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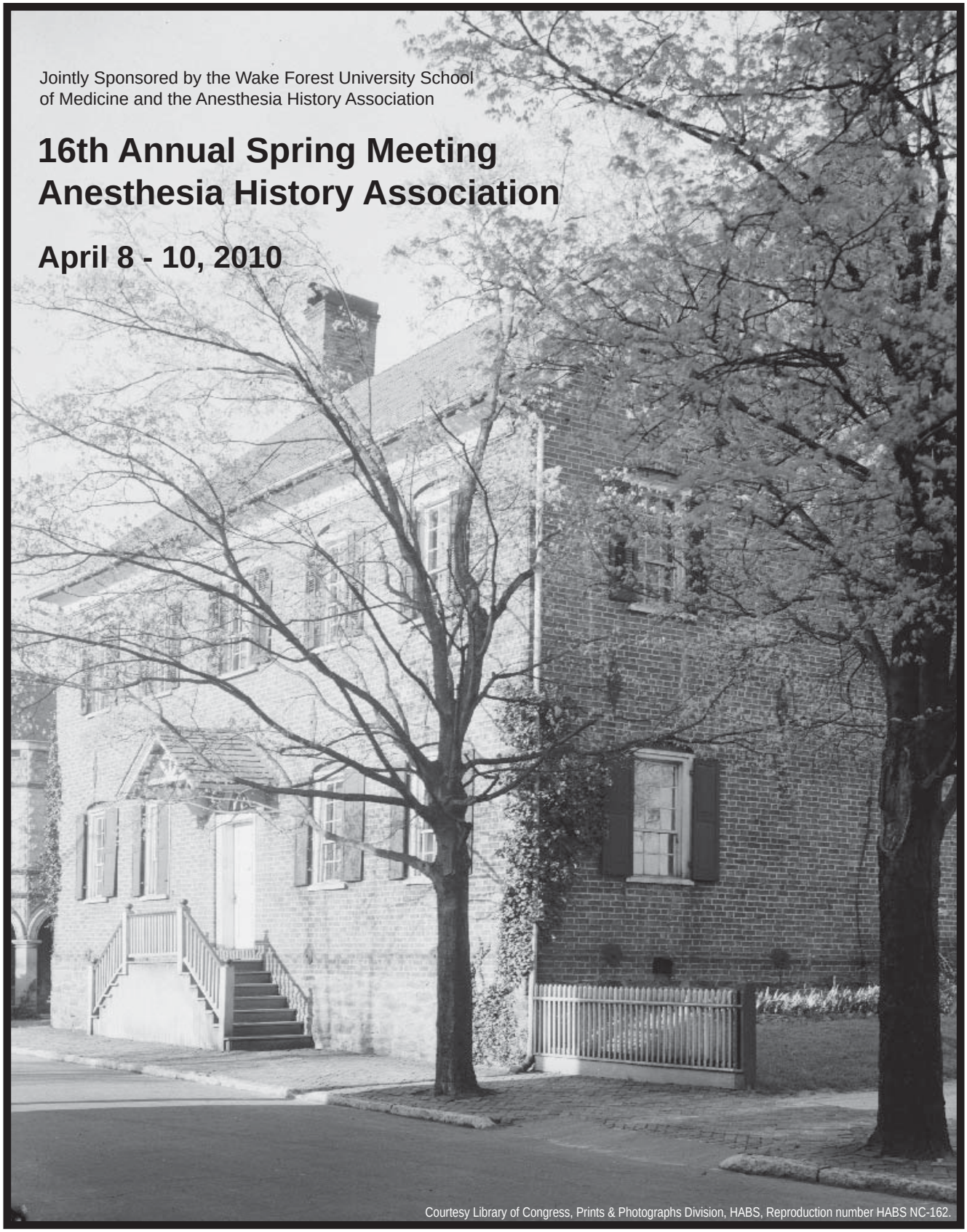
April 8 - 10, 2010



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Dr. Samuel Benjamin Vierling (1765-1817) came to Salem as the community physician in 1790. He constructed his residence at 463 South Church Street (Old Salem), Winston-Salem, NC in 1802.

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AHA

WAKE FOREST UNIVERSITY
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History of the Vierling House, Old Salem

Excerpted from Niven P, Wright CB. *Old Salem: The Official Guidebook.* Winston-Salem, NC: Old Salem, Inc., 2004.

The Vierling House

(Above)
The Vierling House, built by Johann Gottlob Krause in 1802.

(Right)
The Vierling Wash-Bake House, with decorative brickwork, tile roof, and a domed oven.

The Vierling House, one of the finest private dwellings in Salem, was built by Dr. Samuel Benjamin Vierling as a home for his large family and his thriving medical practice.

Dr. Vierling was the most renowned of Salem's early physicians. He was born in Germany in 1765, the child of wealthy Lutheran parents. He joined the Unity of Brethren while studying medicine in Berlin. In the fall of 1789, after completing his studies at the age of 24, Brother Vierling was called to Salem as *medicus*, or physician. Salem had been without a physician for two years, and the town eagerly welcomed its new young doctor. He arrived in Salem in 1790 and quickly won the confidence of the people of the town and the surrounding areas.

Dr. Vierling was a remarkably skillful surgeon. With little if any anesthesia for his patients, he pulled teeth, amputated gangrenous limbs, removed cataracts, operated for cancer or other maladies, and even performed brain surgery. He also delivered babies, trained midwives, and bled and purged his patients as need be. In addition, he was an herbalist and gardener, growing and then mixing the right proportions and blends of medicinal herbs. These were carefully stored in ceramic jars.

Modern visitors to the doctor's house can admire the well-stocked apothecary shop where Dr. Vierling and his assistants dispensed medicine. In an exhibit of early medical practices upstairs, visitors can shudder at the array of then-modern medical tools, techniques, and instruments Dr. Vierling used to treat his patients.

Dr. Vierling kept informed of the latest international developments in medicine. He began inoculating Salem residents against smallpox after Edward Jenner published his findings about vaccinations in 1798. The good doctor was also a pioneer in dealing with dietary causes of illnesses. When he suspected a connection between the high incidence of stroke in Salem and the high consumption of salt pork, he suggested that the town establish a central meat market so that more fresh meat would be available. The townsfolk took him seriously and built the Market-Fire House in 1803.

In 1790, soon after his arrival in Salem, Dr. Vierling married Anna Elizabeth Bagge, the daughter of Traugott and Rachel Bagge. They settled into married life in the First House in Salem, where physicians before him had kept their homes and the town apothecary shop. Anna Elizabeth died in March 1792, leaving Samuel with their only child, Maria Rosina, a busy practice, and a lonely house.

In August 1792, Dr. Vierling married Single Sister Martha Elizabeth Miksch, the only daughter of Matthew and Henrietta Miksch. Martha cared for little Maria Rosina as if she were her own, and

she and Samuel soon had other children. Their first daughter, Henrietta, was born in 1793. The Vierlings would have three sons and five daughters in all. Dr. Vierling was known in Salem as a "tender, loyal, and considerate father for all his house."

The large family quickly outgrew the First House. In 1801, Dr. Vierling asked master builder Johann Gottlob Krause to build a substantial brick house on the hill near God's Acre. Martha and Samuel had chosen the site in February 1801. Their beautiful house would be the last one built by Krause.

They occupied the house on June 5, 1802, filling it with music, children, and medicine. Both Martha and Samuel loved music. Martha had a beautiful voice. Encouraged by her step-grandfather, Bishop Spangenberg, she had memorized "a rich treasury of hymns" from the time she was a child. Samuel loved to play the violin and served the congregation with his musical as well as his medical gifts.

The parlor in the Vierling House now is furnished with a pianoforte, as well as Dr. Vierling's books and some of the music he owned and played. The room also contains furniture that probably belonged to the Vierlings, including a side table and a handsome desk made by Single Brother Johannes Krause.

The large kitchen is furnished as it might have been when the Vierlings lived in the house. Across the wide hallway, the dining room is graced by Windsor chairs—one that belonged to the Vierlings, and five exact reproductions patterned on that surviving chair. You may also see the Vierling family tea kettle, kettle stand, and pearlware coffee pot. The alarm-type clock was made by Salem clockmaker Ludwig Eberhardt. This room sometimes doubled as a bedroom for family members or visitors, especially if someone was ill. Today in this room you may see some of the activities the Vierlings enjoyed, such as painting watercolors, making music, and practicing penmanship.

In the Vierlings' time, many household chores took place outdoors. Behind the Vierling House today, Old Salem interpreters perform some of these activities—straining lye from ashes, making soap over an open fire, washing clothes, and baking bread in the domed oven of the Wash-Bake House.

Dr. Vierling's apothecary contained medical implements such as scales, lancets for letting blood, and amputation saws (above) and herbs and other ingredients for medicines that the doctor prepared himself (left).

In 1805, the worsening health of Sister Vierling's elderly parents, Matthew and Henrietta Miksch, prompted the Vierlings to move them into their home. With the help of Brother and Sister Opitz, they cared for the Miksches until their deaths several years later.

Perhaps the most profound shock of Sister Vierling's life came in 1817, when her husband died after an epidemic of typhoid fever. That summer brought a particularly virulent epidemic of the disease to Salem, and the 52-year-old physician

The Vierling House

The kitchen in the Vierling House.

Portrait of Friedrich Benjamin Vierling, a son of Samuel and Martha, by Daniel Welfare, 1820–30. Benjamin, as he was called, was a shoemaker. He died in 1827 at the age of 23.

was a victim of the disease himself. As was the Salem way, family and friends surrounded him and sang his favorite hymns as he lay dying. Dr. Vierling's "home-going" happened on November 11, 1817.

In 1819, Sister Vierling left her big house on the hill to move into the Widows' House, and then to live with first one and then another of her children. Around 1828 she lived with her youngest son in the Miksch House where she had grown up.

Sister Vierling ventured to Pennsylvania to visit one of her daughters in 1828 and in 1840, when she was 71. She was "lively and busy" until she suffered a "hard fall in the yard" in 1842. The accident set off severe pains and "dropsy," and her suffering grew so intense that Sister Vierling had to sit up in a chair "long, painful hours of the day and night." She died on February 20, 1844. Not long before her death, Sister Vierling "expressed the wish that as little as possible might be said about her" after she was gone. Fortunately, her children recorded her life in a memoir, celebrating her family history and her contributions as teacher, wife, mother, and grandmother.

After Dr. Vierling's death, a thorough inventory was made of the items in the house. This made it possible to authentically resurrect domestic details as the Vierling House was restored. Descendants of the family also contributed many interesting artifacts that are thought to have belonged to Dr. Vierling, his wife, and their children—the original Windsor chair in the dining room, for example, the portrait of Friedrich Benjamin Vierling, and the tea table in the parlor.

Architecture Key

The Vierling House

463 Church Street. Built 1802. Lot 7.

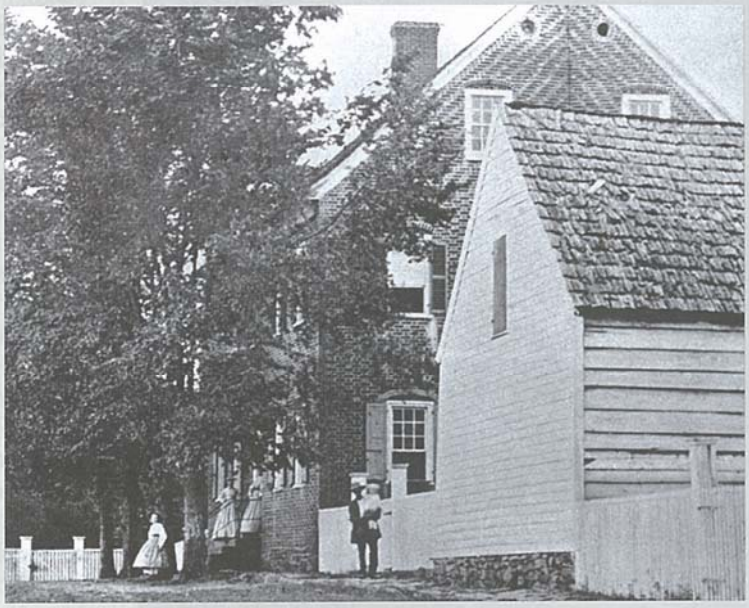
Barn

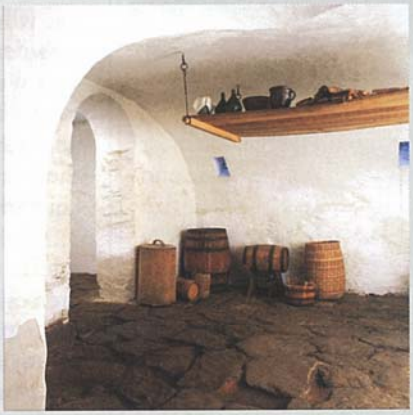
The Vierling House has a five-bay, center-hall plan with interior chimneys on each end. It is the largest of Johann Gottlob Krause's buildings.

Krause built the walls of the Vierling House in Flemish bond with glazed or darkened headers; the gables were laid in a decorative chevron pattern. As a further accent, Krause used yellow-painted bricks to highlight the quoins (bricks forming the corners of the walls) and the brickwork surrounding all the windows and doors. The front door has an arched hood over a window with ogee tracery.

At the Vierling House you can visit several outbuildings of interest. The original 1831 Wash-Bake House has decorative brickwork, a domed bake oven, and a tile roof to reduce the chance of fire. Here and in the swept yard behind the house, household tasks, including soapmaking, laundry, and baking, are demonstrated.

The 1804 wood-frame barn, which was reconstructed in accordance with archaeological evidence and nineteenth-century photographs, now is used for a video theater and restrooms. You can also see the foundations of the small house occupied by Christian David, an enslaved African American who worked for the church Administrator, Henry Schultz. He lived here from 1835 until his death in 1839. This is the only documented abode of an African American in Salem.





(Above)
A nineteenth-century photograph looking toward the Vierling House and Barn along Church Street.

(Left)
The solidly built vaulted cellars in the Vierling house were used for storage.

Painted brick accenting the windows of the Vierling House.

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16th Annual Spring Meeting of the Anesthesia History Association
April 9 - 10, 2010

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George S. Bause, MD; Alexander A. Birch, MD; Jerry Buterbaugh, BA; Shirish R. Chennaiahgari, MD; Manisha S. Desai, MD; Sukumar P. Desai, MD; Bradley Edwards, MD; Adolph Giesecke, MD; William Hammonds, MD, MPH; Anthony L. Kovac, MD; Christine L. Mai, MD; Mark G. Mandabach, MD; Lakshmi Nair, MD; Mark E. Schroeder, MD; Anthony T. Silipo, DO; Amos J. Wright, MLS; Myron Yaster, MD; and Henry Rosenberg, MD, CPE have nothing to disclose.

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Anesthesia History Association
Meeting Schedule
2010

Friday, April 9

6:00 – 7:45 am **Breakfast**

7:45 am **Welcome**

Joseph R. Tobin, MD
Professor and Chairman
Department of Anesthesiology
Wake Forest University School of Medicine

Douglas R. Bacon, MD, MA
AHA President
Professor of Anesthesiology and History of Medicine
Mayo Clinic College of Medicine

8:00 – 9:00 am

THE HISTORY OF MALIGNANT HYPERTHERMIA SYNDROME: FROM THE BARNYARD TO THE MOLECULAR LAB

Moderator: Joseph R. Tobin, MD

Henry Rosenberg, MD, CPE
President MHAUS
Director, Department of Medical Education and Clinical Research
Chief Medical Information Officer
Saint Barnabas Medical Center
Livingston, NJ

9:00 – 10:00 am **Forum for Discussion**

ANESTHESIA HISTORY TEACHING AND MENTORING: WHAT SHOULD OUR ACADEMIC DEPARTMENTS DO?
Moderator: Robert A. Strickland, MD
Associate Professor, Department of Anesthesiology
Wake Forest University School of Medicine

Sukumar P. Desai, et al: The Making of an Anesthesia Historian—Analysis of a Biographical Survey

Shirish R. Chennaiahgari, et al: History of Anesthesia Teaching in U.S. Residency Programs

10:00 – 10:15 am **Break**

10:15 am – 12:00 pm **Free Papers - Concurrent Sessions**

Session #1 **NAMES IN ANESTHESIA: FROM UNKNOWN TO RENOWNED: PART I**
Moderator: Raymond C. Roy, MD, PhD

J. Antonio Aldrete & A.J. Wright: S. Ormond Goldan, MD: An Early Advocate of Physician Anesthesia in the U.S.

George S. Bause: Reviving Nitrous Oxide: Roles Played by Editor G.J. Ziegler, M.D., of *The Dental Cosmos*

Adolph H. Giesecke: Stimulator Guided Regional Anesthesia (Prithvi Raj, MD, FFARCS)

William Hammonds & Lesa H. Campbell: Crawford W. Long and the First Obstetric Anesthetic

Session #2 **PROGRESS IN ANESTHESIA: FROM BATTLEFIELD TO MAIN STREET**
Moderator: Douglas R. Bacon, MD, MA

Brad Edwards: Anesthesia in the Confederate States Army Medical Corps during the Civil War

Anthony Kovak, et al: Comparison of United States vs. German Anesthesia during World War I

Anthony Kovak & David Shepard: Comparison of American Anesthesia Gas Machines Used in World War I

Alexander A. Birch: Combat Anesthesia: 1968

12:00 – 1:30 pm **Lunch**

The First Distal Arm Replantation in the Western Hemisphere, 1965

Jesse H. Meredith, MD
Emeritus Professor
Department of Surgery

Nicholas C. Thompson, MD
Resident
Department of Anesthesiology

Raymond C. Roy, PhD, MD
Professor
Department of Anesthesiology

Elizabeth Craven, CRNA
Department of Anesthesiology

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1:30 – 3:00 pm **Free Papers – Concurrent Sessions**

Session #1 **AGENTS, EQUIPMENT, AND TECHNICS: WHAT WORKS, WHAT DOESN'T, AND WHAT IS GONE: PART I**

Moderator, William Hammonds, MD
Professor, Department of Anesthesiology
Medical College of Georgia

Lu Wang Adams & Raymond C. Roy: When Did Anesthesia Providers Start Wearing Masks?

J. Antonio Aldrete & A.J. Wright: The Chilean Midget Anesthesia Machine: A Project Between Ernesto Frias and the Foregger Company

Margaret F. Brock: The Rise and Fall (or Changing Face) of the Esophageal Stethoscope in Anesthesiology

James G. McCormick & Sam H. Ridgeway: The History of the Development of Surgical Anesthesia for the Dolphin

Session #2 **NAMES IN ANESTHESIA: FROM UNKNOWN TO RENOWNED: PART II**

Moderator: Anthony L. Kovac, MD
Kasumi Arakawa Professor of Anesthesiology
University of Kansas School of Medicine

Mark G. Mandabach & A.J. Wright: ASA Membership in Alabama: The Early Years, 1940-1959

Mark G. Mandabach & A.J.Wright: Dr. Ephraim Cutter—Early Laryngoscopist and Physician Extraordinaire

Franklin L. Scamman: M.M. Ghoneim, M.D.: The Master of Memory, Awareness, and Anesthesia

Mark E. Schroeder: The Pentothal Players: A Third Party View

3:00 – 3:30 pm **Break**

3:30 – 5:00 pm **Free Papers**

AGENTS, EQUIPMENT, AND TECHNICS: WHAT WORKS, WHAT DOESN'T, AND WHAT IS GONE: PART II
Moderator: Mark E. Schroeder, MD
Associate Professor, Department of Anesthesiology
University of Wisconsin School of Medicine and Public Health

David J. Wilkinson: Trilene: The Last Great Stimulus to Vaporizer Design

Robin R. Hopmeier & Raymond C. Roy: Intraarterial Anesthesia: A Brief History

Nabil P. Salameh: Thyroid Steal—A Historical Perspective of the Anesthetic Management of Thyroid Storm

Anthony Silipo: Apneic Oxygenation: Is There a Place for It in Modern Anesthesia?

6:00 pm **Cash Bar**

7:00 pm **Banquet at the Cotton Mill**

7:30 – 8:30 pm **After Dinner Speaker**

What Would Mark Twain Tell Us About Medicine, If He Were Here With Us Tonight?

K. Patrick Ober, MD, FACP
Professor
Department of Internal Medicine
WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE

Saturday, April 10

7:00 – 7:45 am **Breakfast**

7:45 am **Announcements**

8:00 – 11:00 am **Free Papers**
Moderator, Robert A. Strickland, MD
Moderator, Raymond C. Roy, PhD, MD

Informed Consent: From None to Too Much?

Donald H. Wallace: Evolution of Inhalational Anesthesia and the Social Evolution of Informed Consent

Lauren K. Hoke & Yvon F. Bryan: A Brief History of Clinical Research Involving Children: From No Protection to Over-Protection

Pediatrics

Christine L. Mai & Myron Yaster: A History of Pediatric Anesthesiology: From the 1950s to the Current Era, Pediatric Anesthesiologists' Contributions to the Development of Pediatric Critical Care Medicine

Michael Bertz: Charles H. Lockhart, MD's Influence on the Anesthesia Department, The Children's Hospital of Denver, Colorado

Yvon F. Bryan & Lauren F. Hoke: The Pediatric Difficult Airway: From Awake Digital Intubation to the Digital Video Revolution

Anesthesia Outside the OR: Pain Theories and Management

Timothy H. Houle, et al: Historical Examination of Headache Triggers: Millenia of Observations by Philosophers, Physicians, and Other Theorists Underlie Current Conceptualization of Headache

Mark G. Mandabach, et al: Sympathetic Blockade for Complex Regional Pain Syndrome: A Short History

The Making of an Anesthesia Historian – Analysis of a Biographical Survey

Sukumar P. Desai, MD*; Jerry Buterbaugh, BA*; Manisha S. Desai, MD†
The Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts and the Department of Anesthesiology, University of Massachusetts Memorial Healthcare†, Worcester, Massachusetts, USA*

Background
Little is known about history-related training, mentoring, funding, obstacles, or the role of professional organizations in the career of anesthesia historians.

Methods
Electronic surveys were sent to 34 anesthesia historians. Questions dealt with biographic information, medical training, history-related training, mentoring, obstacles faced, funding, and the role of professional organizations. Indirect means were employed to gather reliable information about individuals who did not complete our questionnaire. The list of respondents was restricted to currently living anesthesiologists who have contributed significantly to the history of anesthesia.

Results
Over 85% of the 34 historians surveyed completed our questionnaire. Geographic distribution by residence showed that a majority of respondents were from North America [67%] and Europe [20%]. A similar distribution describes the location where medical school training was obtained. Gender breakdown showed 85% men and 15% women. Their age ranged from 45 yrs to over 90 yrs, with a clustering between ages 55 and 75 yrs. A majority of respondents first became interested in history before 35 yrs of age. Over half [55%] of the respondents have retired from active medical practice.

Only 2 individuals have completed graduate training in history. Of the remainder, there was an even split between those who received no training, and those who were awarded fellowships [e.g., Wood Library Museum]. Full time grant/salary support was reported by very few respondents, with the vast majority regarding themselves as self-funded.

Although many respondents have contributed to more than one area in history, the commonest area of interest was biographical exploration. About 40% respondents reported having mentors - WLM staff and Chairpersons being major categories.

Problems encountered included lack of the following: time, grant support, recognition or appreciation of history-related work, mentoring, training opportunities, access to historical information, and opportunities to present or publish their findings.

Conclusions
Our respondents identified difficulties at every stage in the development of an anesthesia historian. We offer suggestions on changes, in attitude as well as departmental and institutional support, that are necessary to increase the quality and quantity of research conducted in relation to anesthesia history.

History of Anesthesia Teaching in US Residency Programs – Results of a Nationwide Survey

Shirish R. Chennaiahgari, MD*; Sukumar P. Desai, MD†; Manisha S. Desai, MD‡
Departments of Anesthesiology at St. Elizabeth Hospital, Boston, Massachusetts; Brigham and Women's Hospital†, Boston, Massachusetts; and University of Massachusetts Memorial Healthcare‡, Worcester, Massachusetts, USA*

Background
There are no reliable estimates about interest in history of anesthesiology among anesthesiologists in the United States. Specifically, little is known about the amount of exposure residents receive during their training to topics related to history of anesthesia [HOA], and the availability of learning opportunities.

Methods
We surveyed all residency training programs in the United States [n=132]. Commercially available software [Survey Monkey] was used to send an electronic questionnaire. It contained 10 brief questions about HOA- related educational exposure and opportunities. A repeat questionnaire was sent after 4 weeks, and again after 12 weeks, to non-responders. Data were collected automatically as the surveyed individuals completed the online questionnaire.

Results
On the basis of 46 responses [33%], it appears that 58% of programs have at least one faculty member with an interest in HOA, and that 46% of programs provide lectures related to HOA in their didactic curriculum. Additionally, 80% of programs [without such didactic sessions] were willing to invite visiting professors to deliver lectures on HOA. A vast majority [91%] did not conduct tours related to HOA, while 26% indicated a willingness to allow residents interested in HOA to spend 1-3 month elective devoted to such work.

Conclusions
The low rates of interest in HOA among faculty members, and the lower rate of lectures related to HOA during residency training suggest that substantial barriers exist within the academic community towards a wider acceptance of the importance of HOA. Two positive indicators were the willingness to invite outside speakers, and allowing residents to devote 1-3 months of elective time to projects related to HOA.

S. Ormond Goldan, MD: An Early Advocate of Physician Anesthesia in the U.S.

J. Antonio Aldrete MD, MS; A.J. Wright MLS
The David Chestnut History of Anesthesia Section, Department of Anesthesiology, University of Alabama School of Medicine, Birmingham, Alabama, USA

Sydney Ormond Goldan was born in 1869 and graduated from Columbia University's College of Physicians and Surgeons in 1896. He was licensed in the state of New York in that same year and remained a resident of New York City until his death in April 1944. Information about his family background remains to be discovered; we have determined that in November 1898, he changed his name from Sidney Ormond Goldman to the one known to us today.[1] Between 1899 and 1908 Goldan published more than two dozen articles on topics ranging from general anesthesia with nitrous oxide, ether and chloroform to spinal anesthesia with cocaine; patient awareness during surgery; anesthesiology as a profession; and the relationship among the anesthetist, patient and surgeon. One of his articles apparently includes the first published example of an anesthetic record.[2] In 1903 Goldan patented an inhaler, which has been cited in a U.S. patent in 2006.[3]

After this decade of activity, Goldan apparently settled into his medical practice in the city and never published again. In the mid-1930s he began an effort to develop a summer retreat for medical professionals that developed into what is still known as The Terraces, a private residential community on the north shore of Long Island Sound. A New York *Times* article in 1935 noted that "Forty cabins and all-year houses have been built to order in The Terraces . . .."[4] According to a history on The Terraces web site, Goldan had to abandon his vision due to illness and financial problems in 1942, but the area was incorporated the following year. In 1956 Goldan was honored with a community plaza named after him that includes a plaque at the flagpole.[5] Mentions in several *New York Times* articles before and after his death note that Goldan was a "well-known Masonic Official."[6]

Goldan was not the only physician in New York City around 1900 who was interested in anesthesia. Thomas Drysdale Buchanan (1876-1940) became the first anesthetist elected to the Flower Hospital staff in 1899 and within a few years was also serving in that capacity at Metropolitan Hospital and Hahnemann Hospital. His clinical and academic career in anesthesia continued until his death.[7] By 1909 Buchanan had published only a handful of articles unrelated to professional aspects of anesthesia. However, during the first decade of the twentieth century, Goldan proclaimed in print the urgent need for improvement in anesthetic practices. "Were I to require an operation I would have no difficulty in selecting any one of a number of surgeons," he wrote. "The same, however, is not equally true regarding the anesthesia."[8] In the same article, he wrote that in the future "instead of the haphazard methods of administering anesthetics they will be properly taught by those competent to teach, not by any means the surgeon . . .. The anesthetist will not be considered a mere satellite of the surgeon, but recognized as one of a distinct class. There will be an incentive to men to give their best energies to the perfection of anesthesia . . ."
This presentation will examine in detail Dr. Goldan's anesthetic career and his concerns and proposals about the professionalization of anesthesia.

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Reviving Nitrous Oxide: Roles Played by Editor G.J. Ziegler, M.D. of *The Dental Cosmos*

George S. Bause, MD, MPH
Honorary Curator, Wood Library-Museum of Anesthesiology, Park Ridge, Illinois
Clinical Associate Professor of Anesthesiology & Perioperative Medicine and of Oral & Maxillofacial Surgery, Schools of Medicine and of Dental Medicine, Case Western Reserve University, Cleveland, Ohio, USA

A dentist, then physician, and then editor, George Jacob Ziegler, M.D. (1821-1895) parlayed his relationship with a fellow Philadelphian, dentist Samuel Stockton White, into unusually fervent advocacy for the safety of nitrous oxide. As S.S. White became North America's leading "gas" purveyor and dental supplier, championing professional use of "laughing gas" soon paid off handsomely for Ziegler. The latter would serve in two successive editorial positions for *The Dental Cosmos*, the proprietary journal published by the S.S. White Dental Manufacturing Company.[1]

As associate editor (1859-65) and then as co-editor (1865-72) of *The Dental Cosmos*, Ziegler wielded his editorial pen to reprint his own misguided laboratory and clinical reports supporting use of nitrous oxide. He also published extraordinary claims that his favorite gas could cure diseases and resuscitate the asphyxiated.

"Arterialization and respiration can be most readily induced in asphyxia by nitrous oxide, either in its gaseous forms through the lungs, or condensed in water and introduced into the alimentary canal by the mouth or bowels."[2] Or at least so claimed Ziegler in response to reported chloroform-related deaths. Remarkably, a showman-turned-dental-anaesthetist, Gardner Q. Colton—the man who supplied the gas for Horace Wells' landmark dental extraction under nitrous oxide—would parrot these claims by Ziegler about the safety of laughing gas.

By 1863 Colton would revive the dental use of laughing gas by founding what became his Colton Dental Association, an organization promoting brief 100%-nitrous-oxide anesthetics for dental extractions.[3] Within months Colton would opine in Ziegler's *Dental Cosmos* that "nitrous oxide contains *more* oxygen than the common air" and that even chloroform-asphyxiated patients can be "restored to life by giving . . . a dose of nitrous oxide."[4] Apparently, Ziegler had effectively indoctrinated Colton as to the relative safety of laughing gas. Colton would champion American dentistry's reliance on near-asphyxial nitrous-oxide anesthetics for the final 35 years of his life.

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Stimulator-guided Regional Analgesia - Prithvi Raj, MD, FFARCS

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Dr. Prithvi Raj's name is forever associated with progress in regional analgesia and pain management. He was born and educated in India determined to become a medical doctor specializing in orthopedic surgery. He trained in England, married a British lady, then moved to the US where he was disappointed to learn that he could never become Board Certified so he decided to change to anesthesiology. He was offered a residency by the charismatic Pepper Jenkins, Chairman at UT Southwestern, Dallas. Stimulated by the intellectual environment, his time in Dallas was extremely productive in a number of areas.

He realized that success in academics required him to focus on one particular area and he chose regional analgesia, so in the next five years he described stimulator-guided regional anesthesia,[1] the mechanism of action of intravenous regional analgesia, infraclavicular axillary nerve block, a new single-position, supine approach to sciatic-femoral nerve blocks, and the pharmacokinetics of repeated bolus versus infusion techniques for prolonged regional analgesia. In his early trials he used a Welcome peripheral nerve stimulator, unsheathed needle electrodes, and alligator clips for connection.

He left Dallas in 1974 for Los Angeles, then to Cincinnati, then to Atlanta, then to Houston, and finally to Lubbock. In each of these cities, except Lubbock, his goal was to establish a teaching service in the management of acute and chronic pain and improve the practice of regional analgesia. In 1975, he and Dr. Alon Winnie re-established the American Society of Regional Analgesia (ASRA). He also was instrumental in the development of the Texas Pain Society (TPS) and the World Institute of Pain (WIP). Dr. Raj was in Lubbock from 1996 to 2003, where at the age of 72, he retired. He now lives in Cincinnati with his wife Susan. He produced two books which make worthy references.[2,3] Dr. Raj won the Gaston Labat Award, the highest honor from the American Society of Regional Analgesia in 1990.

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Crawford W. Long and the First Obstetric Anesthetic

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Sir James Young Simpson (June 7, 1811 - May 6, 1870) is usually credited with first using anesthesia for childbirth. On Jan 19, 1847 he used ether for what was called the first obstetric anesthetic. On November 8, 1847 he first used chloroform for anesthesia for a vaginal delivery.[1]

However, there are many compelling reasons to doubt that Simpson was actually first in obstetric anesthesia. In her biography of Crawford W. Long (November 1, 1815 - June 16, 1878) his daughter, Frances Long Taylor, relates that Dr. Long gave his wife ether for the birth of their second child. What she did not say was that she was that second child and that the date was December 27, 1845.[2] That is more than a year prior to Simpson's first obstetric anesthetic. Mrs. Taylor did not reveal the date of Dr. Long's first obstetrical anesthetic because she was a very vain woman and would never reveal her age nor would she reveal any information from which her age could be calculated.

Mrs. Eugenia Long Harper, Dr. Long's last surviving child, corresponded with Dr. Frank Kells Boland about the ether anesthetic for the birth of Frances Long. Dr. Boland recorded those facts in his book about Crawford W. Long.[3]

With this presentation I am announcing further validation of the ether anesthetic that Dr. Long gave to his wife on December 27, 1845. This comes from a letter from Frances Long Taylor to Dr. G. W. Quillian stating that Dr. Long gave ether to his wife for the birth of all their children except the first born.[4]

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Anesthesia in the Confederate States Army Medical Corps during the Civil War

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The advent of safe, reliable anesthesia under battlefield conditions was an important medical advancement of the Civil War as indicated by the low mortality data found in the *Medical and Surgical History of the War of the Rebellion.*[1] Both the Union and Confederacy had limited or no military medical organization at the beginning of the conflict. We sought to uncover and will present the depth and utility of the use of anesthetics as carried out by the Confederate States Army Medical Corps (CSAMC). As a result of the Mexican-American War (1846-48),[2] there was opposition to anesthesia by military surgeons who thought it increased bleeding, delayed healing and increased mortality. Paradoxically, anesthetics had been used successfully during the Crimean War (1853-56) in many thousands of cases with a low mortality.[1-4]

The use of anesthetics in the CSAMC was influenced by three principle physicians: Samuel Moore, John Chisolm, and Hunter H. McGuire. Samuel Moore developed the organizational framework for the CSAMC, including examination boards and standards for hospital management. McGuire promoted the clinical use of anesthetics, as well as the concepts of triage and transportation of the wounded. Chisolm wrote on the enhancement of surgical techniques and was involved in the use and manufacturing of anesthetic agents.[2,4,5]

The CSAMC had limited manufacturing and production facilities for pharmaceuticals. They had to rely on the capture of medicines, smuggling through the Union blockade, illegal internal trade with the Union. Late in the war they developed limited manufacturing capabilities.[2,4-6]

In spite of many obstacles and limited resources, the effective use of anesthetics by the CSAMC can be noted in most all of the battles and in the field and general hospitals. Equally important and due to its dedicated professional leadership, the use of anesthetics became commonplace and recognition of the importance of anesthesia in the treatment of trauma was carried away by large numbers Confederate physicians and surgeons.

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Comparison of United States (US) vs German Anesthesia during World War I

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Research Problem: What were influences, similarities and differences between US and German anesthesia methods and techniques used during World War I (WWI)?

Sources: National WWI Museum, Kansas City, MO; Wood Library and Museum, Park Ridge, IL; Horst Stoeckel Museum for the History of Anaesthesia, Bonn, Germany; Google internet search.

Methods Approach: archival, library, museum and internet web research. Anesthesia techniques used by US vs German armies were compared in the areas of: (1) surgeons and anesthetists; (2) drop mask methods; (3) apparatus; (4) gas agents and machines; (5) premedication; (6) regional anesthesia and local anesthetics.

Results: Surgeons (US -- Crile, Cushing, Mayo. German – von Esmarch, Schimmelbusch, Bier, Braun, Kuhn) and anesthetists (US -- Guedel, Gwathmey, Hodgins. German – Kapeller, Dumont, H. Braun, W. B. Mueller (textbooks)) in each country influenced the type of anesthesia used. Drop mask methods were used at front line casualty stations and field, evacuation and base hospitals for both countries. Yaunker and Gwathmey masks were used by the US. While the Schimmelbusch mask was used by both countries, Germany also used the Julliard, von Esmarch, and Sudeck masks. While the Shipway anesthesia apparatus was used by the US, Germany used the Ombrédanne and H. Braun. Gas machines were used at evacuation and base hospitals. The Roth-Draeger and Georg Haertel gas machines with compressed O_2 were used by Germany. N_2O was not used by Germany during WWI. Whereas in 1910 the first N_2O-O_2 machine (Rota-M. Neu) and then in 1926 the Draeger-Model A came on the market in Germany, they were not used for military purposes. Ohio Monovalve, Heidbrink, Connell, Gwathmey, and Teter machines were used by the US. As N_2O was a key component of Crile's Anoci-Association balanced anesthesia technique, Crile supported use of the Ohio Monovalve machine. Intramuscular morphine and scopolamine or atropine were used as premedication by both US and Germany. Oral Veronal, Luminal and Pantopon were used by Germany. Regional anesthesia was used by both countries, with Novocain the most popular local anesthetic. Stovain (from France) was used by the US. Germany used Tropacocain. Germany added Suprarenin (adrenalin) to Novacain.

Conclusions: At front line casualty stations, field, evacuation and base hospitals, the drop mask methods used by both armies were similar. A major difference of anesthesia administration was type of gas apparatus and machine. There was an increased emphasis on N_2O as well as variety of different gas machines used by the US. Regional anesthesia/local anesthetics were used by both countries, with the exception that Stovain (from France) was

used for spinal anesthesia by the US. In Germany, regional techniques were highly accepted and used in up to 60% of all anesthetics.

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Comparison of American Anesthesia Gas Machines Used in World War I (WWI)

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Research Problem: What similarities and differences were common among anesthesia gas machines in WWI and how did they impact anesthesia care?

Sources: National WWI Museum, Kansas City, MO; Wood Library and Museum, Park Ridge, IL; Google internet search.

Methods Approach: archival, library, museum and internet web research.

Results: In the 1860s, the problem of nitrous oxide (N_2O) and oxygen (O_2) storage and delivery was solved by use of high-pressure metal tanks. In the early 1900s, the invention of pressure reducing valves decreased tank pressures to the patient. New gas machines were developed that allowed the addition of chloroform or ether to a mixture of N_2O and O_2 providing a continuous, steady flow of gas at uniform pressure. During WWI, N_2O/O_2 anesthesia was a popular technique discussed at the 1917 Paris Inter-Allied Surgical Conference and popularized by the Anoci-Association theory of Dr. George Crile to decrease mortality associated with using chloroform or ether during surgical shock. Crile's N_2O/O_2 balanced regional anesthesia technique decreased mortality as a lighter depth of anesthesia was needed for surgery compared to using chloroform or ether. Following the Paris conference, N_2O/O_2 was used more consistently in place of chloroform. Gas machines included the Gwathmey, Connell, Heidbrink, Teter and Ohio Monovalve. Factors common to these early machines were electric warmers, vaporizers, rebreathing bags, and pressure reducing and control valves, allowing the simultaneous or single administration of N_2O or O_2. The Heidbrink (1911) and Teter (1912) incorporated reducing valves and rebreathing bags which provided a definite flow and mixture of N_2O and O_2 for continuous breathing. The Ohio Monovalve (1912) passed gas through regulators and automatic valves to reduce gas pressure. The Gwathmey (1912) was simple to use and eliminated need for diaphragm valves. A visible sight feed allowed for economy of gas consumption and eliminated irregularity of gas flow, leakage and freezing of valves. The Connell (1913) had flow meters which allowed accurate gas delivery with quantitative dosing of N_2O and O_2.

Conclusions: WWI N_2O/O_2 machines were used in evacuation and base hospitals. All had: (1) N_2O/O_2; (2) reducing and control valves; (3) rebreathing bags; (4) electric source to warm gases; (5) vaporizers for ether and chloroform. Advantages were even, continuous gas flow with no valve freezing, allowing the use of a minimum quantity of gas given alone or in combination. Choice of machine appeared to depend on individual preference.

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Combat Anesthesia 1968

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An eyewitness account of anesthesia care at the largest military Naval hospital in Southern Viet Nam, shortly after the Tet Offensive began in 1968. The NSA Station Hospital in Da Nang was the center of activity for casualties from such battles as Khe Sanh, My Lai, and Marble Mountain. Content will include anesthesia personnel, anesthesia equipment, ventilation equipment, types of injuries, physical plant, allied and enemy patients, and lessons learned regarding triage. Anesthesia and surgical research was also performed at the hospital. Some of the research addressed the effects of succinylcholine on potassium release, "Da Nang Lung," and proper resuscitation fluids. The hospital staff received a Presidential Unit Citation from President Nixon for our role in the Viet Nam war. Visual aids will be included in the presentation.

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Luncheon Speakers

12:00 – 1:30 pm

The First Distal Arm Replantation in the Western Hemisphere - 1965

Featuring

Jesse H. Meredith, MD
Emeritus Professor of Surgical Sciences

Raymond C. Roy, PhD, MD
Professor of Anesthesiology

Nicholas C. Thompson, MD
Anesthesiology Resident (PGY-3)

Elizabeth Craven, CRNA

WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE
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Anesthesia for the First Replantation of a Completely Amputated Forearm in the Western Hemisphere in 1965

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On June 14, 1965, Dr. Jesse H. Meredith, a surgeon at North Carolina Baptist Hospital (NCBH), performed the Western Hemisphere's first successful replantation of a completely amputated forearm. The patient was Robert Pennell, a 26-year-old inmate, who was working on a road gang clearing brush from a North Carolina roadway when he stepped into a small hole. To break his fall, he extended his left arm at the precise time that a fellow inmate was swinging a bush axe. The result was a complete amputation, about 1½ in above the radiocarpal joint. Fellow inmates fashioned a tourniquet using a stick and shoelaces. He was quickly taken to a local physician in Mt. Airy, NC, who packed the severed hand in ice, started a blood transfusion, and arranged for transportation to NCBH. Within 90 minutes of the accident, Pennell was in the OR with Dr. Meredith and his surgical team. Over the next 7 hours and 15 minutes, they stabilized the distal ulna and radial styloid to the proximal forearm, and then meticulously rejoined the arteries, veins, nerves, soft tissue, and skin.[1]

The anesthetic administered was considerably different from the one that would have been administered today. It was delivered by CRNAs and SRNAs, without direct supervision of an anesthesiologist. No preoperative medications, aside from the preoperative antibiotics penicillin and chloramphenicol, were given. The anesthetist induced with sodium thiopental (2.5%, total of 350 mg). Anesthesia was maintained with a combination of oxygen, nitrous oxide, and cyclopropane. He was not intubated during the first 3 hours of surgery. His ventilation was assisted using a bag-valve-mask technique. Due to the extreme flammability of cyclopropane, the bases and legs of all OR equipment, including the OR table and anesthesia machine, were covered with water saturated rags to eliminate static electricity. All OR personnel wore conductive shoes, and the OR floors contained a grounded brass metal grid. At some point during the anesthetic cyclopropane was discontinued in favor of halothane, possibly because of the need to use electrocautery. It is unclear whether halothane was administered by copper kettle or vaporizer. For reasons not mentioned in the anesthesia record, 3 hours into the surgery Pennell was started on a succinylcholine (0.1%) infusion and was orally intubated using a MAC 3 blade. Assisted ventilation was accomplished by hand. A semi-closed circuit was utilized. Carbon dioxide was eliminated using soda lime and fresh gas flows were kept in excess of 4 liters per minute. A waste anesthetic gas scavenging system was not utilized at this time at NCBH. No opioids or nondepolarizing neuromuscular blocking agents were used. "Pain control" was accomplished intraoperatively by deepening the volatile agent. The patient was monitored using a "constant monitor system," which was a device that allowed the anesthetist to monitor both blood pressure and precordial breath sounds by closing and opening a spring clip.[2] The entire NCBH OR had only 4 ECG monitors, and one was likely not used during this case. Heart rate was monitored with a finger on the pulse or a precordial stethoscope. Tidal volumes were monitored by watching the chest rise and fall, movement of the ventilation bag, and a precordial stethoscope. Intravenous fluid was likely normal saline and was administered through metal needles. A total of 1500 ml of whole blood was administered during the case, likely without the use of

blood warmers. Following the completion of the case, the patient was extubated and monitored in an ICU. Postoperative pain control was accomplished with morphine and hydromorphone.[3,4]

Over the following months, Mr. Pennell regained much of the function in his left hand. At 8 weeks postoperatively, he was able to flex all of his fingers to his palm. Active wrist motion was 30 degrees of palmar flexion and 30 degrees of dorsal extension. A newspaper article on February 1, 1966 reported that Mr. Pennell was able to do 12 pushups, lift 5-pound weights with his left hand, and chin himself.[5] The success of the procedure generated considerable public interest. The story was published in *Time* magazine, [6] but not reported in the medical literature until 29 years later. In April 1966, Governor Daniel Moore, possibly in response to the considerable positive press surrounding the incident, commuted Pennell's 3 to 5 year prison sentence for breaking and entering and possession of burglar tools to time served, and he was released. A mere two weeks later Pennell was shot in the stomach in a Hickory café, and again found himself at NCBH. He recovered and was released, only to be involved in an automobile accident that resulted in head injuries, spinal cord injuries, and ultimately his death on November 24 1966.[7]

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When Did Anesthesia Providers Start Wearing Masks?

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The idea of a face mask was first suggested in 1897 by German scientists, Mikulicz and Flugge, who demonstrated the presence of bacteria droplets from the nose and mouth.[1] Their study was reinforced by Hamilton in 1905, who found heavy droplet infection from surgeons' mouth and nose while talking.[2] "*The surgeon is, however, a far greater source of danger than the nurse. His head is close to the wound, sometimes within a few inches of it, he must give orders to his assistants, and even when he is silent, the strain incident on a difficult operation is liable to make him breathe harder with his lips apart; the short forcible expirations carrying – as shown above – numerous droplets of germ-laden sputum. Especially is the danger great when the operation is performed before a class, and the surgeon talks continuously, explaining his procedure as he works*." In 1918, Weaver reported decreased incidence of diphtheria contracted by health care providers from infected patients when masks were worn.[3] "*The physicians in the hospital always wear the gauze masks when doing intubations and taking throat cultures. . .*" Although in 1918 Haller and Colwell stated the "*use of the face masks by surgeons and their assistants to protect clean operative fields which they would otherwise spray with their own mouth organisms is an old and well established procedure*,"[4] it was not until 1926 that the first clinical study demonstrated a link between wearing masks and reduced surgical site infection.[5]

Based on the above information it appears that the wearing of masks by surgeons became routine in the 1920s. However, it is not clear when this practice became routine for anesthesia providers. To make this determination we examined 73 historical photographs from the 1890s to 1960s. The percent of surgeons wearing masks increased each decade: 1890s – 0%; 1900s – 15%; 1910s – 44%; 1920s – 88%; and 1930s – 100%. For anesthesia providers the data in the same photographs were: 1890s – 0%; 1900s – 0%; 1910s – 0%; 1920s – 14%; 1930s – 43%; 1940s - 100%; 1950s – 91%. The wearing of masks by anesthesia providers in the operating room lagged almost 2 decades behind the wearing of masks by surgeons.

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The Chilean Midget Anesthesia Machine: A Project between Ernesto Frias and the Foregger Company

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"Viajes Ilustran" is an old Spanish saying indicating that travel is a mode of learning and is corroborated in this presentation. Ernesto Frias was a young, self-taught Chilean anesthetist who realized that to learn more about the subject that he had chosen to practice in Santiago de Chile, he would have to travel, and so he did. In 1936, he went to Buenos Aires, Argentina, by train over the Andes Mountains to attend a 3-month course to be taught by Federico Wollbrechaussen, a Mexican anesthesiologist who had spent six months in Ralph Waters' department in Madison, Wisconsin, in 1933. There he realized that to learn the current concepts and the use of the new equipment he wanted to introduce in his country he needed to travel even more. His dream did not become reality until 1938, when he was able to spend nearly one year in the U.S. He spent two months in Madison and then went to New York City to study under Emery Rovenstine at Bellvue Hospital.

Although he had planned to stay two months with Rovenstine, he extended his stay until 1939 because he realized that the possibility of his long planned dream—to develop a small, portable anesthetic apparatus that could be taken from hospital to hospital as that was the custom for anesthetists in Santiago who followed "their" surgeons—could materialize. This idea began to take shape after Ernesto met Dr. Richard Foregger and described his plans. Foregger, a chemist and businessman, realized the potential of Ernesto's idea. Dr. Rovenstine supported the plan and participated in the development of the new machine. Soon thereafter, they began work and in less than six months developed an anesthetic apparatus that was both reliable and portable (Figure 1). This machine contained six-yokes for O_2, N_2O and C_3H_6, a bi-pass valve for oxygen, interconnected with the control valve for oxygen, allowing them to use a second oxygen cylinder, first delivering gases by way of flowmeters, plus a Waters To-and-Fro absorber for soda lime and a glass vaporizer. A special feature was that it could be carried in a suitcase.

Soon after World War II erupted, the necessity of manufacturing a compact anesthetic apparatus that could be taken to the battle front was soon realized and other compact units were developed. One, designed by Wesley Bourne of Canada and another, manufactured by M.N. Desai of India, were introduced but had limited use. Still others, such as the one built by R.M. Muir of South Africa and the one by C.R. Troup of Australia were variations on the portable apparatus built by Frias and Foregger.

In 1940, Frias returned to Chile where he taught dozens of young colleagues how to use cyclopropane with the To-and-Fro system or the midget anesthesia apparatus. He also taught many other concepts that he had learned during his stay in the U.S A. His efforts helped to transform anesthesia in Chile into the modern medical specialty of anesthesiology.

Subsequently, the "Chilean dwarf" was widely used in Latin America. Eventually the flowmeters were modified to function as rotameters, making it possible to deliver a scientific dosage of oxygen, while giving a simultaneous approximation of the anesthetic vapor, making the machine more precise and reliable. Some enthusiasts defined it as "a creation of the expert, for the expert" and labeled it as "extremely portable, extremely practical and

extremely efficient in the hands of the efficient." Such a characterization is indeed a compliment, as not too many apparatus may be defined so eloquently.

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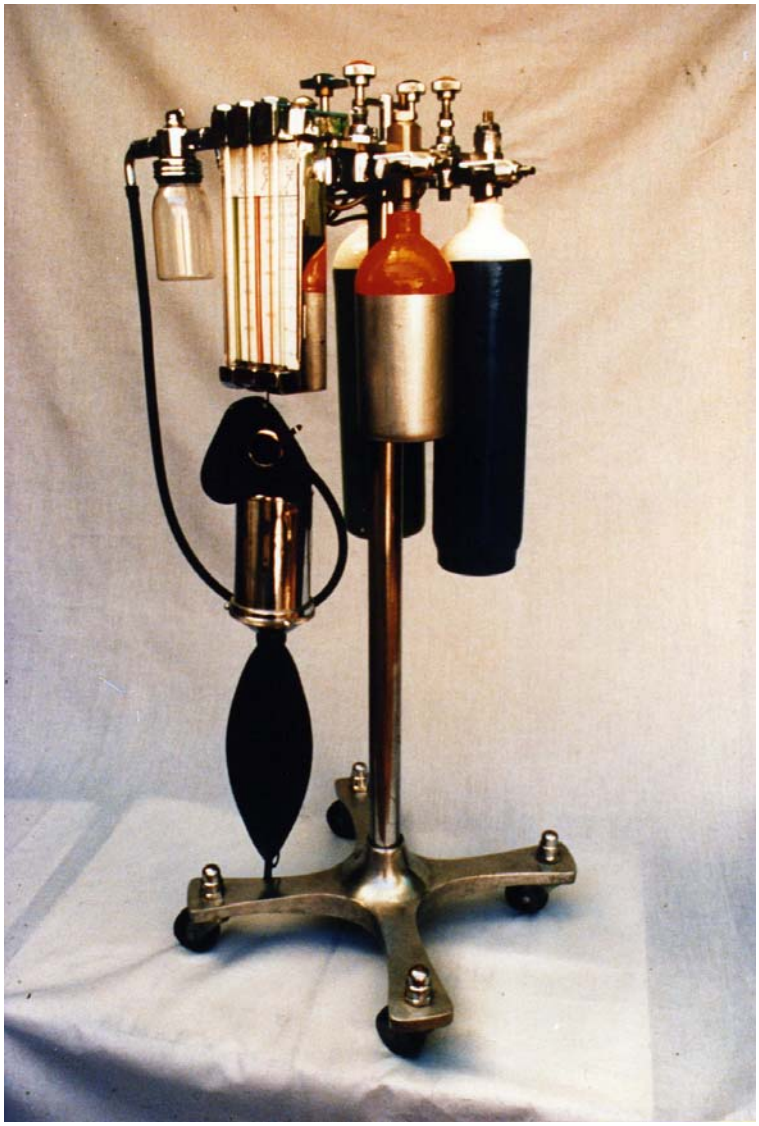

The Rise and Fall (or Changing Face) of the Esophageal Stethoscope in Anesthesiology

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The esophageal stethoscope was first demonstrated in 1893 by Solis-Cohen,[1] as a modification of the apparatus proposed by Sir Benjamin Ward Richardson.[2] Both authors described use of the device primarily for cardiovascular diagnosis. In 1896, the earliest use of transthoracic auscultation in the operating room was studied by Kirk.[3] He investigated changes in heart rate and rhythm of 200 patients during chloroform anesthesia. In 1908 Cushing[4] advocated the use of routine continuous auscultation of cardiac and respiratory sounds during the entire anesthetic course. In 1954 C. Smith[5] published the first known use of the esophageal stethoscope in operating room anesthesia practice. There are no previously published reports of esophageal stethoscopy in the operating room. In 1957 Severinghaus[6] described a three-pound, esophageal probe, battery-operated monitoring device, the "Telecor." This bulky instrument could be used to monitor the electrocardiogram, temperature, and stethoscopic heart and lung sounds of the patient undergoing anesthesia. Electrocardiographic and stethoscopic sounds were amplified. Smith's original esophageal stethoscope was modified and commercial models developed.[7] Auscultation of breath and heart sounds (by precordial or esophageal stethoscopy) was included in Harvard Medical School's Department of Anaesthesia's original Standards of Practice for minimal monitoring.[8] Since 1986, The American Society of Anesthesiologist's Standards for Basic Anesthetic Monitoring, last amended in October 2005, has included auscultation of breath and heart sounds as a useful adjunct to required monitors: pulse oximetry, capnography, capnometry, electrocardiography, blood pressure measurement. In 1995 Prielipp et al.[9] conducted a survey on the use of esophageal and pre-cordial stethoscopes in U.S. anesthesia training programs. They found that anesthesia trainees listened via a stethoscope in only 28% of anesthetics provided. The Australian Incident Monitoring Study[10] analyzed 2000 incident reports in 1993 to determine the role of the esophageal or pre-cordial stethoscope as a continuous monitor. They concluded that correct use of appropriate monitors has replaced the stethoscope as a continuous monitor. Use of the stethoscope for continuous auscultation of the heart and breath sounds is, however, considered a basic requirement during general anesthesia when resources are limited and monitors not available. Recently, the esophageal stethoscope has continued to evolve beyond auscultation. Multiple published uses include transesophageal atrial pacing, noninvasive cardiac output measurement via esophageal Doppler, esophageal temperature monitoring during radiofrequency ablation of atrial fibrillation, fiber-optic esophageal cardiac monitoring during magnetic resonance imaging, and even as an introducer during nasotracheal intubation.

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The History of the Development of Surgical Anesthesia for the Dolphin

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Anesthetization of the dolphin was first attempted by Langworthy of Johns Hopkins University Medical School in 1928, utilizing an ether cone while attempting to map the cerebral cortex of dolphins captured on the coast of North Carolina (1). His preparation was unsatisfactory for electric mapping of the cortex, and anoxic death ended the experiment. Again in 1955, a distinguished group of neurophysiologists attempted to anesthetize a group of dolphins using intraperitoneal Nembutal so they could map the dolphin brain. All the dolphins died of respiratory failure, and no scientific data were obtained (2). Based on information from this group, it became clear that intubation and controlled respiration were necessary for anesthetization of the dolphin, and subsequently in 1964, Forrest Bird of the Bird Respirator Company modified a Bird Mark 9 Respirator so it could mimic the natural apneustic plateau breathing pattern of the dolphin. Later in 1964, another group attempted to surgically anesthetize dolphins with nitrous oxide (3); however, Ridgway and McCormick tested this nitrous oxide preparation in 1967, and found it to be inadequate for major surgery (4). In their 1967 paper, Ridgway and McCormick went on to describe perfection of successful halothane surgical anesthesia for the dolphin with IV thiopental induction. The 1967 work of Ridgway and McCormick was a follow-up on comprehensive study based in part on the first successful halothane anesthesia for the dolphin by Ridgway in 1965 (5). Anesthesia in the dolphin is a complex matter of intertwined unique neural control, airway anatomy, neuromuscular control of respiration, and sleep behavior. These factors were delineated in a series of papers by Ridgway and McCormick, and will be discussed. The dolphin anesthesia work of Ridgway and McCormick involved a large number of successful cases for surgical medical care and electrophysiological studies of the dolphin auditory and central nervous system (6-10).

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ASA Membership in Alabama: The Early Years, 1940-1959

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In 2007 one of us [Mandabach] received the WLM's Rod Calverley Fellowship for his project "The History of Anesthesia in Alabama." Research on that broader topic in the nineteenth and early twentieth centuries had already been published.[1,2] The current project concentrates primarily on professional anesthesia in the state, including the development of the Alabama State Society of Anesthesiologists [founded in 1948]. This presentation examines our initial work on ASA membership in Alabama, and in comparison with other southern states (Tables 1, 2A, 2B).

A few physicians in Alabama with a serious interest in anesthesia are known to have joined and participated in anesthesia organizations as early as the 1920s. Robert G. McGahey of Birmingham appears in a 1920 "List of Members" of the American Association of Anesthetists; and C.B. Jackson of Jasper is listed as a member of the Executive Committee on the program of the sixth annual meeting of the Southern Association of Anesthetists held in Memphis in 1920.[3]

The first Alabama members of what is now the American Society of Anesthesiologists were E. Bryce Robinson and Alfred Habeeb in Fairfield, a small town near Birmingham. Both physicians were employed by the Employees Hospital of the Tennessee Coal, Iron and Railroad Company, built in 1919, and were listed in the membership directory issued in December 1940. Both men went on to long medical careers in Alabama and were among the founding members of the state's component society in 1948. Robinson created the first anesthesia residency program in Alabama at the hospital and Habeeb was its first resident. Robinson died in 1981, and Habeeb in 2009. That 1940 membership directory at the WLM has numerous handwritten notations in it made by either Ralph Waters or Paul Wood; he has added "Alfred Habeeb" under Robinson's name in the Alabama listing.

Two years later we still find only two members listed in Alabama, but Habeeb had been joined by Robert L. Allen in Tuskegee—presumably at the large veterans hospital there. The following year Habeeb and Allen were joined by three military men stationed at Gunter and Maxwell Fields. The 1947 directory listed eight civilian members in Birmingham, Fairfield, Montgomery and Tuskegee. By the end of that decade the state had 11 members in five cities, including two female anesthesiologists: Alice McNeal in Birmingham and Isabel B. Turner in Montgomery. The presentation will include more information about members in Alabama, as well as an examination of membership numbers in other southern states during the same time frame.

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3. All membership listings and meeting programs used for this abstract were found in the collections of the Wood Library-Museum of Anesthesiology, Park Ridge, Illinois

Table 1. Memberships Statistics, Worldwide

ASA Membership

	USA	International	Total
06/01/1936	250	11	261
07/01/1937	414	19	433
12/01/1938	533	29	562
12/01/1940	724	46	770
01/01/1943	795	81	876
07/01/1947	2107	265	2372
07/01/1949	2435	355	2790
07/01/1952	3285	428	3713
01/01/1959	5663	548	6211

Table 2A. Membership Statistics, Southern States

	AL	AR	FL	GA	KY	LA	MI
07/01/1937	0	0	2	4	1	7	0
12/01/1938	0	0	2	5	3	8	0
12/01/1940	2	0	5	6	7	8	0
01/01/1943	5	6	22	24	13	16	1
07/01/1947	8	3	24	25	18	29	3
07/01/1949	11	9	30	28	40	42	2
07/01/1952	21	12	53	36	47	52	10
01/01/1959	35	29	119	71	72	76	18

Table 2B. Membership Statistics, Southern States

	MO	NC	SC	TN	TX	VA	WV
07/01/1937	2	2	0	0	11	0	2
12/01/1938	2	3	0	1	14	2	2
12/01/1940	4	4	0	2	11	4	5
01/01/1943	12	9	5	8	38	12	8
07/01/1947	36	14	4	20	55	14	14
07/01/1949	43	13	3	25	86	16	18
07/01/1952	54	24	12	50	127	31	22
01/01/1959	80	56	37	68	215	65	35

Dr. Ephraim Cutter - Early Laryngoscopist and Physician Extraordinaire

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- Ephraim Cutter, A.M., M.D., L.L.D.
- Born: Woburn, Massachusetts 1 September 1832
- Died: Falmouth, Massachusetts 24 April 1917
- Education:
  - B.A. Warren Academy 1852
  - M.A. Yale University 1855
  - M.D. Harvard University 1856
  - M.D. University of Pennsylvania 1857
  - L.L. D.Grinnell College 1887
- Member of multiple societies in the USA and abroad.
- Over 600 publications, with over 100 references in the JAMA Archives alone
- Mentors and Colleagues:
  - Benjamin Cutter – father
  - Oliver Wendell Holmes
  - Henry I. Bowditch
  - Josiah P. Cooke
  - Dr. Jacob Bigelow
  - Important European Meetings:
  - 1862 presented "virtues and values of *Veratrum Viride*"
  - 1889 AMA delegate for Leeds (UK)Town Hall Meeting
  - 1890 10th International Medical Congress
- Communications on Food and Tubercle
- Electrolysis of Tumors
- Food in the Treatment of Fibroids
- Physical Causes of Heart Disease
- Cutter's Stem Pessary
- Medical Practice:
  - 1856-1875 Woburn, MA
  - 1875-1881 Cambridge & Boston, MA
  - 1881-1901 New York, NY
- Retires to West Falmouth, Buzzards Bay, MA 1901
- Fatal Cerebral hemorrhage, 1917
- Contributions to Medicine and Public Health
  1. Laryngoscopy:
     a. 1859 Alvan Clarke fashioned laryngoscope for Dr. Cutter
     b. 1862 Began study of work of Semelder (Vienna) and Czermak (Paris)
  2. Gynecology:
     a. Treatment of fibroids

   b. Invented pessaries, advocated use of pessaries, not surgery as treatment for fibroids
3. Microscopy:
   a. Invented three unique clinical microscopes
   b. Photographic studies of blood, alcoholic yeast, starch, cotton, lard, lard and soap
4. Public health:
   a. Management of tuberculosis
   b. Studied morphology of water supply
      i. hydrant, lake, pond, well and spring water
   c. Called as expert witness in civil cases regarding water
   d. Studied nutritional aspects of illness
   e. Investigated causes of early tooth decay in children, motivated by experience with his children's problems.
5. Surgical inventions:
   a. 1866 retractors for thyroidectomy
   b. 1869-1875 three clinical microscopes
   c. 1870 new metallic suture, new ear speculum
   d. 1871 eustachian catheter
   e. 1873 invalid chair, digital thoracentesis
   f. 1874 orthopedic hospital bed
   g. 1875 "galvano-caustic" holders

- From his obituary [1]:
  - "Ephraim Cutter was of the philosophy of Leonardo da Vinci, which knew not commercialism nor personal politics; both men died without pelf and both men left great gifts to humanity, Leonardo in his sixties and Cutter in his eighties, . . . "
- Legacy:
  - His life's work
  - His family:
    - His wife
    - His brother, William Richard Cutter, a librarian and historian
    - His two sons
    - Ephraim Cutter, musical director , Boston, Massachusetts
    - John Ashburton Cutter, M.D., a physician in New York, N.Y.

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MM Ghoneim, MD: The Master of Memory, Awareness and Anesthesia

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Problem: When a patient has recall of events occurring in the operating room, we tend to deny the patient's veracity, counting on our skills at safety and comfort to defend the conduct of our anesthetic. However, MM Ghoneim, MD, over the past 30 years, has been researching learning and recall with respect to many psychopharmacological drugs including many of the common drugs we use every day in the operating room.

Methods: In his writings, he states that recall of events under anesthesia is essentially iatrogenic. Reports of recall during anesthesia and surgery were rare until the introduction of muscle relaxants. He outlines that recall can be reduced by use of amnesic drugs such as the benzodiazepines, larger doses of induction drugs, avoidance of total paralysis, keeping the volatile agent concentration at 0.6 MAC or above, using regional anesthesia to reduce surgical stimulation, periodic validation of anesthesia machine function, preoperative discussion with the patient that recall may occur, research into causes of recall, and monitoring for awareness under anesthesia (movement).

He taught that every patient who has received a general anesthetic needs to be asked 4 questions following the anesthetic: What was the last thing you remember before you went to sleep? What was the first thing you remember when you woke up? Can you remember anything in between these two periods? Did you dream during your operation? If recall is a possibility, do detailed interviews with the patient, even offering an apology, document the interview in the patient's medical record, tell the surgeon and the hospital lawyer, visit the patient daily, and do not delay referral to a mental health professional.

History: Dr. Ghoneim did his medical school and anesthesia training at Ain Shams University in Cairo, Egypt. He continued his training in the Nuffield Department of Anaesthesia at Oxford, returning to Egypt. William Hamilton, MD, then the new head of the Department of Anesthesia at the University of Iowa, on a visit to Egypt in 1967, invited Dr. Ghoneim to join him at Iowa which he did shortly thereafter. He is now Professor Emeritus of Anesthesia at the University of Iowa.

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The Pentothal Players: A Third Party View

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Short-acting barbiturates for intravenous anesthesia entered clinical use in the early 1930s, but induced excitatory muscle movement, a side-effect common to the methylated barbiturates.[1] Chemists from Abbott Laboratories described a sulfur derivative of pentobarbital (Nembutal) at the American Chemical Society meeting in August 1935 that was fast acting, of short duration, and with far less muscle related side effects. Initially known as compound 8064 it was called "Barbiturate A" and named "Thionembutal" by John S. Lundy, and later was given the trade name, Pentothal Sodium.[2] While Abbott worked with Lundy at the Mayo Clinic and Ronald Jarman at the Princess Beatrice Hospital in London, England conducting clinical trials, it is generally (but not universally) accepted that Ralph Waters at Wisconsin gave the first dose clinically on March 8, 1934. Noel Gillespie knew each of the clinical Pentothal pioneers and recorded his impressions in his diaries in the spring of 1935.

Pharmacological chemists at the University of Wisconsin collaborated with Abbott Laboratories in developing sodium ethyl (1-methyl-butyl) barbiturate (nembutal) and according to William Neff[3] and Gillespie, had access to the newer sulfur derivative, which they shared with Ralph Waters. Gillespie records that Jarman, during an anesthesia meeting in Boston in October 1934, obtained an initial sample of 8064 from Lundy coupled with an agreement that Lundy would be the first to press. Lundy had an agreement with Dr. J. F. Biehn, Medical Director of Abbott Laboratories, that access to Pentothal would be restricted until the first published reports from the Mayo Clinic appeared. Unbeknownst to Lundy, Jarman arranged for an additional supply from the Abbott office in Montreal before returning to London.

In early 1935, Gillespie, witnessed Jarman "using a new intravenous barbiturate: in this case a yellow solution. When I asked him for details he was completely evasive. Would not tell me what it was chemically, nor anything of the details of its use." “You will see when I publish my paper,” was the only reply."

Gillespie undertook his American Tour in 1935, arriving in Madison in early May. He saw residents using the same "yellowish fluid" he had seen Jarman use, and recorded in his diary, "At this time Madison had been using it for a little over a year."

On arriving in Rochester, Lundy quizzed Gillespie about Jarman's use of the new thiobarbiturate. Gillespie replied that he knew next to nothing about Jarman's use of the drug, but that he had seen it used in Madison, a comment Gillespie discovered was not well received. Before leaving Mayo, Gillespie lunches with Drs. Biehn and Lundy and describes it in his diary in a section titled, "Pentothal Controversy."[4]

If the Pentothal Controversy is a tempest in a teacup it is because Lundy is rightly credited with popularizing the drug and Waters modestly declined to trumpet his priority.

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Trilene: The Last Great Stimulus to Vaporizer Design

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Analgesia, as produced by trichloroethylene, was recognized in the early part of the 20th Century when it was used extensively in the treatment of trigeminal neuralgia. Jackson and Striker followed some animal studies with a series of 300 patients in the early 1930s but further progress with the agent was stultified by a report from the Council of Pharmacy and Chemistry of the AMA who opined that there was no place for using the drug in anaesthesia.

In the early 1940s in London Langton Hewer and Rex Marrett experimented with the drug and published a series of 127 cases in 1943. Initial enthusiasm with the powerful analgesic was tempered by its slow onset of action and recovery together with concerns over its breakdown on heating (such as occurred in soda lime canisters) to form very toxic metabolites that caused cranial nerve palsies. Despite these reservations the drug remained popular in many centres in the UK (and in many parts of its old Empire!) until the1980s when its production as an anaesthetic was terminated by ICI.

In parallel with its use in the operating theatre was the development of a huge series of vaporizers for the use of trilene as an analgesic using air as a carrier gas. The majority of these devices focused on obstetric analgesia but their use was soon extended to minor surgery and for use during any small painful procedure. These analgesic apparatus are of quite differing sophistication, size and shape. They employed all sorts of different design features to try to provide an analgesic dose of about 0.35-0.5% trilene in air. Many received official "approval" but the majority soon fell into obscurity and fill the shelves of anaesthesia collections in the UK.

Few similar devices were made in the USA; the Duke Inhaler as designed by Ron Stephen and the Oxy-Columbus Trilene Inhaler are notable exceptions to this.

Very few anaesthesia agents since the introduction of trichloroethylene had analgesic properties and so vaporizer design became focused on the delivery of drugs from machines that evolved into today's anaesthesia workstations. The only exception to this was methoxyflurane and here it was generally adaptations of trilene vaporizers that emerged for its use.

It is my belief that the introduction of trilene provoked a fascinating innovation in vaporizer design the like of which has not been since.

Intraarterial Anesthesia: A Brief History

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Intraarterial anesthesia was first introduced clinically by the Spanish vascular surgeon Jose Goyanes Capdevila (1876-1964) in 1908 as a means to provide regional anesthesia for short duration extremity procedures in patients who were poor candidates for general anesthesia. Nearly simultaneously, Bier was describing intravenous regional anesthesia techniques. Goyanes described the application of an Esmarch bandage to produce ischemia of the limb, tourniquet application, cannulation of a surgically exposed artery, and finally slow injection of local anesthetic – initially a weak cocaine solution, later procaine. The result was *"instantaneous"* anesthesia (1). This approach was reported three years later by Ransohoff, who in his original article from the *Annals of Surgery* described two successful cases of patients undergoing upper and lower extremity procedures, as well as a series of experiments on rabbits and dogs using intraarterial cocaine as the sole source of anesthesia. "*In two minutes anaesthesia was absolute and antibrachial amputation done without the patient's knowledge*" (2). Although a chapter in Allen's 1918 text, *Local and Regional Anesthesia*, was devoted to intraarterial anesthesia (3), it never really caught on.

Use of this method resurfaced in the 1960s when van Niekerk et al. published a report of 306 cases of intraarterial regional anesthesia using 0.5% lignocaine for upper extremity procedures (4). In this series, they describe technique, dosing, complications, degree of analgesia, and practical clinical applicability. *"Most patients received pethidine 100 mg as premedication in order to reduce the discomfort from the injection . . .."* Three of the cases included femoral artery cannulation for lower extremity procedures; one was successful for 40 min until the tourniquet failed, but the other two failed from unspecified *"technical faults. We do not consider it justified to continue with this method in the leg at this stage."*

In the 1990s a second resurgence of this method occurred with Koscielniak-Nielson et al. Their work included lignocaine dose-finding and systemic toxicity studies. But *"burning pain during intra-arterial injection of lignocaine can be quite intense in some patients and limits the usefulness. . ."* They suggested this technique *"may be useful for ambulant hand surgery in patients with poor veins . . ."* (5,6).

Most recently, interest in intra-arterial administration of medications has centered on difficult IV access in pediatric patients. There are multiple case reports of arterial cannulation being deliberately used for volume resuscitation as well as drug administration after failed attempts at intravenous access (7,8).

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Thyroid Steal: A Historical Perspective of the Anesthetic Management of Thyroid Storm

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In the early 1900s, the world of anesthesia had not yet discovered how to safely excise the thyroid gland without causing the sympathetic response associated with thyroid storm. George Crile recognized the danger associated with the physiological state of patients with this condition. He devised a method to harvest the thyroid while minimizing the stress on the body, called "stealing the thyroid." Crile would admit the patient into the hospital early prior to surgery, make them as comfortable as possible, and initiate his protocol—"there should be no mention whatsoever of an operation." [2] This method involved treating the patient with placebo for several days, inducing them with anesthetic while in their floor bed and whisking them away to surgery without them knowing—"It is our custom to anesthetize all the apprehensive and rather toxic patients with intravenous sodium pentothal in their rooms without the patient knowing that the day for operation has arrived, if it is possible to achieve this deception."[6] According to several case reports, the patients would perform significantly better postoperatively in terms of morbidity and mortality—"the anticipation . . . and excitement producing fatal shock, are by this method eliminated."[3] The induction methods for "stealing the thyroid" involved IV techniques, spinal techniques, and even colonic anesthesia. "When she awakens, she is in her bed, with little knowledge of what has taken place, aside from knowing something has happened to her throat."[3] These inductions, and the situations in which Crile and others conducted them, seem incredible from today's perspective. As the practice of anesthesia has evolved, physicians have devised new treatment plans involving pretreatments with anti-thyroid medications and radiotherapy. In the early part of the 20th century, however, practitioners could only rely upon creativity to devise anesthetic plans for this serious anesthetic issue.

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Apneic Oxygenation: Is There a Place for It in Modern Anesthesia?

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"The object of the function of respiration is to supply the animal with oxygen and remove carbon dioxide."[1] That is the initial sentence from Metzler and Auer's landmark article entitled *Continuous Respiration Without Respiratory Movements*. This technique has been labeled apneic oxygenation. Apneic oxygenation technique dates back to the early 1900s and was initially utilized to remedy the high pneumothorax rate in thoracic surgery. It was first investigated by Vesalius's work with dogs, further investigated by Robert Hooke, and improved on by Kuhn. Then in 1909, Meltzer and Auer demonstrated that rhythmic changes in pressure within the lungs were unnecessary and that continuous oxygen rich air insufflated into the trachea could avoid hypoxia.[2]

Apneic oxygenation can by defined two ways. Number one, it is a method of initially providing oxygen to a patient, followed by a period apnea thereby relying on the filled oxygen reserves to avoid hypoxia. The second definition also involves oxygenation followed by apnea but adds a stream of continuous oxygen by insufflation into the lungs to provide passive oxygenation without respiratory effort. Both methods maintain a quiet, unobstructed surgical field while ensuring adequate oxygenation to the patient. The majority of apneic oxygenation initially occurred in the thoracic surgery field, but it also included procedures from ENT and general surgery.

This concept of apneic oxygenation led to continued research and advancement of not only the technique but devices and instruments that made apneic oxygenation possible. One such instrument is the modern day Sanders injector, which many in our field incorrectly label as the "jet ventilator." The Sanders injector uses oxygen under higher pressure to insufflate via a larger bore IV catheter, or can be attached to a side port of an ENT rigid scope. The double lumen endotracheal tube technology is another device that emerged from apneic oxygenation technique and provided reliable lung isolation. Interestingly enough, it then became such a popular method that it nearly relegated apneic oxygenation to part of history.

There is a place for apneic oxygenation technique in modern practice, although mostly educational and theoretical. The science and physiology behind apneic oxygenation reinforces two of anesthesia's main tenets:

- filling reserve capacity and the associated proper denitrogenation before induction of anesthesia, and
- the predictable rise of carbon dioxide towards the end of case to trigger spontaneous respiration.

One expected downside of apneic oxygenation is hypercarbia, but if the technique is done properly this occurs without hypoxia. This was illustrated classically by Fruman in his 1959 article "Apneic Oxygenation in Man"[3] Hypercarbia and acidosis remain a limiting factor in the use of this technique in today's anesthesia.

I am not advocating apneic oxygenation for everyday use in our operating rooms. However, we will come across cases when this technique can be used. A few instances in which this

technique can find a niche “application” in our modern day anesthesia will be highlighted in the presentation.

Problems encountered with the apneic oxygenation technique in the past have led to advancement and I believe will further illustrate the continued need to re-evaluate anesthesia practice and strive for improvement. This mindset should be instilled in our residency training, as to highlight the importance of our rich history and its impact on our future.

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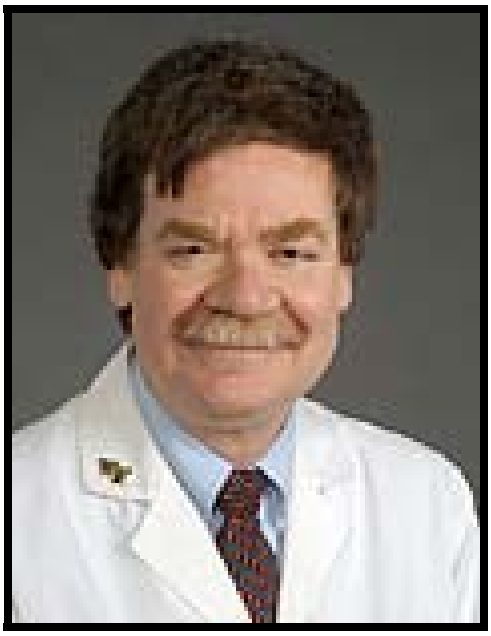
After Dinner Speaker

7:30 – 8:30 pm

What Would Mark Twain Tell Us About Medicine, If He Were Here With Us Tonight?



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Evolution of Inhalation Anesthesia: And the Social Evolution to Informed Consent

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The discovery, evolution, and efficacy of inhalation anesthesia in relief of pain during surgery or midwifery, in a wide view, may be taken together with a coincident gradual social evolution in medicine – the journey to the process of informed consent. Although Crawford W. Long had first given ether in 1842, it was William T G Morton who publicly demonstrated the efficacy of ether anesthesia on October 16, 1846 at Massachusetts General Hospital, Boston (1). He administered ether from a glass inhaler and successfully relieved pain during surgery. News of this humanitarian event by letter from HJ Bigelow in Boston reached London three weeks later, and was immediately communicated to the Lancet, and to Robert Liston by Dr Francis Boott (2). On December 21, 1846, Robert Liston, Professor of Clinical Surgery at the University of London, was first to perform operations under ether anesthesia at University College Hospital, London. On January 19, 1847 James Y Simpson, Professor of Midwifery in the University of Edinburgh administered ether for the delivery of a woman with a deformed pelvis - reported in the Edinburgh Monthly Journal of Medical Science. There were strong protests by some on religious grounds. In France, Dubois gave ether anesthesia for midwifery on February 13, 1847. And in Boston on May 5, 1847 ether was given for an instrumental delivery by Walter Channing, Professor of Midwifery and Jurisprudence at Harvard. News of ether anesthesia spread rapidly in Europe - welcomed by leading surgeons. Anesthesia was accepted as a major American advance in the practice of medicine. An early contribution to medical knowledge on the fundamentals of inhalation anesthesia was the publication "On the inhalation of the vapor of ether" by John Snow in 1847. Snow identified the physical properties of ether vapor and its pharmacological effects; and described stages in ether anesthesia – a contribution found clinically useful for decades thereafter. Snow also was an inventor and advanced the design of the ether inhaler – the inhaler he developed facilitated vaporization of ether by keeping it at a nearly steady temperature. Also the inhaler he designed had tubes of wider diameter which had a lower resistance to airflow. Simpson's paper, "Account of a New Anaesthetic Agent as a Substitute for Sulphuric Ether in Surgery and Midwifery" was published on November 15, 1847. In just a few more months Chloroform had achieved widespread popularity in Europe and replaced ether as the agent of choice. And it was preferred for anesthesia of casualties in the Franco-Prussian war (1870). Chloroform was a potent agent, depressant to both respiratory and cardiac function. Many deaths were reported with this agent. However, Snow recorded he had administered more than 4000 chloroform anesthetics as a full time anesthetist practicing in London without a single death. Not surprisingly, societal acceptance of anesthesia for delivery (as morally respectable) was strongly advanced when Queen Victoria allowed John Snow to administer chloroform to her for the delivery of Prince Leopold in 1853; and then again in 1857 for the birth of Princess Beatrice. The earliest medical practice codes did not speak of consent (3). Importantly in English law (1767) a case decision noted, "because the professional custom among surgeons was to obtain the patient's consent before beginning treatment . . .. it was only fair to impose liability on a physician who failed to meet this standard of care (*5). A simple interchange between patient and physician had been long

accepted for valid consent prior to the beginning of the 20th century. In a New York case (1914) Justice Cardozo noted – "every human being of adult years and sound mind has a right to determine what shall be done with his body" (*22)(*23). In the 1950s a transition to the first "informed consent" cases occurred: documentation in the medical record of the process of informed consent for anesthesia and surgery had become an ethical and legal obligation in the practice of medicine, and research on humans (4).

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A Brief History of Clinical Research Involving Children: From No Protection to Overprotection

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Children have often been the initial test subjects for experimental procedures beginning in the 18th and 19th centuries. The first appendectomy was performed on an 11-year-old child at St. George's hospital in London in 1735, and the first vesicovaginal, rectivaginal fistula repair in 1845.[1] See Table 1 for other examples.

Table 1. Abbreviated list of surgical procedures first performed in children

Year	Location	Surgery	Age (yrs)	Surgeon	Side-note
1735	St George's Hospital-London, UK	Appendectomy	11	Claudius Amyand	First known appendectomy
1845	Montgomery, AL	Vesicovaginal, rectivaginal fistula	17	J. Marion Sims	Patient's 13th procedures without anesthesia.
1902	Montgomery, AL	Drainage of blood in pericardial cavity; repair of 3/8 inch heart laceration	13	Luther L. Hill	First successful cardiac surgery in the US.
1944	Johns Hopkins Hospital-Baltimore, MD	Blalock Procedure- repair tetralogy of Fallot	15 mo	Alfred Blalock	Lab technician who developed technique assisted during surgery.
1954	University of Minnesota	Human cross-circulation; closure of VSD	1	C. Walton Lillehei	Father was the donor, patient did not survive.

Parents often volunteered their children for experimental surgical procedures due to the lack of alternative options or to simply save the child's life. Many of these surgical procedures were experimental or very risky in nature. Formalized research trials were often conducted in pediatric hospitals and orphanages towards the end of the 19th century, usually involving infectious disease. No institutional oversight or state/government regulatory authorities existed to provide codes of law or guidance. There was also little recourse should adverse outcomes occur. Despite this, very little apprehension was expressed by the medical community regarding children as research subjects.[2]

As time passed, paternalistic forms of medicine and uninformed consent were increasingly questioned. The first application of such inquiries in children occurred in Germany in 1900. The Prussian Minister of Religious, Educational, and Medical Affairs established a decree regarding experimentation after children and prostitutes were injected with syphilis without consent. This protected vulnerable populations, emphasized the need of informed consent, and provided methods to hold researchers accountable.[3]

Later, the Nuremberg Code became a template for further legislation and guidelines after the trials of Nazi physicians in Germany in 1946-47. Regulations specific to children were lacking from the Nuremberg Code and were later addressed in the Declaration of Helsinki in 1964. This included the need for written consent of a legal guardian when the subject part is of a vulnerable population.

Abuses continued, such as the Willowbrook State School from 1963-66 in Willowbrook, New York where children were intentionally inoculated with hepatitis C to measure the effects of gamma globulin from 1963-66. Later, the Code of Federal Regulations (CFR), Title 45- Part 46 was established in 1981 by the Department of Health and Human Services based on the Belmont Report published in 1979.[4,5] The Belmont Report was established in

response to abuses of children in research post-Nuremberg Code and contained sections dealing with consent, assent for children, and the level of adequate risk children may be exposed to during research.

Various state laws now exist in addition to CFR Title 45-46 and Title 21-50. The latter delineates regulations specific to children including informed consent by the legal guardian, child assent (if possible), and acceptable levels of risk. State and federal laws have been modified multiple times as needed. The International Conference on Harmonisation released its Ethical Considerations for Clinical Trials on Medicinal Products Conducted with the Paediatric Population (Section E11) in 2000.

By these efforts to protect children involved in clinical research, the pendulum may have swung too far in overprotecting them. Multiple sets of regulations and institutional oversight may have caused confusion and frustration for investigators wishing to include children as study subjects. Thus, a previously minimal risk study involving routine clinical care may change to "more than minimal risk" upon further review. Another example is an IRB's review of an Investigational New Drug (IND) application for non-FDA approved anesthetics used commonly in children, such as dexmedetomidine, prior to use in study subjects.

In summary, current regulations often hinder inclusion of children in clinical research. Thus, children may not have an equal chance to benefit from study outcomes. We need to find a balance in learning from history's mistakes but not overprotect children from inclusion in clinical research.

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A History of Pediatric Anesthesiology: From the 1950s to the Current Era

Pediatric Anesthesiologists Contributions to the Development of Pediatric Critical Care Medicine

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Introduction:
From the first administration of ether by Crawford Long to the famous public demonstration by William T.G. Morton, the origins of pediatric anesthesia have paralleled the innovative discoveries that created the specialty of anesthesiology (1). Many of the achievements that shaped modern practice, such as safer perioperative monitoring, improved patient survival, the creation of neonatal and pediatric intensive care units, and the development of acute and chronic pain services, are the results of the pioneering accomplishments of practitioners who are alive today. In cooperation with the Society for Pediatric Anesthesia (SPA) and the Wood Library-Museum of Anesthesiology, the authors sought to collect an enduring living oral and video history of pediatric anesthesia and critical care medicine for current and future generations of practitioners.

Methods:
Using previously published histories (PubMed, book chapters from the major textbooks of pediatric anesthesia, and the lists of American Academy of Pediatrics Robert M. Smith award winners, and Board of Director members of SPA), the authors compiled a list of physician pioneers in the subspecialties of pediatric anesthesia and intensive care. These physicians were contacted by one of the authors (CM) and underwent a structured and unstructured interview. The structured interview included questions such as background education and training, mentorship and leadership roles, contributions, research and discoveries, and overall experience during the early developments of the subspecialty. An unstructured "open mike" interview concluded the history. Finally, a "live" video moderated panel is planned for the SPA 2011 winter meeting.

Results:
To date we have conducted interviews with: John Downes, MD; Mark Rogers, MD; Frederic Berry, MD; David Steward, MD; George Gregory, MD; Al Hackel, MD; Theodore Striker, MD; and Mark Rockoff, MD. The following individual will to be interviewed in the future: Alan Conn, MD.

Conclusion:
"The human soul longs for enduring continuity in life and understanding the past in order to provide clues to the present and perhaps even the future. Within every enduring organization there exist 3 perspectives, past, present, and future"(2). This is our first attempt at preserving our unique heritage.

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Charles H. Lockhart, MD's Influence on the Anesthesia Department, The Children's Hospital of Denver, Colorado

Michael W. Bertz, DDS, Assistant Professor of Anesthesia
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The progress that The Children's Hospital and its Anesthesia Department have made over the past 100 years is both remarkable and amazing. This was due to the diligence and devotion of a group of unique medical people over the years, all "For a Child's Sake."

This talk will explain why Denver needed a children's hospital, those responsible for its beginning and growth, its financing, and some of the medical problems of the young patients in the late 1800s into the 1900s. The children of families of the expanding West had become very important for those involved in establishing ranches for cattle and farming. TCH grew from a summer tent hospital to the state-of-the-art hospital it is now.

This presentation will also explore how TCH Anesthesiology was started with one itinerant anesthesiologist with minimal training and evolved to the outstanding department it is today. In the 1960s the medical and surgical staff, along with the hospital administration, realized that for the hospital to progress, it needed a strong Department of Anesthesia with trained, full-time geographic pediatric anesthesiologists. Fortunately, Charles H. Lockhart, MD, fresh from the U.S. Navy, was there; his leadership is why TCH Anesthesia is an excellent clinical care, research, and academic department.

Resources

1. Seymour E. Wheelock, MD, *Pediatrician and TCH Historian*.
2. Charles H. Lockhart, MD, *Emeritus Professor of Anesthesiology and Pediatrics TCH*, University of Colorado, Denver School of Medicine.
3. *The Denver Medical Times* August 1893; Vol. XIII, No. 2.
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The Pediatric Difficult Airway: From Awake Digital Intubation to the Digital Video Revolution

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The management of the difficult pediatric airway over the past century may be described as having occurred in several phases.

The first was basically holding the child down for surgery without anesthesia. This can best be described in the early 20th century, when there was a fear in managing children with potential airway problems. The most common example is that of restraining a child with strong help and wrapping them in a blanket for incision and debridement of retropharyngeal abscesses (1). The airway was not controlled during this type of surgery.

The next phase occurred a few decades later with tracheal intubation in children when adult equipment was adapted for use in children. In the 1940s the development of a broad selection of pediatric laryngoscopes occurred (2). However, in certain conditions, digital intubation—using the anesthesiologist's fingers to intubate an awake child—was used if the risk of direct laryngoscopy was deemed to be high. Awake intubations without anesthetic agents were also performed using pediatric laryngoscopes. This phase of airway management, of not administering intravenous induction agents, was propelled by the fear that if the patient lost consciousness and/or airway reflexes, then the airway would be lost.

Another phase followed with the introduction of halogenated agents. Using halothane for induction, intubations using conventional pediatric laryngoscopes or specialized ENT instruments could occur after the patient was well anesthetized. Several different pediatric blades could be used for intubation. After the introduction of the Miller and Macintosh laryngoscopes, the Oxford, Seward, Robertshaw, and Wisconsin-Hipple blades were developed from the 1940s to 1960s. Each laryngoscope had a feature that facilitated use in children with difficult airways (3).

The final phase was the introduction of specialized airway devices, such as the flexible fiberoptic bronchoscopes (FFB) in the 1970s which Ovassapian and others had used with the difficult adult airway. As the FFB became smaller in diameter, ultra-thin FFBs in addition to other ENT devices were used in neonates and infants. In the 1980s and 1990s, the FFB was combined with supralaryngeal devices such as the LMA to secure the difficult pediatric airway while the child was either anesthetized or by using sedation and topical anesthesia. The first decade of the 21st century has seen a proliferation of video laryngoscopes and intubation aids of all shapes and sizes that are now being used in children with difficult airways.

So a digital revolution has occurred, that from the anesthesiologist using his/her own digits blindly to guide the endotracheal tube in an awake child to using his/her digits to control the video laryngoscope camera for all to see the airway in a sedated or anesthetized child.

References

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Historical Examination of Headache Triggers: Millennia of Observations by Philosophers, Physicians, and Other Theorists Underlie Current Conceptualization of Headache

Kenneth B. Brown (Student)*; Dana T. Turner, MSPH*; Jeanetta Rains, PhD†; Donald B. Penzien, PhD‡; Vincent T. Martin, MD§; Timothy T. Houle, PhD*
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Objective: Future headache theories may benefit from a continued appreciation of past conceptualizations. This presentation examines the evolution of beliefs concerning primary headache triggers by reviewing observations of historical headache theorists.

Background: Historical writings suggest humans have been troubled by headache since the dawn of civilization. Throughout human history, physicians, philosophers, and other theorists have recorded observations of factors they believed to have induced ("triggered") headache. Consideration of earlier observations may help to place the current beliefs about headache precipitants in a historical context as well enlighten the contemporary study of trigger factors.

Methods: A historical (1900 or earlier) literature review using the Oxford Bodleian Library sources of headache observations by noted theorists.

Results: Over 2300 years ago, Hippocrates used his theory of pathology to organize what he believed to be the triggers of headaches including an association between headache and physical activities such as exercise. Specifically, Hippocrates believed that the liver produced vapors that ascended to the brain, triggering pain. Galen documented these ideas and further advanced his own theories. Since that time, there have been a host of competing theories concerning the underlying causes of headache, but only minor additions to our list of the triggers of primary headaches. Yet, many theorists have emphasized the importance of various triggers according to their own unique theory of the disorder. For example, western authors primarily focus on triggers that are related to physical activity, weather conditions, and psychosomatic influences. Whereas eastern thinkers (e.g., Ibn-e-sina) relied on their understanding of "chi" disturbances and curses (among others) to organize headache triggers. Middle Eastern medicine consolidated various aspects of each system, attributing organ system disturbances, physical activities, and diet as causing headaches. Finally, although mentioned by many authors, only in the last two centuries (e.g., Liveing) has the idea of stress or "nervous tension" been proposed as a primary trigger factor.

Conclusions: Surprisingly, there have been few meaningful advances in the list of the triggers of primary headache since the time of Hippocrates to the turn of the last century. Although remarkably similar, each historical list of triggers was at least in part influenced by the author's understanding of headache physiology. Although based on a modern pathophysiology, the current understanding of the factors that precipitate headache is quite similar to that of most historical lists. New theories of headache triggers should benefit from the millennia of observations that have been recorded.

Sympathetic Blockade for Complex Regional Pain Syndrome: A Short History

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SW Mitchell described the condition in 1864 and named it causalgia in 1874. In 1917 Leriche attributed his cases of causalgia to a "sympathetic nevritis" and started treating them with periarterial sympathectomy (PAS). His ideas were adopted by his military colleagues Tinel and Meige. After WWI PAS became popular in Europe and in South America, but some German and, especially, US surgeons, disappointed with the results of PAS turned to neurolytic and surgical interruption of the sympathetic chain, procedures that Leriche occasionally performed in the 1930s.

After WWII, large series were published, especially in the US. Brilliant successes (up to 96 %) were reported after surgical sympathectomy following diagnostic novocaine blocks. Similar successes were reported after the Korean War.

Around 1940-50 appeared reports of a syndrome with symptoms similar to causalgia, but occurring after minor trauma and without apparent nerve damage. The condition received more than 20 names, the more popular being Reflex Sympathetic Dystrophy (RSD). Like causalgia, RSD generally responded well to diagnostic and therapeutic sympathetic blockade. At the same time North American researchers proposed various theories to explain causalgia and RSD: all postulated a hyperactive sympathetic nervous system (SNS). The concept received additional support in 1974 when Harrington-Kiff published his success with guanethidine intravenous regional blocks.

In the mid-1990s, however, some researchers became uneasy with the concept of a SNS involvement in RSD and causalgia. From 1993-1995, the IASP (founded by Bonica in 1992) proposed the terms CRPS (1) for RSD and CRPS (2) for causalgia to avoid invoking the SNS, although it accepted that some neuropathic pains may be sympathetically mediated if relieved by sympathetic blocks or intravenous phentolamine.

Three groups (Schott, Baron, and Kurvers) have now clearly shown that the peripheral sympathetic fibers in CRPS patients are hypo- rather than hyperactive, and have questioned the value of sympathetic blockade. Concurrently, five meta-analyses of the case reports published since 1941 showed that most series lacked the basic criteria of a good controlled trial, and that the few which did, found the diagnostic and therapeutic blockade to be ineffective. Many anesthetists, however, still manage their CRPS patients with sympathetic blocks. "Convictions are a more dangerous enemy of the truth than lies" (Nietzsche).

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Author Alphabetical Index