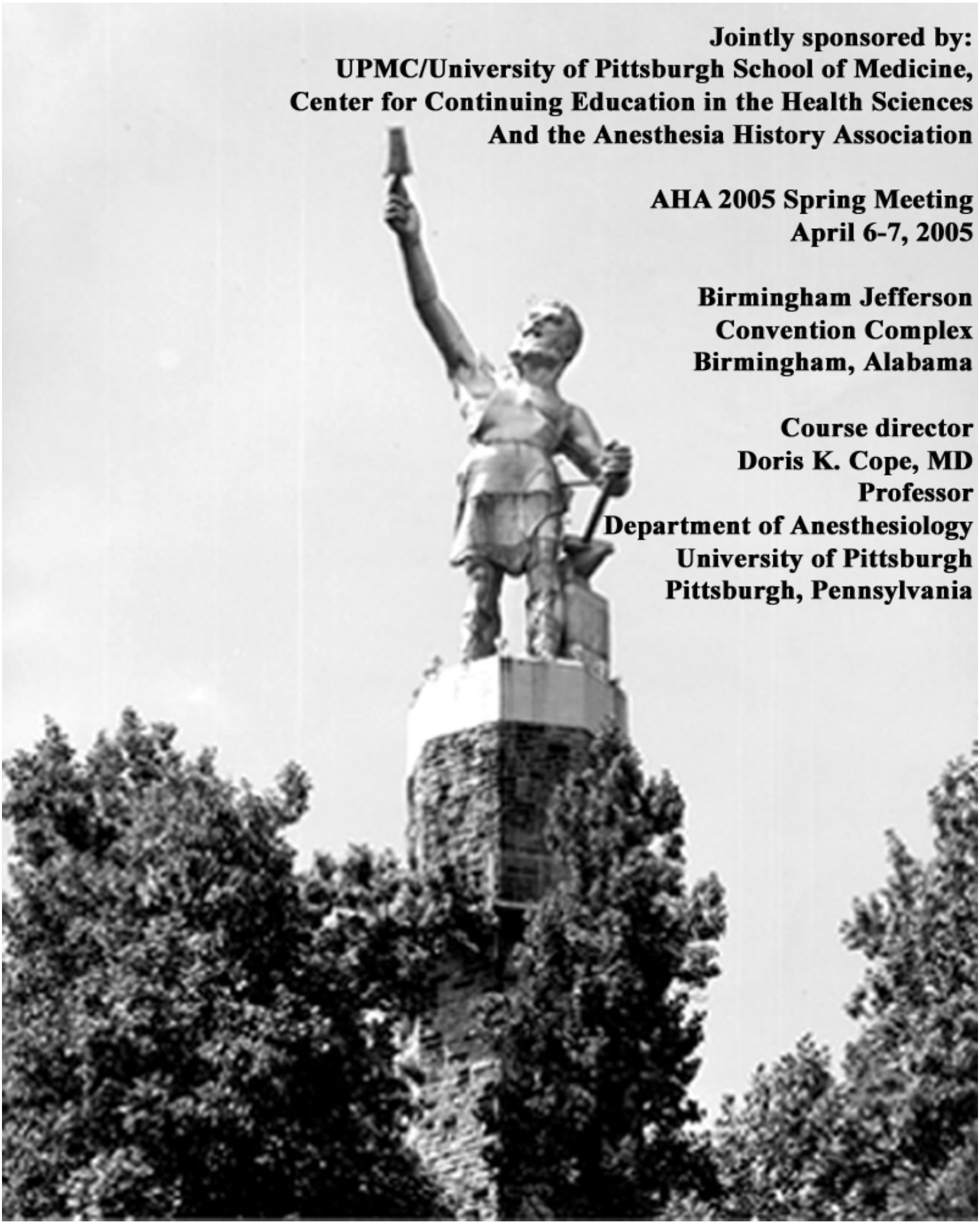

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AHA 2005 Spring Meeting
April 6-7, 2005

Birmingham Jefferson
Convention Complex
Birmingham, Alabama

Course director
Doris K. Cope, MD
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AHA 2005 Spring Meeting
Birmingham Jefferson Convention Complex
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Who Should Attend

Primarily physicians, anyone interested in medical history.

Overview

The program is intended to enhance knowledge of historical events in anesthesia. Great advances have been made in the field of anesthesiology and it is important that practitioners recognize the historical roots of current practice. Meetings of the Anesthesia History Society offer a mechanism of disseminating and archiving the achievements that have been made in the field over the years. Needs assessment is based on prior course evaluations, literature, and expert opinion.

This program is intended to enhance knowledge of historical events in anesthesia.

Continuing Education Credit

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the University of Pittsburgh School of Medicine and the Anesthesia History Association. The University of Pittsburgh School of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

*The University of Pittsburgh School of Medicine designates this educational activity for a maximum of 7.5 category 1 credits toward the AMA Physician's Recognition Award. Each physician should claim only those credits that he/she actually spent in the educational activity.

*Other healthcare professionals are awarded 0.75 continuing education units (CEU's) which are equal to 7.5 contact hours.

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COURSE SCHEDULE

Wednesday, April 6, 2005
University of Alabama at Birmingham
Anesthesiology Library

Tour attendees should plan to meet at the Anesthesiology Library at 9:00 a.m.

9:00 AM Informal Tours

12:00 PM Lunch

Thursday, April 7, 2005
Medical Forum, 3rd Floor
Birmingham Jefferson Convention Complex
Birmingham, Alabama

7:00 AM Registration/Continental Breakfast

7:45 AM Welcome

David H. Chestnut, MD and Doris K. Cope, MD

8:00 AM Opening Plenary Lecture

1847—John Snow's Annus Mirabilis, or Year of Consilience?

Peter Vinten-Johansen, PhD

Session A – Room H

9:00 AM Military Opposition and Religious Objections to Anesthestics, 1846-1848

George A. Swanson, MD

Travers vs. Wilde: Chloroform Acquitted

Ray J. Defalque, MD, and A.J. Wright, MLS

Koller and Halsted at the University of Vienna in the 1870's

Jason L. McKeown, MD

Noel A. Gillespie: Initial Researches

Mark E. Schroeder, MD

Session B – Room I

9:00 AM Charles Bernard Pittinger, MD (1914-1989)

Bradley E. Smith, MD

The Beginnings of Anesthesia at Washington University

William D. Owens, MD

Pediatric Anesthesia—Eighty Years Ago

Thomas J. Golembeski, MD, and David B. Waisel, MD

The Role of World War II Portable Surgical Hospitals in the Development of Anesthesiology as Physician Specialty in the United States

David B. Waisel, MD

10:30 AM Refreshment Break

Session C – Room H

11:00 AM The Rediscovery of John Snow: Was He Really Lost?

William D. Hammonds, MD

Displacing the Dolorimeter: The Fate of a Pain Measuring Instrument in the Era of Therapeutic Reform, U.S., 1940s-50s

Noemi Tousignant, PhD candidate

Alberto Gutierrez, The 'Hanging Drop' and Beyond

J. A. Aldrete, MD, O. A. Auad, V.P. Gutierrez, A. J. Wright, MLS

12:00 PM Luncheon Plenary Session

Sheraton Birmingham Hotel

Origins and Growth of the Medical Center in Birmingham

Charles A. McCallum, D.M.D., M.D.

Session D – Room H

2:00 PM The Rapid Rise and Fall of Rapacuronium

James A. Sparrow, MD

Anesthesia as Women's Work: The Historical Role of the Female Anesthetist

Robert D. Watson, Jr., MD

Regional Anesthesia in Children: The Mexican Experience

Estela Melman, MD

Development of U.S. Academic Anesthesia Centers in the 20th Century

Lucien E. Morris, MD

The Influence of the German-American Bond in the Evolution of Anesthesiology

as a Medical Specialty

Juan N. Pulido, MD, Ronald Mackenzie, MD, and Douglas R. Bacon, MD, MA

Session E – Room I

2:00 PM The Evolution of N20 Anesthesia as Revealed in Publications by Dr. Mary Botsford, Her Staff and Her Surgeons

Selma H. Calmes, MD

The Relationship between Anesthetists and Patients

Lawrence D. Egbert, MD, M.P.H.

Labat and the Early History of ASRA

Mark G. Mandabach, MD

Famous Writers and Anesthetic Agents

A. J. Wright, MLS

4:00 PM Adjournment

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In accordance with the policies on disclosure of the Accreditation Council for Continuing Medical Education and the University of Pittsburgh Faculty Advisory Committee for Continuing Medical Education in the Health Sciences, presenters for this program have been required to identify all financial interests with pharmaceutical companies, biomedical device manufacturers, and other healthcare-related for-profit entities.

No significant financial relationships with commercial entities were disclosed by:
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Alberto Gutierrez, The "Hanging Drop" and Beyond

J. Antonio Aldrete, MD, MS; O. A. Auad, MD;
Vicente P. Gutierrez, MD; and A. J. Wright, MLS

It seems logical that dentists initiated inhalation anesthesia and that surgeons developed regional anesthesia. Of the latter, the Argentinian Alberto Gutierrez is known for the alternative approach to the epidural space. However, his contributions were numerous both in surgery and anesthesia. Born in 1892 into a "family of surgeons" he was assisted in the OR in 1913, in the Gutierrez Clinic, during his 1st year of medical school, became teacher-assistant of anatomy the next year and continued to teach it until he became Extraordinary Professor in 1942.

He founded the *Revista Anatomo Quirurgica* in 1922 and became editor of the *Revista de Cirugia de Buenos Aires* in 1926 and the *Revista Argentina de Anestesia y Analgesia* in 1939, which has been published uninterruptedly as *Revista Argentina de Anestesiologia* until to date. He remained the editor of both until his passing on February 23, 1945. As pioneer in regional anesthesia he either modified established techniques or created his own for radical mastectomy, appendectomy, cholecystectomy,nephrectomy,meningocele, parotidectomy, gastrectomy and designed a device to rapidly infiltrate local anesthetics. In addition, he performed trigeminal neurectomies, splachnic plexus blocks, lumbar sympathectomies and T-M Joint excisions for chronic pain.

In 1932 he began using epidural anesthesia applying the "direct method" (loss of resistance of Pages and Dogliotti) or the "indirect method" (inserting the needle in the subarachnoid space and then withdrawing it until CSF stop dripping. In early 1933 while trying to find the ES by LOR he found resistance, disconnected the syringe and noted that a drop of fluid was left hanging from the hub; he proceeded to advance the needle by holding the hub with his thumb and index finger, he suddenly saw it disappear, reconnected the syringe and was unable to aspirate fluid, injected 1% procaine in 4 bolus of 5ml and proceeded to operate on the patient. By next year, more than 70% of the operations performed at the Hospital Español were done under peridural anesthesia.

He went into study the topographical relation of the emergence of nerve roots to the spinous processes of each vertebra, measured the distance from skin to ES in 3200 patients, determined dose/response from the different concentrations of local anesthetics, measured the effect of EA on arterial blood pressure and heart rate and blood chemistry and conducted a mail survey among users of EA in South America and Europe. He also defined the extent of the sensory block in relation to the volume of anesthetic and to the site of injection and how to avoid incidental dural punctures and other complications while performing more than 12 000 operations, about 6000 under EA, wrote 300 articles and 17 books. Although he remained a surgeon he realized the importance of quality anesthesia, became an advocate for a special section for Anesthesiologists within the Sociedad de Cirugia of Bs As which was created in 1942 and wrote an editorial entitled "About relations between anesthesiologists and surgeons in their respective journals."

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The Evolution of N_2O Anesthesia as Revealed in Publications by Dr. Mary Botsford, her Staff and her Surgeons

Selma Harrison Calmes, MD
Olive View – UCLA Medical Center
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Dr. Mary Botsford was the first West Coast physician to devote her practice to anesthesia, beginning in 1897[1]. Although self-trained she was able to rise to become the first chief of anesthesia and the first clinical professor of anesthesia at the state's most prestigious medical school[2], the University of California at San Francisco (UCSF). The 14 papers she published between 1916 and 1937 contributed to a national prominence. Also, her UCSF department of anesthesia staff (all female) published papers, and surgeons she worked with documented her anesthesia practice in their papers. Botsford and her staff commonly used N_2O-O_2 anesthesia. This paper looks at how they gave nitrous oxide and how techniques, equipment and concepts of hypoxic gas mixtures changed over time, as shown in these published papers. This abstract expands a previous paper on the introduction of N_2O into clinical practice in California[3]. That paper found that, although information on N_2O anesthesia reached the state by 1877, there was no evidence of its use for surgery until 1914. Publications on N_2O peaked from 1915-1921 and again in 1925-26. After 1926, there were few articles on N_2O.

Four of Botsford's 14 papers were on N_2O anesthesia. Her first paper[4] was on 5 years experience with N_2O. She reported 627 cases done for 40 surgeons. Nearly 60% were done with N_2O-O_2 alone, 28% needed some ether for muscle relaxation, and 14% were done with ether only. She noted N_2O anesthesia demanded more skill from the anesthetist and a surgeon who could deal with lack of relaxation. Best results were with anoci-association: premedication with morphine plus local anesthesia. Her conclusion was that N_2O was not used enough. Reasons were the lack of skilled anesthetists, cost of the gases and lack of opportunity for surgeons to "test its efficacy." "Cost of the gas is the factor which more than anything else retarded the appreciation of its value," she stated. She suggested rebreathing techniques to use less N_2O and also building N_2O manufacturing plants in hospitals, to decrease cost.

Her second paper[5] addressed hypoxia and what percent of oxygen was safe for anesthesia. It reviewed the literature on hypoxia during N_2O anesthesia and described planned animal experiments to study how much O_2 might be needed. (These were never completed.) Two years later, she described her use of N_2O-O_2 anesthesia in children[6]. She noted that N_2O was "almost universally condemned" for children, due to the need to breathe through mechanical valves. She reported on 30 children less than 4 years of age and described her technique, which always included O_2. The fourth paper[7] described reasons to use N_2O in oral surgery, the risk of hypoxia and the need to treat it as it occurs, by increasing O_2 delivery. No specific equipment was mentioned in any paper.

Three articles by her staff or trainees on N_2O were found. The most dramatic was on N_2O given by mask positive pressure for 21 thoracotomies, starting in 1910[8]. The simple mask

equipment was noted, although not the anesthesia machine. Three other articles included sections on N_2O. The risk of hypoxia was not noted.

Of the four articles by surgeons (1927-1936), two advocated N_2O-O_2 with good premedication and local anesthesia. One described this technique for tonsillectomies, done in 36 secs to 4 mins. Two discussed regional anesthesia and recommended N_2O to supplement an inadequate regional. Reflecting Botsford's professional approach to anesthesia, all surgeons expressed the need for preop evaluation, monitoring of vital signs and the avoidance of shock. It was clear that their anesthetists were very respected, reflecting Botsford's and her trainees comparatively high status as anesthetists.

Conclusions

1. N_2O was used in the state much earlier than previously thought, being used by 1910, including for thoracotomy.

2. Botsford and her trainees realized the risk of hypoxia. Botsford never completed her proposed studies on this. Both the major hospitals in San Francisco gave O_2 with N_2O and tried to avoid cyanosis, a somewhat unusual practice for the time.

3. Botsford and her trainees and surgeons realized the need for premedication and local anesthesia to supplement the weak effect of N_2O.

4. Botsford and her trainees were able to achieve a relatively high professional status with their surgeons.

5. Although equipment for delivering N_2O was not described, it is known that the Ohio Monovalve machine was used later. This did not come out until 1912 so would have not been available for cases reported as done in 1910.

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7. Botsford ME. Nitrous oxid-oxygen anesthesia in oral surgery. *Anes Anal* 1929;8:170-172.

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Travers vs. Wilde: Chloroform Acquitted

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The peak of the career of Professor William R. Wilde, the father of Oscar Wilde, came in 1864. At 49 he had become the leading British ophthalmologist and otologist, was a prolific medical writer and an authority on Irish archeology and folklore. He had introduced anesthesia in Dublin. His eccentric wife Jane, under the pen name of "Speranza" was an acclaimed poetess and Irish nationalist. Dr. Wilde had been knighted in early 1864.

Shortly after the knighthood ceremony, a pamphlet, signed "Speranza", circulated in Dublin, accusing a "Dr. Quilp" of having raped a "Miss Price" under chloroform during an office visit. The leaflet's author was Miss Mary J. Travers, the 29-year-old daughter of Dr. Robert Travers, professor of legal medicine at Trinity College. In May 1864, a copy of that pamphlet reached Lady Jane while she was vacationing in Bray. She immediately wrote to Professor Travers to denounce his daughter's behavior and deny her accusations. Mary Travers found the letter and promptly sued Mrs. Wilde for libel, asking 2,000 pounds in damages.

The trial opened in Dublin on December 12th, 1864, and lasted five days. Both parties had retained Dublin's topmost lawyers. The proceedings and the scandal enthralled Dubliners and the British medical world. Lady Jane denied her husband's infidelity (despite his known reputation as a philanderer) and accused Miss Travers of blackmail. Sir William did not take the stand, which was seen as an implicit admission of guilt. The star witness, of course, was Miss Travers.

In 1854, at the age of 19 she had consulted Dr. Wilde, who cured her deafness. He continued to treat her for her neck scar, a sequel of a childhood burn. A friendship developed, with exchanges of letters and gifts, loans of money, tickets to various events and invitations to the Wilde's house. She claimed to have repulsed his occasional amorous advances. She told the court that on October 14, 1862, while Dr. Wilde examined her scar, he became excited and tried to fondle and embrace her. As she resisted, he applied a handkerchief soaked with chloroform to her face. She lost consciousness and woke up in a bedroom where she was forced to drink wine. Still dazed, she fled home.

On cross-examination, she could not recall the exact date of the assault and admitted that she had invented the chloroform incident to dramatize her story. She now said that she had passed out when Dr. Wilde had suffocated her with her clothing. As she equivocated, under the prodding of the exasperated judge, she reluctantly confessed that she had been raped. The defense also forced her to admit that she had never mentioned the incident to her father and that over the next two years she had continued to visit with Dr. Wilde and to accept large sums of money. She grudgingly acknowledged that she had been fondled (and possibly violated) at several of those visits.

The cross-examination immensely damaged Miss Travers' story and exposed her as a highly unreliable neurotic. The jury, instructed by the judge to consider the libel, not the rape, found for the plaintiff and rewarded her a derisory farthing (1/4 of a penny). The Wildes had to bear the trial costs of 2,000 pounds, a considerable sum they could ill afford at that time.

The trial failed to reveal the true story, but Dr. Wilde's compromising letters presented by Mary Travers suggest that he had a ten-year affair with his pretty young patient (she may have borne him a child) and that he had become tired of her, her neurotic behavior and her constant demands for money. Thus snubbed, Miss Travers decided to disgrace him publicly.

Most of his colleagues and the medical journals sided with Professor Wilde, but the scandal took a great emotional toll. He lost his enthusiasm for medicine for the rest of his life, and died in 1876. Mary Travers survived him, dying in a poorhouse in 1919. She was 83.

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The Relationship between Anesthetists and Patients

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Purpose of this report: One often wonders what stimulates the curiosity to study a subject in the first place. This is the story of such a stimulus. A.H. (Buddy) Giesecke, then chairman of Anesthesia at Southwestern University in Dallas, told me in 1982 that an article concerning the preoperative interview by the anesthetist published in 1963[1] was the most quoted article in the anesthesia literature. I didn't know that. The paper had been published 19 years before!

I took my residency in anesthesia at the Naval Hospital in Philadelphia and then two years as a Navy sponsored fellow at the University of Pennsylvania under the supervision of Robert D. Dripps. Dr. Dripps was a dynamic person and very knowledgeable. Although he loved the questioning of research, he could be very dogmatic on the many occasions when he "knew" the answer. One meeting at Penn I will always remember. There was comment about visiting patients the evening before the operation rather in the style of Eckenhoff and Helrich when they wrote that the value of the visit should never be underestimated. They added that each patient must be considered individually.[2] Dr. Dripps dogmatically repeated this visit was very important for the patients.

"We should remember that we have an important effect upon our patients", he said. He used some language like the therapeutic laying on of hands (see the Epistle of James.[3] Dr. Dripps was definitely speaking biblically! I almost laughed. However, a mere fellow did not laugh at Robert D. Dripps! When you disagreed with him, you presented data.

DATA! I thought about this a lot and, after settling down when transferred to the U.S. Naval Hospital at Great Lakes, decided we should study this laying on of hands nonsense. The reader will understand my bias when I use the word, "nonsense." After all, one of the "advantages" of being an anesthetist is that close social relationships with patients are rarely required, much less intense psychological care. I listed some powerful psychological relationships with patients. Patients have psychological histories and habits. The disease has an effect. The hospital has an effect. The surgeons have an effect. The nurses have an effect. Our medications have an effect. Who would ever dream that a ten-minute visit by an anesthetist might have an effect?

As every researcher knows, one cannot properly state there is no effect from statistical data. With a lot of carefully organized data the best we might say is that the effect at most is small and not statistically significant. We planned on studying approximately 1000 patients. Randomly we saw the patients the evening before operation; we talked with them about arriving in the operating rooms, their sedation, what would happen, etc. Randomly we did not see the patients. A random half of the patients had barbiturate preanesthetic medication ordered for one hour before coming to the operating room. All patients received atropine injected about one hour before being sent to the OR. In the OR, the anesthesia technician took the patient's blood

pressure and asked were they calm and relaxed, were they sleepy, etc. He knew we were studying the effectiveness of the barbiturate but was not told about the visit at all.

In the military all research projects are evaluated by the Bureau of Medicine and Surgery. I automatically sent in a request for approval by BuMed. However, since I was confident the project would be approved, we* started work without waiting for the Bureau to respond. Six or seven weeks later they responded! Permission was denied and the reasons given were the very same reasons I had thought these visits were not needed! Of course we immediately stopped the project!

That was the first rule I abused. The second was that I peeked at the data we had already obtained! We had about 130 charts and they were neatly filed in my desk. Patients who had received a preanesthetic visit by the anesthetist were more likely to be calm than those who had not. The barbiturate was not even close to being significant although those patients clearly were sleepy. So, Dr. Dripps was right after all and it was very clever of me not to have laughed at his "laying on of hands" idea. All this was statistically significant at the .01 level so we could have simply published it had not BuMed denied approval to do the research.

I was leaving the Navy going to a job at the Massachusetts General Hospital under the direction of Henry Beecher. I told Dr Beecher about this dilemma and asked could we repeat the study? He agreed. George Battit, Herman Turndorf (who later went on to NYU and Bellevue) and I then visited or did not visit the nurse anesthetists' patients and they filled out the same evaluations as had the Navy OR technician previously. We checked the data after about 90 patients and found it statistically significant. We combined the MGH data with the USNH Great Lakes data and sent the article to *Anesthesiology*. Leroy Vandam was editor of Anesthesiology then. We received a polite but, I felt, rather curt rejection. This kind of social stuff was not something *Anesthesiology* published. We received a similar reply from Dr. Seldon at *Anesthesia and Analgesia*. I was astonished. Here we had random order, double blind, statistically highly significant data! I went to see Dr. Beecher and he laughed and said he was not surprised; try *JAMA*. So that was where it was published. A couple of years later, I was invited to speak at the University of Pennsylvania and Dr. Dripps introduced the subject. He was glad to see scientific proof that the laying on of hands by anesthetists was valuable! I did not laugh.

George Battit and I went on to study the effect of anesthetists talking in detail about educating patients as to what they could do to reduce postoperative discomfort.[4] We found that patients who had been instructed about how to modify pain when moving, deep breathing, or coughing requested half as much morphine for pain relief. In addition, our surgeons were discharging the educated patients from the hospital several days earlier than the control group.

As a sequel to that study, we enquired how much morphine patients received after removal of their gall bladder related to their religious affiliation. There were differences between Catholics, Jews and Protestants. *JAMA* would not accept that; it was too political! I should add that years later Alan Sessler invited me to present these ideas at the Mayo Clinic and John Michenfelder

argued vociferously that this was nonsense. All Mayo Clinic patients at that time were seen by the anesthetists in the OR. Data be damned.

Twenty years later the subject was reviewed.[5] Bennett noted the practice of anesthesiology had largely ignored the consistent research findings that psychological interventions can increase the ability of patients to recover from surgery. They included a comment worth repeating. Since the sole purpose of anesthesiologists in administering anesthesia is to reduce pain associated with operations, it appears reasonable for us to consider the whole job, the psychological and social as well as the technical and mechanical.

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*The study at the U.S. Naval Hospital, Great Lakes included Peter Bosomworth who later became chairman at the University of Kentucky, Alan Sessler who went on to finish his training at the Mayo Clinic and subsequently become their chairman, Ray Bush, Bob Woods and myself. The stimulus to submit this paper came from a former medical student, later resident, Stephen Jackson.

Pediatric Anesthesia -- Eighty Years Ago

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In a review lecture published in 1925, Dr. Charles H. Robson gave an overview of the issues and controversies facing pediatric anesthesiologists. When comparing pediatric anesthesiology practices of 2005 to those of 80 years ago, it is striking how Dr. Robson describes many of the same concerns which pediatric anesthesiologists today face.

One issue that retained relevance into the latter part of the 20th century is the question of the need for neonatal anesthesia. Dr. Robson states that many of his contemporaries felt that "infants under 7 days of age do not require anesthetics for operations." He describes this practice as "simply vivisection" and did not share the belief that "their association tracts for pain are not fully established and that minor operations may be carried out any damaging effects on the infant." He unequivocally states that he opposed this practice and advocated the use of local or general anesthesia for these patients.

Anesthetists recognized the possibility of differing anesthetic requirements for adults and children as early as the 1920's. Dr. Robson included in the "Prevalent Misconceptions" section of his lecture the "statement that children take more anesthetic agent to establish narcosis than do adults." He felt this was untrue and presented a complex argument based on airway obstruction and inadequate mask fit as to why induction of anesthesia takes longer in children than adults. While his conclusion that "the tissues of a child do not require any higher percentage of vapor than those of the adult" has been disproved by modern studies of MAC, the importance he placed on age-appropriate mask sizing and maintaining a patent airway during induction maintains relevance.

Robson's description of the effect of trauma on gastric emptying is particularly striking in its modern relevance. He explained, "the stomach is empty in from three to four hours after the taking of food." He then goes on to relay an anecdote about a trauma patient who regurgitated solid food 5 hours after a meal. He warns the reader "we must not consider ourselves safe in giving an anesthetic to accident cases, even of a minor nature, believing the stomach to be empty in four hours."

According to Robson's description, the passage of eight decades has not changed the fundamentals of pediatric mask induction. He routinely administered no premedication to his patients. He would then instruct the child to blow through the mask. "This is a psychological trick, for the natural impulse is to blow away a strange-smelling vapor. Obviously, the patient ventilates very thoroughly." He then described the gradual application of ethyl chloride "as the patient tolerates it" and concluded, "it is not an objectionable induction for it is the exception to have a child struggle or cry out."

In 1925, the most commonly performed surgical operation on infants was for pyloric stenosis. Standard management included preinduction passage of a "large-sized rubber catheter" into the stomach to remove the gastric contents. Dr. Robson recognized that these patients were usually dehydrated necessitating a slow induction and that "patience must be exercised by the anesthetist" in dealing with these frail patients.

Robson noted, "there is no more dangerous type of anesthesia than that required for removal of foreign bodies from the respiratory tract." This maxim remains true. Dr. Robson eloquently described the hazards inherent in maintaining deep inhalation anesthesia and the difficulties potentially encountered in ventilation during rigid bronchoscopy. It was commonly held in 1925 that all anesthetists should be "prepared to do and able to do a tracheostomy." In a remarkably prescient observation, he states "I would like to add that he should be able to pass an endotracheal catheter, by the sense of touch in any patient under anesthesia, whose mouth can be opened."

In conclusion, Dr. Robson's account of pediatric anesthesiology in 1925 is more remarkable in its similarity to modern pediatric anesthesiology than it is for its differences. This lecture illustrates that while the practice of pediatric anesthesiology has progressed dramatically over the past century, many of the underlying principles were known and taught as early as 1925.

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The Rediscovery of John Snow: Was He Really Lost?

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John Snow was an English physician who made substantial contributions to medicine. He is recognized as the first physician anesthetist, and the father of epidemiology. While doing research into the life of John Snow, I was surprised to learn that Snow had been "rediscovered" in the mid 1930s after being forgotten soon after his death.[1,2] It is a puzzling paradox that one of the most productive and brilliant physicians of the 1800s could be forgotten. I had an opportunity to discuss this situation with a senior anesthesiologists who trained at the University of Wisconsin.[3] His memory of the Ralph Waters era at the University of Wisconsin was that Dr. Waters was well aware of John Snow often quoted him and revered his research.

My hypothesis in this research is that Ralph Waters was influenced by Snow and that he was aware of Snow's work in anesthesia before Snow was "rediscovered."

The interest both men had in accurate vaporizers, CO2 absorption, chloroform, and the effect of CO2 on respiration reinforces my hypothesis that Waters was aware of Snow. It is probable that Waters had already assimilated the writing of Snow when he started the Anesthesia Department at the University of Wisconsin in 1927.[4]

In 1934 Ralph Waters took a sabbatical and made a trip to England. One of his goals while there was to visit the gravesite of John Snow. He found Snow's grave marker to be in a deteriorated condition. He brought the condition of Snow's gravestone to the attention of his English colleagues and probably helped raise money for the restoration. The base reads, "Inscription restored 1938 by members of the Section of Anesthetics of the Royal Society of Medicine and Anaesthetists in the United States of America."

Waters position as Chairman of the department that trained many of the leaders in the young field of Anesthesiology gave him ample opportunity to educate residents about Snow and they in turn were well positioned to pass on their knowledge of Snow to the next generation of anesthesiologists.

The information that I found indicates that although the epidemiologists forgot Snow, anesthesiologists were aware of him prior to his rediscovery and Waters trainees passed that knowledge on to the next generation of anesthesiologists.

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Gaston Labat and the First ASRA: Lessons Learned and Unanswered Questions

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Gaston Labat and his colleagues founded the first American Society of Regional Anesthesia [ASRA] in New York City in 1923. Although they wanted to name their new group "the Labat Society" in his honor, modesty prevailed and the name ASRA and the society as we know it today was born.[1] Their mission was to promote regional anesthesia through education and research. The group met four times each year – the annual meeting was scheduled for the second Tuesday in April; with other meetings scheduled on the second Tuesday of October, December and February. Provision was made for special meetings, as needed. They had a well-written organizational structure with elected officers (President, Vice-President, Secretary, and Treasurer), an executive committee, and a plan to insure sound financial management. Meetings were recorded by a stenographer and distributed to members whose dues were up to date.[2]

Records of the early society have been preserved and are now archived at the ASA's Wood Library Museum [WLM]. When the first ASRA merged with the ASA in 1939, the group discussed moving their archives to the WLM, but apparently that was not done until quite recently.

The archive contains the by-laws and organizational structure of the society, typed transcriptions of the meetings, financial records, an early log listing the names of members, and correspondences which tell the story of the founding of the society and its eventual merger with the ASA. In addition, there are four papers of importance that the founding fathers preserved:

Remarks on General Spinal Anesthesia. Professor Thomas Jonnesco, Bucharest, Hungary. 1909.[3]
Sensibility and Local Anesthesia in Surgical Procedures on the Abdominal Cavity with Special Consideration of Splanchnic Anesthesia. Dr. Max Kappis, 1919.
Sacral Anesthesia. Major Points of Clinical Importance. Dr. Gaston Labat (date unknown)
Regional Anesthesia. Dr. H. M. Wertheim. (date unknown)

The group was constantly re-inventing itself, never content to rest on the laurels of past achievements. Early on, the focus was on spinal, epidural and peripheral nerve blocks for surgical procedures. One scientific session (March 1936) was devoted to a round table discussion of spinal anesthesia from the perspective of surgeon (Dr Wayne Babcock, Philadelphia, PA, anesthesiologist (Dr. E.A. Rovenstine, NY, NY) and research worker (Dr. F. W. CoTut). Dr. Orkin, another anesthesiologist (NY, NY) presented summary of cases and data from hundreds of cases performed under spinal anesthesia. Data was analyzed and complications including mortality were addressed.

With time, the group moved beyond the focus of regional anesthesia for surgical procedures. As many of the members were surgeons, it was natural for them to focus on the use of regional

anesthesia and pain management to complement their surgical practice. What developed was an interest in diagnostic and therapeutic nerve blocks. Diagnostic nerve blocks with lidocaine were utilized to predict the efficacy of surgical sypathectomy for peripheral vascular disease, angina, and other medical conditions not amenable to other forms of medical or surgical treatment at the time. Many of the blocks were palliative in nature. Alcohol blocks for causalgia and other forms of sympathetically mediated pain and phantom limb pain followed diagnostic lidocaine blocks if the lidocaine block show efficacy.

A highlight of the archives is an address to the society by Dr Rudolph Matas on February 27, 1934, at meeting dedicated to honoring his 50 years of experience in medicine. Dr. Matas presented his reflections on pivotal innovations in surgery and anesthesiology in a humble and refreshing way. I was left with a profound feeling of respect for his contributions and his cogent perspective on the early history of our specialty and the pivotal interactions of anesthesiology with the practice of medicine and surgery.

The most recent glimpse that we have into the membership of ASRA comes from the roster of members dated 17 December 1937 and provided by the Secretary of ASRA – presumably Dr. Paul M. Wood, who resigned as Secretary in a letter dated 09 April 1934 when the offices of Secretary and Treasurer were combined. Notes from the Regular meeting of 15 October 1936 indicate that Dr Wood was filling the new combined office of Secretary-Treasurer, succeeding Dr. Hyman Lieber. In December 1937, ASRA had forty two regular members. The breakdown of localities is as follows:

1) 22/42 (53%) New York or New Jersey with 13/42 from New York City

2) 8/42 (19%) Other East Coast Locations (Connecticut - 3; Pennsylvania 2; Massachusetts, Rhode Island, and Washington, D.C. – 1)

3) 4/42 (10%) Midwest (Wisconsin - Madison, 2; Milwaukee, 1; Rocky River, Ohio, 1)

4) 1/42 (2.5%) South (Augusta, GA)

5) 1/42 (2.5%) Rocky Mountain States (Denver, Colorado)

6) 3/42 (7) West Coast (Los Angeles, California)

7) 2/42 (5%) International (Canada – Saskatchewan and Toronto)

Notable names include:

Virginia Apgar, M.D. & E.A. Rovenstein, M.D.	New York, New York
M. Digby Lee, M.D. & Ralph M. Waters, M.D.	Madison, WI
Ralph Tovell, M.D.	Hartford, Connecticut
Meyer Saklad, M.D.	Providence, Rhode Island

F. H. McMechan, M.D. Rocky River, Ohio

When the group merged with the American Society of Anesthetists [ASA] in 1940, several forces came were at work. The American Medical Society [AMA] was organizing medical specialties and many groups were formed as divisions within the AMA. The ASA was one of these groups and would eventually become the American Society of Anesthesiologists. Labat had passed ways some 10 years earlier but the leadership within ASRA was strong. Dr. E.A. Rovenstin was President and Dr. Paul M. Wood was Secretary-Treasurer. As late as April 1937, the last date that transcripts from meetings are available, there were three Vice-Presidents, 6 members on the Executive Committee, and a dedicated Historian, Dr. E. M. Livingston. Some of these leaders became active in forming the group that would become the ASA, and most likely, were consumed with this effort as a high priority matter, at the expense of ASRA. Correspondence at the time cited dwindling membership numbers, a large lapse in time between meetings, and overall a general sense that their interests would best be served through a new group promoting the practice of anesthesiology. Members in ASRA were offered membership in the American Society of Anesthetists, and once accomplished, the society was dissolved. This left the new group free from any legal connection with ASRA, which would have resulted from a merger, and achieved the objectives of the officers of ASRA. ASRA would also be protected from any debts or legal claims made to the new organization. The funds that were left in the coffers, approximately $250, were used to fund a research scholarship in honor of their founding father, Dr. Gaston Labat. The ASRA members were prescient in their appreciation for the importance of the ASA, which at the tine was the only national incorporated society of anesthesia, and which also supported the American Board of Anesthesiology, Inc. – at the time an affiliate of the American Board of Surgery.

In summary, the history of the first ASRA is a rich tapestry of trials and tribulations, victories and failures in the early days of our specialty. Through the archives, now protected at the WLM, we witness the innovations first hand and are offered a rare glimpse into the minds of the men and women of this period. Although Labat founded the society, his presence, as gleaned from the archives, is remarkably absent. Perhaps he was busy with his private practice and the publication of his textbook. To better understand this period of our history, I would advocate that we edit and then publish a complete record of these archives, either in the form of a book or a special edition of the journal of the American Society of Regional Anesthesia and Pain Management. As far as I can tell, only 2 of the references cited in this discussion have been printed – the article by Jonnesco (published 14 years before the society ASRA was formed and somehow included in the archives) and the article by Dr Meredith Campbell on Caudal Anesthesia in Children, read before ASRA 14 February 1933 and published in the Journal of Urology in the same year.[4] As we approach the 30th anniversary of the new ASRA, this would seem a fitting time to do this. In addition, we need to study, edit and publish the history of our current ASRA, and preserve the living history through the founders of new ASRA who are still able to tell us the story first hand.

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Origins and Growth of the Medical Center in Birmingham

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No abstract available as of April 5, 2005.

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Koller and Halsted at the University of Vienna in the 1870's

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The Habsburg Dynasty ruled over an empire that covered much of Central Europe for over 600 years. Not only was Vienna the seat of Habsburg imperial power, but in the 19th century it became the heart of a global medical empire through the second Vienna School of Medicine. The universities of the German speaking countries of Europe were the most influential in the world to the advancement of surgery, and students and physicians from around the world traveled to Vienna to be exposed to the most distinguished scientists of the day.

Two physicians made famous by their contributions to the advancement of anesthesia in the 19th century were students simultaneously at the University of Vienna and its affiliated *Allgemeine Krankenhaus* (AKH), or general hospital from 1878 to 1880. The men were Carl Koller of Vienna, and William S. Halsted of New York. Their later careers would become linked because of Koller's monumental discovery of cocaine anesthesia in 1884. Their respective contributions to local and regional anesthesia after Koller's discovery have been well documented, but could there have been an earlier encounter between these two men?

The goal of my research was to discover if there was a personal acquaintance between Koller and Halsted while they were at the University of Vienna. I traveled to Vienna to research several sources to determine if any connection might have occurred. I examined Vienna residential records to conclude that both men probably lived within a short distance of each other and the university. At the Archives of the University of Vienna I found detailed listings of lectures and clinics offered during 1878 to 1880. By comparing this information to the biographical accounts of Koller and Halsted, it is obvious that they would have frequently attended the same classes. They trained under the same professors and would have known many of the same people, especially in the department of pathology. Through their study under the embryologists in the pathology lab it would have been possible for the two men to become acquainted, most likely because of a very famous research paper that Koller published while Halsted was in the department.

In this paper, I will briefly review the history of the Vienna AKH and changes that made it a major destination for American medical graduates in the late 1800's. Then I will describe the training of these two physicians and their activities in Vienna which may have resulted in a chance meeting between Koller and Halsted before they became famous.

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Regional Anesthesia in Children: The Mexican Experience

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Based on previous reports,[1-4] regional anesthesia in its different modalities was initiated in the early part of the 1970's at the Hospital Infantil de Mexico, in Mexico City. Our first results published in 1975[5] gave us the incentive to continue using this technique in spite of the harsh criticism we received at that time.[6]

Our first series of central blocks included 200 children, newborns to 15 years of age, who received either epidural by the caudal or lumbar approach or subarachnoid block anesthesia. Lidocaine in concentrations varying from 1-2% in doses not exceeding 8 mg-kg were used for different lower abdominal and orthopaedic surgical procedures, without encountering serious adverse effects. At that time we learned that epidural blocks provided a more prolonged block and thus postoperative analgesia; since caudal blocks were so easy to perform and did not require special equipment, subarachnoid blocks were only seldom used thereafter.

After bupivacaine was introduced to the market, we initiated different studies to obtain a dose that would provide safe and secure regional anesthesia for different abdominal, urological and orthopedic procedures. Studies were done in fresh cadavers of children of different ages, injecting different volumes of local anesthetic plus a radiological contrast media in order to obtain the volumes necessary to reach a dermatomal level that would provide adequate anesthesia (T4-T6, T10, or T12). This was done under fluoroscopic control. The doses obtained were clinically corroborated in vivo, using bupivacaine 0.25% in a volume of 1.6 ml/kg (4 mg-kg^{-1}) to attain the higher level, 1.4 ml/kg (3.5 mg-kg^{-1}) for T10 and 1.2 (3 mg-kg^{-1}) for a dermatomal level to T12.[7-9]

Plasma concentrations of bupivacaine in different age groups: neonates, infants, 1-4 ears and 4-10 years of age have also been determined, proving that with these clinically used doses, the plasma concentrations fall well below toxicity.[9]

Using 1.6 ml/kg of either 0.25% bupivacine or 02.% ropivacaine for the caudal approach to the epidural space has allowed us to provide anesthesia for upper abdominal procedures such as gastrostomies, pyloromyotomies,[10] etc. in thousands of patients without ill effects.

The introduction of appropriately designed equipment for children such as disposable Tuohy needles and radio-opaque catheters has contributed furthermore to change the overall panorama of regional anesthesia and post-operative pain control in children.

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Development of Academic Anesthesia in the United States during the Twentieth Century*

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It is currently recognized that a major impetus for the development of the modern medical specialty of anesthesiology resulted from the vision, persistence, persuasion and stimulating activities of Ralph M. Waters, M.D., including his able leadership in the establishment at the University of Wisconsin of the world's first academic center for education and research in anesthesia at a medical school. This innovative program almost immediately received worldwide attention and attracted many visitors to see with their own eyes this exciting new development at the University of Wisconsin at Madison.

This presentation will review a number of the possible reasons why anesthesia was rejected in the United States by both organized medicine and most university medical schools for nearly a hundred years after the first credible demonstration of inhalation of ether for surgical procedures. It will also describe the format and ramifications of the program developed according to Dr. Waters' concepts for the education of post-graduate physicians as residents-in-training for anesthesia practice and teaching. It will also describe the slow evolution in the second half of the twentieth century from anesthesia being a section or sub-department of a medical school department of surgery to the current usual status of being an independent, autonomous department sharing and contributing as a partner in the medical school hierarchy. Finally, there will be a few comments about the current need to project anesthesia with enthusiasm as we tell students about the major contributions of anesthesia to all branches of medical and surgical practice including emergency care, resuscitation, respiratory therapy, critical care, management of pain, and facilitation of all kinds of lengthy and complicated surgical procedures while maintaining life support under anesthesia.

*Supported in part by a fellowship from the Wood Library-Museum.

The Beginnings of Anesthesia at Washington University

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The earliest reference to anesthesiology at Washington University and Barnes Hospital was in 1911 when Dr. Fred Murphy came to St. Louis from Boston to become the first Chairman of Surgery at Washington University. He brought with him a nurse who had minimal anesthesia experience.

Following years of exclusive anesthesia administration by nurses, Dr. Murphy's successor, Dr. Evarts Graham began trying to recruit a physician to provide anesthesia at the hospital although he was quite pleased with the chief nurse anesthetist, Helen Lamb. Some very prominent individuals were offered a position. This included his personal friend, Henry K. Beecher and at least five individuals in St. Louis.

Some of the major impediments to successful recruiting included:

1. A lack of enthusiasm on the part of Graham,

2. A lecture that Graham gave in 1946 at the 100th Anniversary of Ether Administration in Boston,

3. An unwillingness to give an anesthesiologist the same privileges that other physicians enjoyed at Barnes Hospital

4. A hospital president who was also the President of the American Hospital Association and a strong proponent on making anesthesia personnel hospital employees.

It was only after fellow surgeons coerced Dr. Graham in the late 1940's that he gave in and seriously started looking for a physician to head up anesthesia. Dr. Tom Burford, a protégé of Dr. Graham actually did the recruiting and was instrumental in leading the mini-revolt by the surgical staff. Graham actually named an individual to be the head of a section of anesthesia at Washington University and Barnes Hospital which then led to the resignation and retirement of the long standing chief of nurse anesthesia but not the end of the nurse anesthesia school. In the 1950's there were several individuals who tried to establish anesthesia as a physician specialty at Washington University but all left after frustrating times.

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*WUBML is the Bernard Becker Medical Library at Washington University in St. Louis.

The Influence of the German-American Bond in the Evolution of Anesthesiology as a Medical Specialty

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Recent events in the Middle East have caused some friction in the strong post World War II relationship between Germany and the United States. Played out upon the world stage, these events have caused some people to question the relationship between Germans and Americans. On a much smaller scale, the history of the evolution of anesthesiology in both nations has some interesting parallels. How did the United States foster anesthesiology in the twentieth century? What was the German attitude toward anesthesia? How have these nations, or their physicians worked together to improve anesthesia and patient care across the twentieth century?

Anesthesia: An American Contribution

On October 16 1846 William Thomas Green Morton, gave the first public demonstration of a successful anesthetic in the ether dome at Massachusetts General Hospital. This event marked the beginning of a new era in medicine. The news of this American discovery was so great that within two and a half months, anesthetics were being given in England and France. By January of 1847, the first anesthetics were given in Germany in Berlin.[1] Thus, the first seemingly unrelated event in German-American anesthesia occurred, the transfer of unique American medical knowledge to Germany.

German physicians and scientists have contributed a great deal of knowledge to the field of anesthesia. Almost four decades after the American demonstration of ether anesthesia, Carl Koller, a Vienna ophthalmologist struggled with the difficulties of inhaled anesthesia for ophthalmic surgery, especially ether with it's high incidence of post-operative nausea and vomiting. After an incidental observation, whereby he accidentally brushed his lips with cocaine and observed that they grew numb, discovered the local anesthetic properties of cocaine.[2]

The German speaking world had discovered the first local anesthesia. Investigations, mostly in Europe continued with the Germans leading the way. Some of the most important contributions to regional anesthesia include:

1884 Carl Koller used cocaine topically in the eye.
1891 Heinrich Quincke introduced spinal puncture.
1892 Heinrich Braun introduced the term "conduction anesthesia."
1892 Karl Schleich described infiltration anesthesia.
1898 August Bier described cocaine spinal anesthesia.
1902 Heinrich Braun added epinephrine to cocaine.
1904 Alfred Einhorn synthesized procaine.
1905 Heinrich Braun used procaine clinically.
1908 August Bier reported intravenous regional anesthesia.

1909 Lawen demonstrated extradural analgesia via sacral route.
1911 Kulenkampff introduced "blind" approach to brachial plexus.
1917 Capelle described perivascular approach to brachial plexus.

Although some early development in regional anesthesia occurred in the United States, especially Corning's work on intraspinal anesthesia and William Halstead's work on plexus anesthesia, the development of regional anesthesia was more advanced in Europe by the 1890's and early 1900's with the Germans most prominent among the pioneers.

Transfer of German Knowledge to the United States

Most of the German anesthesia knowledge concerning regional anesthesia arrived to the United States via France as opposed to direct contact. Victor Pauchet, a renowned French surgeon with great interest in regional anesthesia, is an important conduit to America concerning regional anesthesia. Pauchet shared his knowledge of percutaneous techniques in regional anesthesia with the French speaking world in a comprehensive illustrated regional anesthesia textbook entitled "L'Anesthesie Regionale". This textbook described and illustrated all of the important European techniques.

The impact of Pauchet's pupil, Louis Gaston Labat, is well known. In 1920, while working with Pauchet in Paris, Charles H. Mayo, the prominent surgeon and co-founder of the Mayo Clinic was impressed with the regional anesthetic techniques used during surgery. The physician at the head of the table, Gaston Labat, was recruited to the Mayo Clinic in Rochester to produce an American textbook of regional anesthesia.[3] On October 1, 1920,[4] Dr. Labat began his appointment at the Mayo Clinic in Rochester, Minnesota and began work both clinically and on his book which would be entitled "Regional Anesthesia: Its Technic and Clinical Application."[5]

Thus, it is through Labat's "best selling" text that German and European knowledge concerning regional anesthesia became mainstream American practice. This book is important for various reasons. It was first American comprehensive regional anesthetic text employing the European knowledge of percutaneous plexus block and extensive field blocks for surgery. It also marked the beginning of the development of the specialist in regional anesthesia, noting the importance of another physician other than the surgeon to perform the block and care for the patient during surgery.[6]

American Contributions to German Anesthesia

In a reciprocal fashion, American anesthesiologists brought to Germany the concept of anesthesia as a medical specialty. Despite of all of these early advancements, the attempts to found a German anesthesia society were unsuccessful before the World War II.[7] The German professors of Surgery were against the idea; August Bier wrote that Germany was fortunate not to have specialists in anesthesia like those in the United States.[8] Physicians like Wolfgang Schwarz, Helmut Schmidt and Hans Killian were few of the German surgeons with a particular interest in anesthesia that tried for years to form a specialty in anesthesiology, separate from

surgery. In the face of the World War, the development of anesthesia lagged behind from what was happening in the United States and the United Kingdom, where anesthesiology had become an independent specialty of medicine.

One of the most influential characters in the creation of a specialty in the United States was Francis Hoefer McMechan. He helped establish the first national anesthesia organization in the United States; Associated Anesthetists of America in 1912, and the International Anesthesia Research Society (IARS) in 1922. In September 20, 1928 Dr. McMechan was invited to attend the first "German Anesthesia Congress" and his suggestions for a separate medical specialty were not received with enthusiasm by the German surgeons.

Despite the controversy, the need for education in the specialty brought those surgeons with an interest in anesthesia to America. In 1929, the IARS had seven German members, and by 1937 there were seventeen. During that period of time, a strong professional and personal relationship between the German surgeons with a strong interest in anesthesia and some of the prominent anesthesiologist in the United States, including John Lundy and Ralph Walters.[9] There was German participation in exchange fellowship programs in the United States.[10] This strong relationship disappeared during World War II and the German's membership in the IARS was discontinued.[11]

After the war, there were many conflicts in establishing anesthesia as a separate specialty in Germany. One more important American contribution to German anesthesia was the role played by the American anesthesiologist Dr. Jean Henley. She had trained at Columbia Presbyterian and graduated in 1949. She experienced first hand the lack of technical sophistication in German anesthesia during her visit shortly after graduating from residency.[12] Her suggestions and way of practice were taken as example and helped create the opportunity for Anesthesia to become an independent medical specialty in Germany. On April 10, 1953, the German Society for Anesthesia (DGA) was formed in Munich.

Conclusions

The influence of the German-American relationship in the evolution of anesthesiology is of importance in early history of modern anesthesia. From the discovery of Cocaine in 1884 to the formation of the German Society of anesthesia (DGA) 1953, there were sixty-nine years of significant discoveries and productive interchange between Germany and the United States in anesthesia. There was a reciprocal contribution from each partner; initially, it was Germany and Europe who provided the knowledge and techniques in regional anesthesia to American anesthetists. After the Second World War, it was America that greatly contributed to the adaptation of anesthesia as a separate medical specialty in Germany.

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Noel A. Gillespie: Initial Researches

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Noel Gillespie was a faculty member and colleague of Ralph Waters at the University of Wisconsin. He has a remarkable history, but little has been written about him. This paper describes initial research about this man.

T. E. Lawrence, commonly known as Lawrence of Arabia, tutored Noel, as a child in Syria. At age eighteen, with the encouragement of his mother, Gillespie left his chemistry studies at Oxford and accompanied Albert Schweitzer on his second journey to Africa. In the late 1930s Gillespie resigned his position as an anesthetist at London Hospital in order to join Ralph Waters at Wisconsin General Hospital in Madison were he insisted on a resident position.

Noel Alexander was born on Christmas Day, 1904 to Emily and Andre Rieder in Sydenham, England. The name Noel was undoubtedly selected to reflect the day of his birth, but may also have been chosen because his mother saw him as a gift as she still grieved the death of her first son, James, or "Jimmy Jim" less than a year before.[1] The family was apparently well to do with Emily's diaries describing nursemaids, trips by train and ship, and hotel stays. The marriage appears to have ended in 1908 when Andre moved to Paris and Emily, taking her young son, went to Syria. She worked as a schoolteacher at the American Mission School in Jebail. While there, she befriended a young British archeologist, Thomas Edward Lawrence (1888-1935), in late 1910. T. E. Lawrence was studying a north Syrian Arabic dialect with another teacher at the school and it may have been during this time that the future Lawrence of Arabia was tutor to the young Noel. Correspondence between Noel and T. E. Lawrence is part of the archival collection of the Wisconsin State Historical Society.

After returning to England, Emily, with her son, moved again to New York to live in proximity to her family. Noel entered Peekskill Military Academy. In 1915, Noel decided that he preferred an English education and he was enrolled at Perse School, Cambridge.[2] His mother pursued a career as a lecturer speaking on the topic of international peace in many countries. It was during this period that Noel chose to take his grandmother's surname, Gillespie. He further pursued his studies in chemistry at Oxford University.

Albert Schweitzer left a career as a theologian, academic, writer and organist to become a medical missionary to Africa. He was awarded his medical degree in 1911, and first went with his wife to Lambarene, in French Equatorial Africa, to establish a mission hospital in 1913. With the outbreak of World War I in 1914 the Schweitzers were considered enemy aliens and were later removed to Provence, France where they were imprisoned from 1917 to 1918.

Schweitzer toured England in 1922 giving concerts and lectures to raise money to restore the decaying mission at Lambarene. Emily Rieder met Schweitzer during this tour, admired his

work and began a correspondence with him. Mrs. Schweitzer was physically unable to make the return to Africa. It is likely that Emily suggested her son accompany Schweitzer.

The great theologian, philosopher and missionary wrote to Noel Gillespie, then eighteen years old and a student at Oxford in late 1923. The letter in French is now part of the Wisconsin State Historical Society collection:

> Mr. Noel Alex Gillespie:
>
> I am looking for a young man who will accompany me in Africa for six months as a companion, secretary, and above all, as professor of English. We will leave at the end of January. We will travel a month to the English Cameroons, and from there we will go to Lambarene. There you will help me to install the house and organize the hospital.
>
> As you are very young, and since the voyage may interest you, I ask if your professors would have anything against your interrupting your studies for six months. Think about it, ask, and write me at Grunsbach near Munster, Alsace, within the week.
>
> Sincerely yours,
> Albert Schweitzer
>
> You will naturally make the voyage at my expense.

Gillespie's letters[3] to his mother from the steamer *S. S. Orestes* give the details of their trip: concerts over the wireless from London and Paris, how the "great man is very silent, and has commanded that he is not to be spoken to unless necessary, as he is too tired even to think when it is not necessary…" English lessons, Schweitzer's correspondence, a quarantine for typhus at Seccondee Roads that prevented a shore trip, the lady passenger whose cause for seasickness is relieved with the delivery of a son for whom Noel becomes the chief caregiver. After a side trip to Buea in the Cameroons, they re-embark aboard the *S. S. Europe* to Cape Lopez and then a two-day trip up the Ogowe River on the riverboat *Alembe* to Lambarene.

They arrived at Lambarene at Easter-time, 1924. The jungle had encroached on the mission buildings in Schweitzer's absence. Again Gillespie's letters detail the work of restoration, of patient care learned by doing, the frustration of the taciturn Schweitzer, and of the beauty and overgrown wildness of the primeval forest. Noel's last letter to his mother was written July 20, 1924, after which he returned to New College, Oxford.

Noel was awarded a bachelor's degree with honors in physiology in 1926 and a master's degree in 1929. He received from the London Hospital Medical College the Bachelor of Medicine and Bachelor of Chirurgica degrees granted in Oxford in 1931, and a Doctor of Medicine degree from Oxford and a Diploma in Anaesthesia in 1935. He was elected as Fellow of the Faculty of Anaesthesia of the Royal College of Surgeons on its organization in 1948.

Gillespie took a position as Assistant Anaesthetist and Assistant Instructor at the London Hospital in 1934. It is likely that he met Ralph Waters in 1936 when Waters visited England. Some sources indicate Gillespie visited Madison before he resigned his position in London to take an appointment as resident at Wisconsin General Hospital in 1939.[4] Interestingly, Gillespie

was registered as a fourth year medical student at the University of Wisconsin, graduating with the Doctor of Medicine degree in February 1945. He rose to the rank of associate professor prior to assuming a part time position that he held from 1947 to 1953.

Gillespie was an active clinician and participant in Anesthesia Department conferences often expressing a dissenting view.[5] He authored the classic text, **Endotracheal Anaesthesia**, whose first edition was published by the University of Wisconsin Press in 1941. He was also the departmental statistician and author of the annual reports detailing all anesthetics and complications. Data for these reports was coded onto Hollerith cards and sorted with an IBM machine.

Other aspects of Noel Gillespie's life were his involvement in youth work, charitable organizations, small bore rifle competition and music. His enthusiasm for Boy Scouts, coupled with his English accent, made him the embodiment of Baden Powell for young Madison scouts.[6]

Noel Alexander Gillespie died in Madison, Wisconsin on August 21, 1955 of a myocardial infarction.[7] His obituary, written by "an anonymous friend," Geoffrey Kaye, in the Medical Journal of Australia concludes, "Sir Robert Macintosh once wrote that Noel Gillespie should have been put on the road as a permanent ambassador of international anaesthetics. With his death the specialty loses a valuable servant. The world at large loses an idealist, eager for social justice, for non-technical education in a grimly technical age, and for international goodwill."[8]

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Charles Bernard Pittinger, M.D.
(1914-1989)

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Born in 1913 in Akron, Ohio, Pittinger, too, took his first degree in chemistry, and taught chemistry. He was employed as a chemist at the Wright Patterson Air Force Research Center in Dayton, Ohio from 1937 through to the end of World War II where he participated in secret research activities.

After World War II, he entered medical school at the University of Cincinnati, graduating in 1949. Thereafter, he immediately entered anesthesia training at the University of Iowa under one of the twentieth century's most famous and respected anesthesiologists, Professor Stewart Cullen. Pittinger rapidly rose to the rank of full Professor at Iowa and was acting chairman of that department for two years after the departure of Cullen.

Dr. Pittinger became Chairman of the Department of Anesthesiology at Vanderbilt beginning July 1, 1962. During his tenure as chairman of the department, eighteen residents were trained in anesthesiology and the faculty was expanded from five to seven full time members. He stepped down from the chairmanship of the department on July 1, 1968.

Pittinger's research publications were amazing in the number of "firsts" in the medical literature, which still have direct bearing on today's clinical practice. One example was his revelation that both non-depolarizing and depolarizing muscle relaxants do not readily pass through the human placenta, and can therefore be utilized to great advantage in obstetric anesthesia to reduce the amount of anesthetic agent needed, thereby protecting the unborn infant Later he, Cullen, and coinvestigators explored in great depth the anesthetic action of xenon. Multiple implications can be drawn with the use of this chemically inert gas to produce anesthesia in animals and humans. Sixty years after his first publication, xenon again is in "research news" as an advanced research tool to further explore still unsolved mysteries of the state of anesthesia. Some of these studies were pursued during a two year research fellowship awarded by the Brookhaven National Laboratory.

Along with co-authors, Dr. Pittinger was the first to point out the sometimes fatal dangers of the use of intraperitoneal neomycin, particularly when given in combination with anesthesia and with anesthetic muscle relaxants. Later, he published a definitive summary of the neuromuscular blocking effects of all of the then known antibiotics. This publication was later designated an official "Classic Publication" by the Institute for Scientific Information. Pittinger also produced some of the basic literature concerning the cardiovascular effects of ionized calcium in the serum, particularly during rapid blood transfusion.

Halothane (Fluothane) was introduced in 1956 by Raventos (?ref) after formulation by Suckling. However, Dr. Pittinger, along with his colleagues at Iowa, had been given financial support and samples of halothane by the Ayerst Pharmaceutical Company before it was released to the general public. Within a very few months after the first public announcement, of halothane Pittinger published extensive pharmacologic and physiologic research on its qualities and characteristics. His reports in 1957 and 1958 included studies of halothane's muscle relaxant characteristics, its cardiovascular characteristics and its respiratory characteristics.

Dr. Pittinger was awarded membership in the prestigious Association of University Professors and held a professorial position in the Pharmacology Department at Vanderbilt and leadership positions in national pharmacology associations. He was appointed a "Consultant" to the Food and Drug Administration and served from 1966 to 1970 and as a "Consultant" to the U.S. Pharmacopeial Convention Anesthesiology Committee from 1966 to 1970.

The Rapid Rise and Fall of Rapacuronium

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The FDA approved rapacuronium bromide (Raplon, Organon Inc., West Orange, NJ) for clinical use on 08 August 1999. Nineteen months later, on 27 March 2001, the manufacturer withdrew the drug from the market voluntarily. Although anecdotal evidence of severe brochospasm in children surfaced soon after the drug was introduced, it took time for the magnitude and severity of the problem to become evident.

A report published in *Anesthesia and Analgesia* by Dr. Donna M. Rachert and her colleagues at the Children's Hospital of Pennsylvania (CHOP) after the drug had been withdrawn gives some insight into the clinical experience with this new drug and its problems.[1] The drug became available for use at CHOP on 01 March 2000. Within a few months, anesthesiologists noted an increase in the incidence of severe, life-threatening bronchospasm. The increased incidence of bronchospasm seemed related, at least temporally, with the use of this new muscle relaxant. Six months later (31 July 2000) the drug was withdrawn from the hospital's formulary and two studies were undertaken. First, they did a retrospective study to ascertain risk factors for developing bronchospasm after the administration of rapacuronium. Second, they designed a study to answer the following question: "Are Children with bronchospam during induction of anesthesia more likely to have received rapacuronium compared with other muscle relaxants?"[1] To gather data, they used the CompuRecord® system. 287 patients were included in the studies; 12 developed severe bronchospasm. The two main risks factors for developing bronchospam were rapid sequence induction and prior history of reactive airway disease. Children that developed bronchospasm were at least 10 times more likely to have received rapacuronium than another muscle relaxant.

Voluntary Phase IV reporting of adverse events such as these were instrumental in the swift withdrawal of the drug from the marketplace. This article[1] and the accompanying editorial in *Anesthesia and Analgesia*[2] were published after the drug had been voluntarily withdrawn. Another series of articles with an accompanying editorial was published in *Anesthesiology* in May 2001. They were in press when the drug was withdrawn and publication proceeded. These reports[3-5] give frighteningly vivid details of the severity of the bronchospasm (like "ventilating cement"[5]). In most cases, endotracheal tubes were removed and replaced because evidence of ventilation or CO2 return was nil. Most practitioners, after one experience with rapacuronium induced bronchospasm, did not use the drug again.

Clinical experience supports the association between rapid injection of the drug and the ensuing development of bronchospasm in children. Rapid injection most commonly occurs in the setting of a rapid sequence induction. Since the drug was developed as a substitute for succinylcholine for the use in just this situation, the severity of the problem became evident soon after the drug was introduced. Dr. Goudsouzian, in the editorial that accompanied these articles, advocated the use of rocuronium instead of rapacuronium in situations where succinylcholine was contra-indicated. He thought it was better to wait a little longer before reversing the patient than have to deal with life-threatening bronchospasm. In summary, he

states: “In my experience, anesthesiologists who have encountered rapacuronium induced bronchospasm are usually reluctant to use the drug again.”[6] The case reports were meant to inform and warn the uniformed. Fortunately, the point was mute as the drug was withdrawn from the marketplace while the articles were in press.

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Military Opposition and Religious Objections to Anesthetics, 1846-1848

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On October 16, 1846, William Thomas Green Morton used sulfuric ether to anesthetize a patient at the Massachusetts General Hospital. January 19, 1847 Sir James Young Simpson first used sulfuric ether during labor in Edinburgh, Scotland. The first wartime use of anesthesia was on March 29, 1847 in Vera Cruz, Mexico when Edward H. Barton administered sulfuric ether for an amputation. (Aldrete JA, 1984) Simpson introduced chloroform in late 1847. From the start the introduction of anesthesia would be controversial. Arguments against anesthesia in obstetrics ranged from questioning the safety for mother and fetus to challenging the theological basis for altering the birthing process. Simpson lived in a society immersed in religion, and his daily interactions were with people whose culture was shaped by the established Church. In December 1847 he wrote, **Answer to the Religious Objections Advanced Against the Employment of Anaesthetic Agents in Midwifery and Surgery**. In the creation narrative of Judaism and Christianity, the first parents, Adam and Eve were tempted to defy the command of God not to eat of the Tree of the Knowledge of Good and Evil. In their choice to disobey, *Original Sin* was born in which they and all their descendants fell from a state of innocence and intimacy with God, to a state of suffering and toil (the *primal curse)* experienced in the pursuit of food and childbirth. Farr points out, documented evidence of the opposition which fueled Simpson's efforts is thin. In fact, rather than condemning, prominent leaders from across the established religious spectrum agreed with the pro-anesthesia argument. Dr. Protheroe Smith (Anglican obstetrician), Rev. Thomas Chalmers (Moderator of the Free Church of Scotland), and Rabbi Abraham De Sola (Canada's first Rabbi) were in written agreement with anesthesia. Queen Victoria, the *Defender of the Faith,* gave implicit endorsement by allowing John Snow to administer chloroform at the delivery of her son, Prince Leopold in April, 1853. (Farr AD, 1980) The Most Rev. John Bird Sumner, Archbishop of Canterbury (1848-1862) records no condemnation of anesthesia, whose daughter had obstetric anesthesia in the year following Queen Victoria's. Early military opposition to the use of volatile agents was initially based on the anecdotes and bias of military surgeons. John B. Porter was an example. Concern centered on fears of hemorrhage and poor wound healing. Contemporary social preconceptions regarding the physical constitution of males centered on notions of "manliness." There was a prevailing social attitude that young, healthy men did not need or might be harmed by anesthesia. (Pernick MA, 1985) However, using chloroform in the Crimean War, the French reported more than 25,000 operations without a fatality, and the British reported 20,000 operations with one fatality. (Albin MS, 2000) Porter misstated the views of the British Surgeon, J.G. Guthrie, and French surgeon, Velpeau. They in fact approved of ether and chloroform. (Guthrie JG, 1863; Neveu R., 1945) Porter doubted the safety of any anesthetics, prohibiting them in his medical commands. (Porter JB, 1852) Despite Porter's opposition, these agents were in common use by the American Civil War. Porter's style of military opposition to anesthetics would be only a temporary delay in the development of trauma care in the United States.

Displacing the Dolorimeter: The Fate of a Pain Measuring Instrument in the Era of Therapeutic Reform, U. S. 1940s-50s.

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Research problem, findings and conclusions

In 1940, a newly introduced pain measuring apparatus heralded a revolution in analgesic testing. Hailed as ingenious and elegant, the dolorimetric method elaborated by James Hardy, Harold G. Wolff and Helen Goodell at Cornell University promised to overcome the failings and fluctuations of human pain perception that had plagued previous attempts at measuring the efficacy of analgesics. The appeal of the dolorimeter lay in its alleged ability to produce easily identifiable, uniform and quantifiable responses to pain. But in other experimenters' hands, the method often failed to reproduce the results reported by Hardy, Wolff and Goodell. By the early 1950s, it had become evident that the dolorimeter would not play the major role it had been forecast in the evaluation of analgesic drugs in the United States. How can we explain this transformation?

The failure of the apparatus to produce consistent results does not fully explain why the Hardy-Wolff-Goodell method was largely abandoned as a gauge of analgesic efficacy. The first part of my paper will describe how attempts at solving problems in the diffusion of the dolorimeter gave way to a more fundamental debate about what constituted legitimate means of standardizing experimental conditions. The second will demonstrate that the rejection of the Hardy-Wolff-Goodell apparatus, and the adoption of clinical trial methodologies, can be linked to shifts that took place between 1940 and 1950, in the setting and sponsorship of analgesic testing.

Two principal arguments were offered to explain why the dolorimeter did not perform uniformly in different sites. Critics charged that only subjects who had been trained and informed gave predictable responses with the machine. Hardy et al. conceded that "familiarization" with the method, combined with the proper attitude, protected subjects from distracting mental influences. Critics, however, took the non-interchangeability of subjects, and their knowledge, as evidence that they were biased. If predictable results could only be obtained by standardizing and shaping subjects' minds, then the method was not a reliable indicator of "true" analgesic efficacy. A second reason given for the methods' inconsistencies was that the experience of pain could not be standardised. This position questioned the authenticity and meaningfulness of the response produced by the instrument. From the mid-1940s, it became increasingly common, particularly for clinical researchers, to state that the "natural" pain of illness and injury differed fundamentally from "artificial" pain induced in the laboratory. The very predictability and measurability of "laboratory pain" made it a poor substitute for "real pain."

Researchers who worked on analgesic testing could emphasize the need for large numbers of untrained, "naturally" suffering subjects because they had obtained access to better funding, more clinical research facilities and abundant patient populations during the course

of the 1940s. Various developments facilitated this increased availability of resources: Public health and military interests in synthetic opiates created a demand for methods to compare the analgesic power of newly synthesized drugs with morphine and codeine, for which they were intended to serve as substitutes. A Committee on Drug Addiction combined the grants and facilities provided by these federal agencies with funding it attracted from pharmaceutical companies. The researchers who benefited from this funding increasingly consisted of academic clinicians, notably anaesthetists, who had access to large populations of hospital patients, and who were allied with pharmacologists and statisticians. Increased access to resources for clinical testing, and the political pressure exerted on academic researchers and the pharmaceutical industry to follow certain rules of experimental procedure, such as placebo-controlling and randomization, favored the adoption of clinical trial methods to measure the relative efficacy of analgesics. The features of laboratory testing methods, like the dolorimeter, had become less valuable.

Methodology, sources and contribution

This paper contributes to an understanding of the re-conceptualization of pain during a pivotal period: the 1940s and 50s. While other historians, notably Marcia Meldrum (**Departures from the Design**, unpublished PhD thesis) have pointed to shifts in the use of analgesic testing methods and understandings of pain, this paper anchors these transformations more closely to the material practice, conditions and organization of medical research, and particularly to the activities of the Committee on Drug Addiction. This was also an important period in the organization and development of anaesthesia as a clinical research specialization and in the reform of therapeutic evaluation methods, as described by Harry Marks in **The Progress of Experiments**. I believe that a close examination of the reception of an instrument such as the dolorimeter must be situated within these important and relevant trends. In addition, little attention has been payed to the role played by American anaesthetists in running clinical trials of analgesics. However, my archival research has revealed that some of the foremost American anaesthetists, such as John Adriani, Henry K. Beecher, Arthur Keats, and John J. Bonica were very interested in issues of experimental design for the testing of analgesic drugs. Their participation in testing analgesics was both a sign and an agent of shifts in the field of drug evaluation that affected the reception of the dolorimeter.

The conclusions presented in this paper are based on research I conducted in the archives of various researchers who operated and criticized the Hardy-Wolff-Goodell dolorimeter, including the personal papers of Harold G. Wolff, Janet Travell, Henry K. Beecher and William K. Livingston. The archives of the Committee on Drug Addiction, a committee affiliated with the National Academies of Science and supported by the Public Health Service, military agencies and pharmaceutical companies, also provided revealing information about the fate of the Hardy-Wolff-Goodell dolorimeter within the broader context of analgesic testing at the time. This research is part of a larger project that examines the history of attempts to make pain assessment more objective. My approach in this project is to focus on the social value of technologies of pain assessment. In this case, I identified the social projects that generated demands and support for the creation and implementation of pain assessment technologies, and the social arrangements that were fostered by the use of these methods.

1847 – John Snow's *annus mirabilis*, or year of consilience?

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On Saturday 19 December 1846, James Robinson, dentist, of Gower Street, London, administered ether vapor to Miss Lonsdale to the point of unconsciousness, and then painlessly extracted a firmly fixed molar tooth. He used an inhaler of his own devising, having heard from his neighbor, Dr. Francis Boott, of the successful use of ether in the United States by the Boston dentist, William Morton. Robinson's apparatus, however, was less effective in subsequent cases, so he had an improved model made, which he used "with the most perfect success" on several occasions, including Monday 28 December in the presence of Dr. John Snow, a friend and respected local general practitioner.[1]

It is unclear if Snow was troubled by something he saw that morning, or if subsequent reports in the medical journals of inconsistent results, or both, caused Snow to evaluate current approaches to inhalation anesthesia from a scientific perspective. While a host of empirics continued uninhibitedly to tout their own inhalers, Snow wondered if the inconsistencies occurred because the operators were never certain precisely how much ether vapor they were administering to their patients. He reasoned that a certain concentration of ether vapor must be inhaled for a sufficient period of time to produce levels in the blood necessary for the desired degree of insensibility, and that this concentration could be controlled by setting the temperature of the ether. His response to the current, hit-or-miss use of ether inhalation was to follow in the tradition of William Harvey: structure a research agenda to test his hypothesis.

In a matter of weeks, Snow confirmed the accuracy of the formula for the elastic force of ether proposed in 1818 by the distinguished chemist, Andrew Ure; used Ure's tables to calculate the quantity of ether vapor that atmospheric air would contain at a range of temperatures; made arrangements with an instrument maker to modify a Jeffreys' humidifier into an ether inhaler that would permit him to monitor dosages; and presented his hypothesis and a table of concentrations at the weekly meeting of the Westminster Medical Society on Saturday 16 January.[2] The following Saturday, Snow demonstrated his own apparatus at the Society. Whereas all previous inhalers had been made of glass, a poor conductor of heat, and were usually modifications of existing items of chemical equipment, his was of metal, a good conductor, that would secure adequate vaporization of the ether.[3] Confident that his purpose-built ether apparatus and a vaporization table would permit him to achieve and control the desired concentrations, Snow then offered his services as an anaesthetist to St. George's Hospital. On Thursday 28 January he administered ether to his first three hospital patients.[4]

Nine weeks, and thirty cases of major hospital surgery later, Robert Liston, senior surgeon at University College Hospital stated publicly that "Dr. Snow managed the ether better than he had previously seen it given."[5] By mid-June, Snow had made two modifications to his apparatus, designed a portable inhaler for the country doctor, and settled on a face piece he considered

reliable; had revised his ether vapor table so that every medical practitioner, regardless of facility in mathematics, could determine the amount of ether inhaled during an operation; had delivered his first paper on the administration of ether in surgical operations at the Westminster Medical Society – and re-written it for publication in the *London Medical Gazette*; sat for a formal portrait that was displayed in the rooms of the Royal Academy of Arts in the National Gallery;[6] and been invited to deliver a formal lecture on ether inhalation at the United Service Institution in Whitehall Yard. During the summer months, whilst preparing and delivering a course of lectures on Forensic Medicine at the Aldersgate School, he wrote the equivalent of a clinical manual – and cogent defense – of the proper administration of ether as a new dimension of the science of medicine. This was published in September; then, after the introduction of chloroform in November, he repeated the entire process of research, apparatus modification, and clinical epidemiology for that agent. For John Snow 1847 was, in all respects, a remarkable year.

How did it come about that a thirty-three year old general practitioner was able, in so short a time, to set out the principles for the design of anaesthetic vaporizers that remained good for a century, to show the importance of knowing and being able to control the concentration of vapor that the patient was inhaling, and to establish that the potency of an anaesthetic agent was in inverse proportion to its solubility in the blood? First, his research program, as he described it week by week at meetings of the Westminster Medical Society, showed a logical mind that asked for criticism and doubts, then undertook further investigations to resolve new problems that had become evident. Among his peers, Snow was recognized for the skill with which he applied "both the inductive and deductive method" in scientific and medical research.[7] Second, Snow was as much a beneficiary of luck and happenstance as his own pluck. In Newcastle, he had served an apprenticeship to a surgeon who considered chemistry a collateral science of medicine. In London, he took special interest in chemistry while a medical student from 1836 to 1838. After qualifying as a surgeon-apothecary in 1838, Snow's case presentations, comments, and papers delivered at medical society meetings, reflect particular scientific interests and medical expertise in respiratory physiology and diseases, narcotics and poisons (especially in gaseous forms), and related medical apparatuses. For example, he had undertaken experiments on the therapeutic use of ether in cases of respiratory congestion earlier in the 1840s while maintaining a full practice and preparing to qualify as a physician.

For John Snow, therefore, investigating the scientific properties and clinical applications of the vapor of ether in 1847 required a lateral move – what we term an act of consilience – from chemistry and dimensions of medicine in which he already had considerable facility as a researcher and clinician.[8]

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8. Consilience – "the linking together of principles from different disciplines especially when forming a comprehensive theory"; **Merriam-Webster's Eleventh Collegiate Dictionary**. Herschel's description of the same process was "that there is scarcely any natural phenomenon which can be fully and completely explained in all its circumstances, without a union of several, perhaps of all, the sciences"; **Preliminary Discourse**, 174.

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The Role of World War II Portable Surgical Hospitals in the Development of Anesthesiology as a Physician Specialty in the United States

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It has been proposed that the actions of World War II physician-anesthetists prompted the development of anesthesiology as physician specialty primarily because surgeons, under wartime situations, were able to see the advantages of having physicians perform anesthesia. These physician-anesthetists were able to do multiple things that other people were not, such as endotracheal intubation, regional anesthesia, volume and fluid management, and blood banking. Actually, the credit for this development mainly goes to the practice of physician-anesthetists of the portable surgical hospitals in the European theater of operations.

Portable surgical hospitals performed definitive surgical procedures in the forward area on patients on whom transport would be fatal. Teams were small, often consisting of 4 officers and 25 enlisted people. As the portable surgical hospitals for the European invasion were being developed, Col Ralph M. Tovell, the consultant in anesthesia for the European Theater of Operations (ETO), and the other consultants tried to learn from the North African Theater of Operations (NATO) about portable surgical hospitals. Tovell learned in the fall on 1943 that the greatest need for fairly qualified anesthesiologists existed in the units situated in the forward areas where the severest injuries were seen. In the NATO, purportedly inexperienced physician-anesthetists did not provide the highest level of care, primarily by not being able to tailor anesthetics. Thus, for the invasion, teams were established with the intent of having experienced physician-anesthetists on the front lines. The goal of this study is to assess the adequacy of anesthesia care in the North Africa Theater of Operations and the portable surgical hospitals and to assess why Tovell thought the anesthesia was inadequate.

We are fortunate to have many of the records of the Third Portable Surgical Hospital (3dPSH) from 14 September 1942 through 11 December 1945. The 3dPSH consisted of two surgeons and two internists. The two internists practiced anesthesia. It did not appear that these men had extensive study in anesthesia.

Unfortunately, data from the 3dPSH does not bear this out, at least grossly. The 3dPSH operated on 377 people and had 28 die, which is a rate of 7.4%. Kornfield, who practiced on the Normandy Beachhead and field hospitals in the ETO, anesthetized 274 patients and had 38 die, which is a rate about 13.9%. Admittedly, this analysis misses complexity of cases, is dependent on available data and does not even begin to consider morbidity, fluid management, and regional anesthesia.

Nonetheless, at first blush, these data did not support the putative argument that physician-anesthetists from the NATO portable surgical hospitals were inadequate. One explanation may be that these data were not representative. But assuming they were representative, there were

several other possibilities, including the most tantalizing: Tovell took advantage of the situation to advance the medical practice of anesthesiology.

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Anesthesia as Women's Work: The Historical Role of the Female Anesthetist

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Although the first modern anesthetics were developed and administered by men,[6] surgeons soon began recruiting nurses, who were almost exclusively female, to provide anesthesia care for their patients.[1] A combination of social and economic factors contributed to the selection of women as anesthesia providers. Foremost, the lack of competitive compensation for anesthesia care precluded men from being anesthetists exclusively,[2] since men needed a well-compensated job in order to fulfill their societal obligation of being the family's financial breadwinner.[3] Women were able to take lower-paying jobs, one of which was anesthesia. In addition, the anesthetist was considered secondary and subservient to the surgeon – the "Captain of the Ship."[1]

One fascinating concept that figured prominently into the early choice of women as anesthetists was that women have a natural ability that makes them superior anesthetists to men. Surgeons of the early twentieth century "recognized the importance of feminine qualities in the administration of anesthetics."[4] Nurse anesthesia historian Virginia Thatcher wrote in 1953 that the woman anesthetist "brought to her work a natural aptitude that made her superior to the man."[5] Dr. George Crile, early head and neck surgeon at the Cleveland Clinic, declared: "I do not think a man can ever have the finesse in the administration of an anesthetic that a woman has."[7] Other surgeons of the early 1900's echoed similar sentiments, with one stating that the female anesthetist "has certain qualities that a man does not possess,"[8] such as a "musical feminine voice."[9]

Arguments for the anesthetic superiority of women to men focused on psychological and social skills rather than the more technical skills of anesthesia. Alice Magaw, the "Mother of Anesthesia," was "deeply concerned with the psychological preparation of patients for surgery and used 'suggestion' to soothe her patients prior to surgery." She refined a technique of psychological preparation designed to increase the safety of the anesthetic by requiring less intraoperative anesthesia .[2] Motherly qualities, such as a soft voice and gentle touch, were considered among the most valuable in a female anesthetist's arsenal.[10]

The dramatic change in American society's perception of gender roles that occurred in the twentieth century were echoed in the changing perceptions of women's roles in anesthesia. The social skills that help put patients at ease preoperatively are no longer considered uniquely feminine. Further, technological and pharmacologic advances have rendered "psychological preparation" less important to the everyday practice of anesthesia. The difficulty with which these dramatic changes in perception came about is evidenced by the conflict within the American Association of Nurse Anesthetists in the late 1940's on the issue of whether to accept male nurse anesthetists for membership.[11]

In addition to women's natural anesthetic talents, the notion that women were the ideal anesthetists was also bolstered by the convergence of two complementary concepts – the prevailing social belief that women should be subservient to men and the "Captain of the Ship" concept, which was the status quo in the operating room. The male surgeon could be clearly in charge of all aspects of perioperative care as the female anesthetist carried out his wishes. "Certainly the perception was that the surgeon could more easily control the 'nurse (woman) anesthetist' than the 'physician (male) anesthetist'."[12] In 1896, British anesthetist Dr. Frederic Hewitt wrote, "Anesthesia was born a slave; and she has ever remained the faithful handmaid of her master Surgery."[13] His use of the feminine "she" and the word handmaid to refer to anesthesia reflects the perception that a subservient woman would make the best anesthetist.

While the social changes of the twentieth century have also abolished the notion that women are inferior or subservient to men, anesthesia's role as Surgery's "handmaid" continues to be a source of professional conflict today. Ira Gunn describes what happened when a *USA Today* reporter asked a male surgeon who was in charge in the operating room. "The surgeon stated that surgeons were in charge. When he asked a male anesthesiologist the same question, the anesthesiologist stated that anesthesiologists were in charge."[12] Even today's anesthesiologists continue the struggle for professional identity in a specialty originally conceived as the "handmaid of surgery."

In the modern practice of anesthesia, gender is no longer seen as a factor in the skill of an anesthetist. However, the obvious and important role of women in early anesthesia cannot be overstated. The excellent care that women anesthetists provided to their patients paved the way for further advancements in the sciences of surgery and anesthesia.[13] Understanding the role of early female anesthetists also reveals the source of the professional conflict that exists among modern surgeons and anesthesiologists. In today's fast paced environment of rapid turnover and operating room efficiency, anesthesia care providers would serve their patients well to remember that a soft touch and "sweet words of comfort"[9] were effective anxiolytics long before effective pharmacologic premedication was available.

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Famous Writers and Anesthetic Agents

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During 1799 and early 1800 Thomas Beddoes and Humphry Davy conducted human trials of nitrous oxide inhalation at the Pneumatic Medical Institution in Clifton, England. At the time the nearby seaport of Bristol was a magnet for young intellectuals, including such writers as Samuel Taylor Coleridge, Anna Laetitia Barbauld, Robert Southey, and Maria Edgeworth. Coleridge, Barbauld and Southey were enthusiastic participants in the gas inhalations, and Edgeworth observed the activities at Beddoes' Pneumatic Institution. Thus began encounters between authors and various anesthetic drugs that have continued to the present day.

Many of these relationships fit one or more categories of experience. Some result from time spent as a patient. As a young man poet William Ernest Henley had an operation for club foot. Later he wrote a number of poems that resulted in the collection *In Hospital*,[1] which includes "Before," that describes "The thick, sweet mystery of chloroform" as "the little death-in-life." Irish playwright and poet John Millington Synge published an article in 1916 that detailed his personal experiences when given ether for an operation. Synge's encounter produced an experience of the second type, transcendental enlightenment. "I seemed to traverse whole epochs of desolation and bliss," he wrote. "All secrets were open before me, and simple as the universe to its God."

A number of writers have noted anesthetic experiences that resulted in some type of mystical understanding. Henry David Thoreau, Oliver Wendall Holmes, Sr., Oscar Wilde, William James, Walter de la Mare, and R.H. Ward have all left accounts of such experiences often resulting from a dental anesthetic. Such was also the case with Benjamin Paul Blood, whose dental anesthetic in 1860 resulted in such a profound experience that he spent the rest of his life trying to elucidate it in such works as **The Anaesthetic Revelation** and **Plurivers**.[3-5] More recently physicians such as John C. Lilly and Howard Alltounian (along with his wife, Marcia Moore) have explored the mystical possibilities of deliberate ketamine use.[6-7]

Some authors have written thinly disguised accounts of personal use or accounts that may be based on personal experiences. French master of the short story, Guy de Maupassant, self-medicated with ether to relieve his migraines. In 1888 he published the short story "Afloat" in which the narrator takes ether for migraines; a doctor also praises ether in the story "Reves."[8-9] In 1915 American author Theodore Dreiser published "Laughing Gas," a play in which the narrator, Dr. Jason James Vatabeel, has surgery to remove a tumor and experiences a dark night of the soul while under nitrous oxide/oxygen anesthesia.[10-11] In "Under the Knife," a short story by prolific English author H.G. Wells, the narrator has an operation at home under a chloroform anesthetic and has a near-death experience – what today is described as anesthetic awareness. "...I perceived all that was going on, and it was as if I both heard and saw. Haddon was bending

over me, Mowbray was behind me; the scalpel...was cutting my flesh..."[12] Were these tales of Dreiser and Wells based on some personal experience?

We can hope that many uses of anesthetic drugs by writers are purely imaginative. The serial killer in William Peter Blatty's novel **Legion** uses succinylcholine as his murder weapon.[13] The titular dentist in Frank Norris' **McTeague** cannot resist kissing his lovely patient Trina while she is sedated by ether.[14] In Mark Billingham's first crime thriller, **Sleepyhead**, the serial killer use midazolam as part of his gruesome murders.[15] In P.G. Wodehouse's novel **Laughing Gas**, the Earl of Havershot inhales nitrous oxide in a dentist's office and suddenly exchanges identities with a child movie star. As is usual in Wodehouse's fiction, hilarious events ensue.[16]

Other writers' connections with anesthetic drugs have involved addiction or suicide. French author Jean Lorrain distilled his own experiences that eventually killed him in the short stories of **Nightmares of an Ether-Drinker**.[17] English poet, painter and magician Aleister Crowley spent much of his adult life addicted to ether and chloroform, in addition to heroin and cocaine. Vivienne Eliot, the first wife of Nobel Prize-winning poet T.S. Eliot, was apparently addicted to ether drinking.[18] This behavior appears in fiction as well; the physician in John Irving's **The Cider House Rules** is an ether addict.[19] Two authors known to have committed suicide with chloroform are the American Charlotte Perkins Gilman, who was suffering from terminal cancer, and Edmund Gurney, an English author.

The ways in which writers have used anesthetic drugs in either their lives, their works, or both is but one example of the intersections among popular culture and anesthesia. Others include anesthesiologists or nurse anesthetists as characters in fiction, films and television shows; depictions of anesthesia administration in those media; and the use or attempted use of anesthetic drugs in the real-life commission of murders, kidnapping, and robberies. Anesthesia can even appear in music; Richard Bone's compositions on his release **Ether Dome** are but one example. Thus there is a long and rich relationship between anesthesia and popular culture.

More information on this topic can be found at the following URL:
http://www.anes.uab.edu/aneshist/AHA2005Wright.doc

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