The Religious Objections and Military Opposition to Anesthetics, 1846 – 1848*

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This article won third place in the 2004 AHA Resident Essay Contest Award.

More than four years before the anesthetic first published in the medical literature, on March 30, 1843, Crawford Williamson Long administered sulfuric ether for the excision of a neck cyst on a patient in Jefferson, Georgia.1 On October 16, 1846, William Thomas Green Morton (1819-1868) used sulfuric ether to anesthetize a patient at the Massachusetts General Hospital. Bigelow’s first published account of anesthesia greatly influenced the spread of volatile anesthesia.2 Within months anesthesia had been used throughout Europe and had even made its way to China.3 The next year on January 19, 1847 Sir James Young Simpson (1811-1870) first used sulfuric ether during the management of labor and childbirth in Edinburgh, Scotland.4 The first wartime use of anesthesia took place later that year on March 29, 1847, in Vera Cruz, Mexico, when Edward H. Barton administered sulfuric ether during the amputation of a gangrenous lower limb performed on a civilian teamster who had suffered an accidental gunshot wound during the Mexican-American War (1846-1848).5 Simpson lived in a society immersed in religion and yet shaped by ideas of the Enlightenment period. His daily interactions were among people whose culture was shaped by two forces, an emerging secular liberalism that was by mid-century strong enough to realize the election of a non-Christian born prime minister, Benjamin Disraeli, and the enduring influence of the established Churches of Scotland and England, headed by the British Monarch. The idea of early religious opposition to anesthesia animated Simpson’s professional efforts to popularize the ether and chloroform techniques. In December, 1847, he produced a thought-provoking treatise, Answer to the Religious Objections Advanced Against the Employment of Anaesthetic Agents in Midwifery and Surgery. He wrote the pamphlet because he had:

“during the last few months, often heard patients and others strongly object to the superinduction of anaesthesia in labour, by the inhalation of Ether or Chloroform, on the assumed ground, that an immunity from the pain during parturition was contrary to religion and the express commands of Scripture. Not a few medical men have, I know, joined in this same objection; and have refused to relieve their patients from the agonies of childbirth, on the allegation that they believed that their employment of suitable

*From the Section on the History of Anesthesia

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The Anesthesia History Association (AHA) sponsors an annual Resident Essay Contest with the prize presented at the ASA Annual Meeting.

Three typed copies of a 1000-3000 word essay written in English and related to the history of anesthesia, pain medicine or critical care should be submitted to:

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

This award, which has a $500.00 honorarium, will be presented at the AHA's annual dinner meeting to be held in October, 2005, in New Orleans, LA. This dinner is always held during the annual meeting of the American Society of Anesthesiologists. The paper will be published in full in the Bulletin of Anesthesia History.

All entries must be received on or before August 23, 2005.
Objections... Continued from Page 1

anesthetical means for such a purpose would be unscriptural and irreligious.11

Simpson’s encounters with his patients are perhaps his private justifications; however, his professional and very public interactions with medical colleagues and members of the theological community could serve as historic documentation for the wider audience of an assault on the fledgling practice of anesthesia. J. Parke, a surgeon from Liverpool, was to deliver a paper to the Liverpool Medical Institution of which he was a member, On the Moral Propriety of Medical Men Recommending the Inhation of Alcohol and recommending anesthetic means for such a purpose was unscriptural and irreligious.” 11

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Simpson was alerted to the upcoming academic presentation and pre-emptively addressed Parke’s presumed argument. In a postscript to a letter dated Monday 14 to Mr. David Waldis, physician and chemist from Liverpool, who introduced the idea of chloroform to Simpson, a somewhat visceral reaction to a perceived opposition is evident:

“Imlach tells me Dr. P. is to enlighten your medical society about the ‘morality’ of the practice [of obstetric anesthesia]. I have a great itching to run up and pound him. When is the meeting? The true moral question is, Is a practitioner justified by any principles of humanity in not using it?”12

We need to understand that Simpson lived in a society strongly influenced by religious institutions. In Edinburgh, this institution was the Church of Scotland, reformed theologically and Presbyterian in its form of government. Further to the heart of the religious argument, Simpson’s postscript enters into two complicated theological maneuvers, one centered on semantics and philology and the other on theology proper:

“He will be at the primary curse, no doubt. But the word translated ‘sorrow’ is truly ‘labour’, ‘toil’; and in the very next verse the very same word means this: Adam was to eat of the ground with “sorrow”. This does not mean physical pain, and it [the earth] was cursed to bear “thorns and thistles”, which we pull up without dream-

Simpson’s day would have enjoyed a span of interpretation from the literal to the symbolic. Theologically then, the fallen state must be restored to goodness through a process of “redemption”. If humankind (originally the Israelites) would keep the Law of Moses they would be restored to divine favor. The “curse” embodied in the fallen state would be nullified. The specific curse applied to the female is mentioned in the Scriptural text, Genesis chapter 3, verse 16, and thus the key to deciphering the first part of Simpson’s postscript.

“Unto woman he said, I will multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children.” (King James Version)

Ironically, Parke did not mention this “primary curse” argument until the next year, 1848, well after Simpson’s Answer to Religious Objections appeared in circula-

As A.D. Farr points out, there is no evidence that Dr. Parke discussed any primary curse at the meeting of the Liverpool Medical Institution. At first glance this correspondence with David Waldis is rather cryptic. An explanation for the modern reader is in order. Simpson first refers to a theological concept, that is, the “primary curse.” In traditional Christianity this refers to the physical and spiritual circumstances in which humankind is said to survive after the climax of the Judeo-Christian creation story found in the Torah of Judaism and the Pentateuch of the Christian Scriptures. In the shared creation theology there is a loss of a primal “state of perfection” replaced by a “fallen state” after the original sin of the biblical first parents, Adam and Eve. This new fallen state is seen in orthodox Christian theology to be inherited by all subsequent generations as “human nature” manifested by a predisposition to error, harm, and fall short of perfection (sin). This condition is understood in the broader context of a “fallen world” in which the spiritual sins of the original parents have tainted all physical creation manifested by the tendency for all things to age and decay, for living creatures to suffer illness and ultimately die. This language would have been familiar to any educated member of Victorian society.

The concept of original sin and primal curse is treated variously among the different schools of Christian thought, and in Simpson’s day would have enjoyed a span of interpretation from the literal to the symbolic. Theologically then, the fallen state must be restored to goodness through a process of “redemption”. If humankind (originally the Israelites) would keep the Law of Moses they would be restored to divine favor. The “curse” embodied in the fallen state would be nullified. The specific curse applied to the female is mentioned in the Scriptural text, Genesis chapter 3, verse 16, and thus the key to deciphering the first part of Simpson’s postscript.

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Ironically, Parke did not mention this “primary curse” argument until the next year, 1848, well after Simpson’s Answer to Religious Objections appeared in circulation.12 Nevertheless, Simpson’s efforts at a layman’s technical, semantic (word position) and philological (word meaning) interpretation of this particular Scripture did not go un-noticed. His detailed reliance on the work of Wilhelm Gesenius (1786-1842), Hebrew and Chaldee Lexicon to the Old Testament, may have brought the issue credibility. In 1849, Canada’s first rabbi, Abraham De Sola, was invited by the British American Journal of Medical Science to interpret the meaning of Genesis 3:16. He wrote a three part article based on his analysis of the original Hebrew text, turning on the philology of the word E tzeb (labor, toil, pain or sorrow). Based on the context of the passage and higher specificity of alternate Hebrew words for the concept of suffering, De Sola rendered the verse: “Unto the woman he said, I will greatly multiply thy travail [work] and thy conception: with travail [work] shalt thou bring forth children.” Suffering is thus rendered travail (as in the French), understood as work or labor. Further, De Sola agreed with Simpson’s notion that E tzeb referred to contraction of the uterus and other muscles during labor. Treating the pain of labor did not interfere with toil of labor, so anesthesia should not be withheld on religious grounds.14

The second part of Simpson’s postscript to Mr. Waldie is purely theological. If the literalist reader of Scripture could not be convinced by his particular interpretation of Genesis 3:16, then perhaps the greater thrust of theology could be brought into play. Thus he writes:

“God promises repeatedly to take off the two curses on women and the ground, if the Israelites kept their covenant. See Deut, vii, 13, etc., etc. See also Isaiah xxviii. 23; extirpation of the ‘thorns and thistles’ of the first curse said to come from God. Besides, Christ in dying ‘surely hath borne our griefs and carried our sorrows’, and removed ‘the curse for us’. His mission was to introduce mercy, not sacrifice. Go up and refute him [Mr. Parke] if I don’t come.”15

Simpson speaks of the classical Christian view of the redemptive process here. If the Law of Moses could not be kept perfectly and a perpetual state of “broken covenant” were maintained between humankind and the Divine, then only an act of “atonement” could rectify an un-payable debt. Hence, Simpson refers to the death of Christ as removing “the curse for us [humankind].” Essentially, through Christian redemption theology he argues that pain is not (in itself) an act of redemption and as such plays no constructive role in human existence. So, if the argument based on Hebrew vocabulary and grammar is not a sufficient loophole, the issue is settled by extension through a central tenet of Christian theology. This second, purely theological argument was perhaps Simpson’s trump, ideally suited to address the morality of anesthesia in a manner very familiar to the Victorian mind.

Far from attempting to refute Simpson, a prominent Evangelical in the established Anglican Church, Dr. Protheroe Smith, in late 1848 published his argument for a
physician’s obligation to treat, Scriptural Authority for the mitigation of the Pains of Labour, by Chloroform, and Other Anaesthetic Agents. Reiterating the points of his Scottish colleague, he developed the theme of redemptive freedom from any obligation to suffer pain, using the elaborate language of the Anglican Book of Common Prayer: “He [Christ] made a full, perfect, and sufficient sacrifice, oblation, and satisfaction for the sins of the whole world.”14 Smith was not the only prominent churchman to admire the use of anesthesia early on. Thomas Chalmers, Moderator of the Free Church of Scotland witnessed chloroform anesthetics performed at the Royal Infirmary and held the opinion that there was no theological issue with its use, relegating such debate to a small group of theologians.

On April 7, 1853, Dr. John Snow (1813-1858) performed a chloroform anesthetic on Queen Victoria for the birth of Prince Leopold (her seventh child and fourth son) at Buckingham Palace, London. As monarch, Victoria held the offices of “Temporal Head of the Church of England and Defender of the Faith.” There was no recorded condemnation of anesthesia prior to or after this event by The Most Right Reverend John Bird Sumner (1780-1862), Ninety-first Archbishop of Canterbury (serving 1848-1862) and spiritual leader of the world wide Anglican Communion. That there was no formal theological opposition to volatile agents does not mean that Simpson did not experience opposition; however, absence of written pronouncements and opinions against anesthesia by the clergy and hierarchy of the established Churches argues against opposition by “organized religion.” With the implied endorsement of the monarch, the six year period of potential religious opposition to obstetric anesthesia rapidly declined.

Early military opposition to the use of volatile anesthetics was initially based on anecdote and the bias of surgeons in the military establishment. When Edward H. Barton first administered sulfuric ether (then called Letheon) to anesthetize his patient for limb amputation, fellow surgeon, John B. Porter was present. Porter gained a limited experience in its use for surgical care of gunshot victims during his service with the American Army of Occupation during the remainder of the Mexican-American War. His limited clinical experience and incomplete understanding of contemporary medical literature suggested to Porter that increased hemorrhage and inhibition of wound healing occurred with the use of inhaled anesthetics (ether or chloroform), especially in gunshot wounds and amputations. He doubted the safety of any use of anesthetics and prohibited their use in his medical commands.17

Porter’s commentary, “Surgical Notes of the Mexican War” revealed a strong bias against the use of inhaled anesthetics in cases of gunshot wounds, and to a lesser degree, amputations in general. This opinion may have reflected an early underlying attitude among American physicians toward surgical management of battlefield trauma. However, Porter’s bias did not accurately reflect the attitudes of European surgeons or the published medical literature following the Crimean War (1854-1856), where the French reported more than 25,000 operations using chloroform without a death, and the British described more than 20,000 procedures under chloroform with only one death. Porter appears to have misstated the views of the British Army Surgeon General in the Crimea, J.G. Guthrie and the French surgeon Velpeau.18 Far from condemning the use of volatile anesthetics, these surgeons in reality approved of ether and chloroform.19

Additionally, as the chief opponent of volatile anesthesia, Porter may have shared the social preconceptions of his day. Contemporary attitudes regarding the physical and emotional constitutions of adult males centered on notions of “manliness.” Along with the Western notion of chivalry went a prevalent stoic idea which held that young, healthy men did not require or might even be harmed by anesthesia.20 These ideas may have molded his clinical prohibitions.

The experience of battlefield surgeons at Vera Cruz would be interpreted differently by men such as Barton and Porter. Barton was a civilian and academic, eventually serving on the faculty of the newly formed Medical College of Louisiana. Porter was a career military surgeon, advancing in rank and bureaucratic influence. Each was poised to change the professional views of fellow physicians. Their estimates of the benefit of volatile anesthetics were extreme opposites. Despite Porter’s efforts anesthetics were in fairly common use among military surgeons by the time of the American Civil War (1861-1865). Opposition among military physicians prior to the war between the States would be only a temporary delay in the development of trauma care in the United States as this period of history saw an acceleration in acceptance of volatile anesthetics in general.21 Acceptance of volatile agents and anesthesia overall was rather brisk as pointed out by Donald Caton in “The Secularization of Pain.” Religion had “ushered in” an age in which progress meant, among other things, using the discovery of God’s natural laws to human advantage. In Britain and America, medical contributions by clergy such as Joseph Priestley, Stephen Hales, and Cotton Mather illustrated the intertwined relationship of the Church and medical science. The Victorian age was a period of large ideas accompanied by technological, economic and political expansion, into which the notion of human progress fit well. Prominent was the “minister-scientist” and the clergy such as Chalmers who were deeply sympathetic to medical science and the innovation of anesthesia. Truly, the humanitarian ethic of religion drove the early development and advancement of anesthesia perhaps more so than any brief, reactionary opposition on religious grounds feared so by Simpson. Religious leaders in Britain were in agreement with the pro-anesthesia arguments of Simpson. In the United States, the Jacksonian era of populism brought an ethic of embracing practical science, which had direct benefit to the people. Barton’s application of ether to trauma surgery naturally gained increasing appeal in such an intellectual climate, and military opposition as voiced by at least one military surgeon, Porter, who was relatively short-lived and faded into a curiosity of medical history.

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Alberto Gutierrez: Beyond the Hanging Drop

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Fig. 1. Alberto Gutierrez (wearing white suit), anatomist, surgeon, anesthesiologist, author, editor, artist and humanist. His father Avelino Gutierrez is on his left and his uncle Vicente is on his right.

It is not surprising that many of the earlier contributions to regional anesthesia were made by surgeons, as they had operated under less than ideal conditions with the general anesthetics of the time. Bier, Cushing, Matas, Braun and Pages among others, developed expertise in infiltrating local anesthetics and regional anesthesia to be able to complement their operations trying to achieve better and safer operating conditions.

The Argentinian, Alberto Gutierrez (figure 1) was an accomplished author, anatomist and surgeon; like those named above; he initially looked for alternatives to the general anesthetics (ether or chloroform) prevalent in the early 20th Century. In order to facilitate and improve the care of his patients, he became acquainted with epidural anesthesia. And by careful observation, he once noted the disappearance of a drop of fluid hanging from the hub of a needle. From then on, he began to study why and how it happened. As he became more passionately involved with “extra-dural anesthesia,” he not only joined a group of physicians practicing anesthesia, but also founded and edited their journal and participated in their congresses. For the last half century, he has received greater recognition for his description of the “hanging drop method” to identify the epidural space than for the many contributions that he made to the surgical literature.

Anatomist and Teacher

Born in November 10, 1892, into what

the topographical rather than the descriptive approach with greater clinical application, a method that was initially resisted and would not be adopted until the last fourth of the 20th century. He continued to climb the ranks of the teaching staff, from instructor in anatomy in 1921, until he was appointed Extraordinary Professor in 1942.

Throughout his career he continued to teach anatomy to medical students and to publish on surgical anatomy topics such as “Distribution of the brachial plexus,” “Anatomy of the cecum and megacolon,” “Anatomies of the right subclavian artery,” “Anterior dissection of the iliac-lumbar region,” “Anomalies of the iliolumbar region,” and others. Internationally he was an honorary member of the Anatomical Societies of Paris, Madrid and Rio de Janeiro.

His knowledge of anatomy and experience dissecting cadavers gave him special advantage as he carefully and meticulously studied the anatomy of the spine, specifically the subarachnoid and the peridural spaces, the distribution of the nerve roots and their topographical relation to the vertebrae. Of note is that in 1922, he went back to medical school to take a course in physiology given personally by the then recent Nobel Laureate Bernardo Houssay.

Author and Editor

Gutierrez’s writings revealed a well-informed surgeon who always quoted and cited others that had pioneered work on the topic in question, given credit to those that deserved it and commented gently on those that he might disagree with. References in the journals he edited did not appear at the end of articles until after 1937, but from that time on, they were regular features.

Gutierrez joined the Surgical Society of Buenos Aires in 1922, then was admitted into the Argentinian Academy of Surgery and eventually became its president in 1943. A review of the annual index shows that under the name Gutierrez were consistently the most numerous articles pub-
lished year after year with approximately 80% under the denomination of Alberto. He also wrote a total of nine books of which the most notable treatises were on:

“Lessons in the Surgical Clinic” (298 pages), in 1931,

“Local Anesthesia for Surgery of the Abdomen” (206 pages), in 1932,


Initially, Alberto Gutierrez wrote on anatomy and surgery; his articles were first written in elegant calligraphy and eventually typed with impeccable grammar and classic style. By the time he graduated from medical school in 1917, Gutierrez had already published three articles.1,11,12 He founded and edited the Revista Anatomop-Quirurgetica in 1922, which became the Revista de Cirugia de Buenos Aires in 1926. By that year he already had written 88 more publications. Eventually, he wrote more than 300 articles and 13 eulogies. He received 15 Honorary M.entsions from foreign countries, was the keynote speaker at 24 conferences, received three prizes from the Medical School of the Buenos Aires, supervised seven M.D. theses, gave 160 lectures at national meetings and wrote 17 books. In addition, he performed more than 12,000 operations, gave more than 6,000 epidural anesthetics and wrote to the Dean of the Medical School a one-half page daily report of his didactic activities with students. When he traveled abroad, he also mentioned details of meetings, the lectures that he gave and the prominent physicians he had met. He was well liked by the students even when he preferred to give some of his lectures on Saturdays. Moreover, his colleagues not only admired him for his scientific achievements, but also for his kind manner in communicating with them and his gentlemanly demeanor. He was always glad and willing to substitute for ill or absent professors.

Of considerable significance to the specialty of Anesthesiology was the comprehensive reviews that he published periodically including most of what was known about epidural anesthesia, always updating it. Though already a respected academic surgeon, he developed an interest in epidural anesthesia from 1932. Two years later he was lecturing on epidural anesthesia all over Latin America. He not only proposed a new approach to the peridural space, but he studied it in depth. Gutierrez remained in essence a surgeon. However, he realized that this relatively new field needed a literary forum, so he founded and became the editor of Revista Argentina de Anestesia y Analgesia, later called Revista Argentina de Anestesiologia that has continued to be published without interruption since 1939. As editor, he believed that medical writers ought to be concise and to the point. His editorials were labeled “Two Words,” usually limited to one-half page and contained a message to the readership and brief commentaries on the innovative articles. In spite of his many achievements in surgery and his devotion to anatomy, six decades after his passing, Alberto Gutierrez is best known, worldwide, for the “hanging drop” method to initiate epidural anesthesia. Although his contributions are numerous and diverse, this review will point out those considered important to medicine in general and to anesthesia in particular.

Surgeon

From his early teens he assisted in the operating room at the family clinic (figure 2) and in the Hospital de Clinicas where he served as intern in surgery. He joined the surgical staff of the Hospital Español in 1917, became in charge of the Women’s Ward in 1992 and was appointed Chief of Surgery in 1929.

From his publications, it is evident that he was a real “General Surgeon” who cared for patients with a myriad of diseases, from “Degenerative keloid scars,”14 “Hydropneumothorax,”13 “Rib graft in Pott’s disease,”16 “Syphilitic granuloma of the kidney,”17, “Drainage of sphenoidal sinuses,”18 “Excision of sarcoma of the tibia”19 to mention a few. However, his real love was abdominal surgery where he published extensively on topics as varied as “Coalescence of the peritoneal sheets in abdominal incisions,”20 “Bone in a laparotomy scar,”21 “Lateral drainage of the biliary tract,”22 “Gastroptosis and gastrectomy,”23 “Differences in the peritoneum of the adult and the newborn,”24 “Congenital absence of the diaphragm,”25 “Torsion of the spermatic cord and testicular gangrene,”26 etc.

Amazingly, in every case, Gutierrez gave the anesthetic and then went on to operate in the same patient, leaving a young doctor, a medical student or a nurse to care for the patient. At one time he was quoted as saying, “There is no reason for any operation to last more than one hour” and apparently he lived up to his statement.27

Surgeon Anesthetist

Gutierrez made an unannounced transition gradually becoming interested in anesthesia. His successor as editor of the Revista Argentina de Anestesia y Analgesia, Juan A. Nesi,27 in his eulogy, mentioned that Alberto understood the importance of the anesthesia in surgery outcomes and was attracted to this field as he noticed that he could apply his vast knowledge of anatomy as well as his clinical dexterity. This combination of personal characteristics allowed him to unravel the science while practicing the art. His assistants noted that during surgery they received a lesson in surgery while at the same time learning how to administer regional anesthesia. Gutierrez emphasized that it was not only an infiltration of the tissues, but the anesthetizing solution ought to be deposited precisely in the path of the nerves going to the operated regions. Any surgeon who pretended to operate under local or regional anesthesia should possess a complete knowledge of the topographical anatomy, patience, calmness and gentle handling of every tissue as necessary virtues. Gutierrez possessed them all, allowing him to obtain excellent surgical outcomes. Some of his disciples were known to have said that “the patients not

Fig. 2. Abdominal operation in the Gutierrez Clinic (circa 1912); no gloves were used, the patient was in the lateral position, Alberto Gutierrez was assisting and a male nurse is shown “dripping” chloroform. Continued on page 8
only had their symptoms relieved, but survived the operation.46

Gutierrez was aware of the seminal works of Braun,28 Labat29 and other masters of regional anesthesia who insisted that the operation could not be perfect if the anesthesia was not perfect, too. He developed modifications of many of the techniques described by these pioneers and he also created some of his own, leaving a legacy of regional blocks for certain surgical procedures, among them were regional anesthesia for:

- Biliary Tract surgery30
- Gastric surgery31
- Urological surgery32
- Parotidectomy33
- Appendectomy34
- Mastectomy for cancer35
- Female and Male genital organs37
- Addition of Vasopressin to Novocaine38

To expedite and facilitate these techniques, he constructed a device (figure 3) that would allow him to infiltrate and inject nerve trunks and tissues easily, promptly and without having to withdraw the anesthetic directly from a glass ampule. Instead, using a presterilized glass jar with a wide opening, a cork or rubber stopper with two orifices that would accept a glass tubing was connected to an 18 French rubber hose that would adapt to a three-way stop-cock with an entry connected to a control syringe (with rings for the middle, index and thumb fingers) and the other going to the needle through a segment of rubber hose of about 10 cm. The whole set could be sterilized easily and the anesthetic solution would be emptied into the jar, requiring minimal assistance and preventing contamination.39 As if this was not enough, he also considered the treatment of some chronic conditions that produce severe long lasting pain, including:

- Splanchic plexes block40
- Hutchinson’s operation for trigeminal neuralgia41
- Braun’s anterior splanchic anesthesia42
- Excision of the superior and inferior maxillary nerves as they exit the skull43
- Anterior paraperitoneal lumbar sympathectomy44
- Hallux valgus45
- Calcaneus spurs46
- Three cases of “cliking” temporomandibular joint.47

Anesthesiologist

As we have previously noted,48 there is usually no coincidence in discovery, as not uncommonly, some of the newly described events most likely have occurred before. However, only an alert and curious observer can recognize their value. Concerned about some of the accidents occurring with general anesthetics, desiring to achieve a more dependable anesthesia Gutierrez turned first to spinal anesthesia and then to epidural anesthesia using the approach called at that time “direct method,” currently named the “loss of resistance” of finding the epidural space. Occasionally he used what was labeled as the “indirect method” when the needle was intentionally introduced into the dural sac and then withdrawn a few millimeters, gradually until the point at which CSF stop dripping; at that moment, it was assumed that the bevel was in the extradural space.

Gutierrez49 presented his preliminary results on May 28, 1932, at his surgical clinic class at the medical school, where medical students and other physicians were present. He briefly reviewed the experiences reported previously by Pages50 in 1920 and by Dogliotti51 in 1931 and then proceeded to describe the anatomy of the spine and to explain the differences between intradural versus the extradural injection of local anesthetics. This was followed by a more detailed description52 of his brief experience mentioning that the patients were usually in the sitting up position, discussed how the dosages were chosen (mostly by trial and error, as some patients apparently were numbed up to the mandible) noting that the greater the volume, the higher the spread of the block, though in some instances a “metameric” distribution was observed as some patients were able to move their feet. Gutierrez noted that a period of 20 minutes was necessary to obtain optimal surgical analgesia and that usually lasted for about 90 minutes, gradually fading, completely disappearing by two hours. Subsequently, most of his assistants and other colleagues in Buenos Aires began using this technique of peridural segmental anesthesia.

In this publication, Gutierrez defined which would be the best spinal level at which to introduce the needle in reference to the type of surgery contemplated. He realized that to achieve metameric anesthesia, the anesthetic solution must be deposited in the area of the spine where the nerve roots, for that particular operative site, emerge, so the anesthetic would fix on those specific nerve roots, a phenomenon that he called “neuropexia.” He relied on his knowledge of anatomy and experience on the dissection table to specifically pinch point which roots to block, taking also into consideration the innervation of the thoracic and/or the abdominal wall, as well as, that of the viscera that were to be manipulated emphasizing the need to relate
it to the spinous processes, used as points of reference.\textsuperscript{52} Accordingly, he suggested that in the cervical region of adult patients, this could be determined by adding a 1 to what ever spinous process is felt by palpation, so just below the spinous process of the 5th cervical vertebra, the sixth cervical nerve root will emerge (figure 4). In the upper levels of the thoracic spine, a number 3 will have to be added, for example at the level of T\textsubscript{3}, spinous process, the seventh thoracic nerve root emerges. In the lower segments, below the spinous process of T\textsubscript{11}, is the exit of the third, fourth and fifth lumbar roots. The sacral roots emerge just below the spinous process of T\textsubscript{12}, therefore if the desired blocked segment is between T\textsubscript{7} and L\textsubscript{1}, (figure 5), the puncture was made at the T\textsubscript{12}-L\textsubscript{1} level, requiring 40cc to have adequate anesthesia.

The H\textsuperscript{2}anging D\textsuperscript{rop}

About the same time, while attempting to find the epidural space by the “loss of resistance” method, with fluid; as he approached the ligamentum flavum, he felt undue resistance, so he disconnected the syringe and noted that a drop of the fluid was left hanging from the hub, he did not re-attach the syringe but continued to advance the needle very slowly, suddenly he noticed that the drop disappeared (figure 6). He then reconnected the syringe and aspirated without obtaining fluid; injecting 5cc of 1% procaine without feeling resistance; after a short interval and in the absence of warmness or numbness, he repeated four more bolus; the patient developed complete anesthesia up to just above the umbilicus and underwent a saphenectomy and vein ligation in 25 minutes, uneventfully. The first twenty cases were reported within few months.\textsuperscript{54,55}

Not long thereafter, most surgeons at the Hospital Espanol, where Gutierrez was Chief of Surgery, learned and practiced the hanging drop technique replacing, in two years general and spinal as the most popular type of anesthesia (figure 7) administered in 1933.\textsuperscript{56} Other studies with colorants injected into the epidural space, in cadavers, failed to show dural crossing.\textsuperscript{57}

Nevertheless, as it is common with most innovations, apparently in
November 17, 1937, in response to a negative commentary about extradural anesthesia made by one of his colleagues at the Academy of Surgery, Gutierrez responded that in the 4,000 cases which he and his group had thus far performed, the interval from the start of the anesthetic to the initiation of surgery, averaged about 20 minutes, similar to the induction with ether, the inadequate anesthetics reported were probably due to defective technique and suggested to the audience, that if in some cases the anesthesia or relaxation of the abdominal wall was inadequate, this could be remedied by the infiltration, of 15 to 20cc of 1% procaine, into the rectal muscles; he then proceeded to encourage the critic to further pursue this technique and to present documentation of his experience, concluding his remarks by saying “An optimal technique is needed to produce better results.”

International Survey

In 1938, Gutierrez published the results from a mail survey by mail that he had sent the year before. Some of the respondents were well known surgeons using extradural anesthesia in Argentina, Chile, Brasil, Uruguay and Italy. The results were as follows:

Dogliotti (Italy) reported on 4000 anesthetics; apparently using 20cc of 3% procaine plus one cc of 1:1000 adrenaline, pre-medicating with morphine and scopalamine. The epidural space was found by injecting 2% procaine into the rectal muscles, using the hanging drop method to confirm it and quantitate it. The operations were abdominal and some thoracic (thoracoplasties and lung resections). They considered that the anesthesia was excellent in 90% of the cases. As far as complications, they had fainting in 5%, apnea in 2% of cases and one death in a septic patient that had several punctures of the dura behind. Finally soon after the anesthesia, injecting 4cc of distilled water in the abdominal wall was inadequate, this could be remedied by the infiltration, of 15 to 20cc of 1% procaine, into the rectal muscles; he then proceeded to encourage the critic to further pursue this technique and to present documentation of his experience, concluding his remarks by saying “An optimal technique is needed to produce better results.”

In Argentina, Pedro

Jauregui had performed 750 epidural anesthetics using 2 or 3% procaine in volumes of 40 to 30cc, respectively. He prefers to use the “hanging drop method” injecting the medication at intervals reporting six hypotensive episodes, three postdural puncture headaches and four cases of confusion. Two deaths occurred, in extremely ill patients in whom the hanging drop was positive. In 2.7% of cases the anesthetic failed and in 4.4% was unsatisfactory. Alberto’s cousin, Vicente Gutierrez had performed 186 epidural anesthetics with the loss of resistance method, administering from 30 to 50cc of 2% procaine with one cc of 1:1000 adrenaline, he used morphine as premedication. R. E. Passman had performed 230 anesthetics finding the epidural space by the loss of resistance using 2% procaine with “XX gts of adrenalin 1:1000”; he had noted three cases of cephalaea. R. P. Penin had done 582 epidural anesthetics with the hanging drop method, injecting the loss of resistance by the loss of resistance method, administering from 30 to 50cc of 2% procaine with one cc of 1:1000 adrenaline, he used morphine as premedication.
deaths that occurred in the first 100 cases attributed to serious illnesses of the patients. E. Sammartino had given 196 anesthetics, using the hanging drop and a combination of procaine and tetracaine for anesthetic he reported one death in the postoperative period from sepsis and cardiac arrhythmias.

Other contributors with lower number of cases are not mentioned here; nevertheless, the review included a total of 12,195 cases, of which 4,630 were performed by Gutierrez and his group that included M. Lopez Rubido, V. Ruiz, T. Moreno Burton, I. Lazaro, C.R. Uribe, J. Rahola, B. Labandibar, F.M. Del Rio and A. Coviello. The one common denominator was that every one approached the epidural space with the patient sitting up using some kind of preanaesthetic sedation, with the exception of Gutierrez that preferred not to use it, unless specifically indicated. Other colleagues like Odom, Morton, and Black from the USA, Smith and Rego Luins from Brasil and Tello from Chile had visited and learned the technique from him, but for some reason or another they did not reply to the survey. As a matter of fact, on June of 1939, when E. Emery A. Rowenstine traveled to Buenos Aires and Rosario to demonstrate cyclopropane, thiopental and spinal anesthesia, he watched Gutierrez give a demonstration of the hanging drop technique.

In every new publication Gutierrez contributed new observations. This was summarized in his presentation before the Argentinian Congress of Surgery in 1938 entitled “Peridural Anesthesia” where he reported about the distribution of the anesthetic solutions, using a mixture of lipiodol and olive oil injected epidurally and taking roentgenograms showing a more caudad than cephalad displacement, as well as through the lateral foramina and the intervertebral foramen, following the path of the nerve roots (figure 8). From that study, he proposed that their probable, site of action was the extradural portion of the nerve roots and the dorsal ganglia. He, however, still did not feel that anesthetics crossed the dura. As side effects, he listed fainting and pallor as the most common, specially when the anesthetic solution was injected rapidly and another observation was that evidently, nausea and vomiting usually occurred, when bradycardia and, or hypotension developed.

In the same year, a 95-page book entitled “Extradural Anesthesia” was published by Gutierrez including an extensive historical review of the subject, pointing out the specific important contributions made by each author citing the early studies by Cathelin in 1901. Performing epidural anesthesia through the sacral approach, he also mentioned that the bicarbonate of procaine had been used in 1911, by Lawen, to shorten the onset and intensify the blockade. In addition, Van Earps noted in 1927 that two epidural injections, one at the top of the desired anesthetic area and one at the sacral hiatus, dividing the total anesthetic dose in two, resulted in a slow onset ranging from 20 to 30 minutes, but a deeper block.

After recognizing, the earlier studies by Janzen and by Heldt and Maloney who reported that the peridural space had negative pressure, Gutierrez mentioned that Giordanengo, an assistant to Dogliotti measured the pressure connecting the hub of a needle to a glass tube in “U” shape with water, advocating that the pressure became negative when the tip of the needle pushed against the posterior wall of the dural sac. Zorraquin in 1933 used a manometer to measure the epidural space pressure at various levels by the loss of resistance method, found the pressure to be more negative at the thoracic than at the lumbar or cervical regions.

Gutierrez also designed an anesthetic record in order to collect data that would reflect the conduct of the anesthetic by his group and to objectively derive statistics from their cases, including every one of his collaborators:

<table>
<thead>
<tr>
<th>Name of the doctor who made the puncture,</th>
<th>Operation,</th>
<th>Date,</th>
<th>Preoperative blood pressure and pulse,</th>
<th>Motor block,</th>
<th>Sensory level,</th>
<th>Distance of penetration of the needle,</th>
<th>Dosage of anesthetic,</th>
<th>Levels of anesthesia,</th>
<th>Time when the operation was started,</th>
<th>Time when the anesthetic was finished,</th>
<th>Accidents during the anesthetic (pallor, diaphoresis, nausea, syncope, anxiety, respiratory difficulties),</th>
<th>Blood pressure after the completion of surgery,</th>
<th>Blood pressure and pulse after the injection of the anesthetic,</th>
<th>Blood pressure after the completion of surgery, Was there complete relaxation?</th>
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Continued on Page 12
Gutierrez... Continued from Page 11

Local Anesthetics

Until 1937 Gutierrez used 2% procaine which in most cases produced consistent analgesia and muscle relaxation. In 4,500 cases, his group reported that the volume injected was between 30 and 35 cc in 570 cases (12.6%), from 35 to 40 cc in 2,445 patients (54.3%), from 40 to 45 cc in 1,056 patients (23.46%) and from 45 to 50 cc in 256 patients (5.6%). One hundred and seventy three others (3.8%) received less than 30 cc. In a subsequent report in 1941, he described his experience combining procaine 500 mg with tetracaine 50 mg diluted in 50 cc of normal saline that in his opinion produced a more profound and long lasting anesthesia. The mixture was prepared just before the procedure and after sterilization by the tyndallization method.

The dosages recommended varied according to the operation planned. However, if there was any indication that an incidental dural puncture had occurred, he insisted injecting first the dose required for spinal anesthesia and waiting for at least five minutes as indicated for a subarachnoid block. When there was no doubt about being in the epidural compartment to obtain longer lasting anesthesia and wider effect (from the mandible to the toes) it was suggested administering 50 cc of the combination to which 1 cc of 1:100 adrenalin was added. More specific dosages were suggested for certain types of surgery. For example, for gastric surgery the injection of 50 cc of the mixture was usually done at the T12-L1. For biliary surgery 35 to 40 cc were injected at the same level. For colon surgery, 50 cc of the same anesthetic were injected at L2-L3. And for appendectomies and pelvic surgery 30 to 35 cc were administered usually at L2-L3 space. For mastectomies 40 cc of the same anesthetic were injected at the T12-L1 level.

The group reported 28 failures, mostly from technical difficulties; Gutierrez advised to convert the anesthetic into a spinal if an incidental dural puncture occurred and if the epidural space was not found after more than four attempts he proposed to consider general anesthesia. In cases of high spinal with respiratory function impairment, patients were treated with manual ventilation, vasoconstrictors and analeptic drugs.

Mediator, Philosopher and Artist

In the early forties, Gutierrez found himself in the middle of two specialties, so dependant on each other but at times, in conflict. By then, more and more physicians were dedicating themselves full time to anesthetize patients. At least three of them had returned from having being trained at the University of Wisconsin under Ralph Waters introducing cyclopropane, closed circuit anesthesia with the to-and-fro apparatus and apparently more proficient in spinal anesthesia. Eventually, at the insistence of Alberto Gutierrez, the Argentinian Society of Surgeons created a separate chapter in Anesthesiology on June 26, 1943. Being the editor of both journals, Gutierrez wrote one article in each of the journals with slightly different contents, but similar title “About relations between surgeon and anesthesiologist,” recognizing that to provide the best care for the patient both physicians need to assist each other in order to maintain professional harmony and a cordial relationship, setting up the principles of inter-specialty relations and mutual respect that ought to exist between the two groups, keeping in mind, above all, the good of the patient.

Taking the role of an unofficial intro...
spective examiner on topics being debated at the time, and based on his knowledge, didactic experience and scientific productivity he wrote on:

“Horacio Wells and inhalation anesthesia” 

Simmelweis and Infections” 

“Asepsia in Surgical Operations” 

“On the Formation of a Surgeon” 

“Vices of modern Medicine” 

He also expressed some curiosity about the history of his specialties by writing on:

“Lister and antiseptic Medicine” 

“Simpelweis and Infections” 

“Horacio Wells and inhalation anesthesia” 

Since his medical student days, Alberto Gutierrez drew many of his anatomical lessons, and later he also drew a good number of the illustrations in his articles and books (Figures 3, 4, 6 and 13), although he had the more complex illustrations in his publications drawn by a professional medical illustrator D. A. Bartolomei. Nevertheless, his distraction and hobby was oil painting, mostly landscapes that took him often to the family’s ranch in the province of Río Negro and to the Andes mountains. It was there where unexpectedly this outstanding and distinguished physician died suddenly, probably from an acute cardiac illness in Bariloche on February 23, 1945, where he had been on vacation with his wife Nelly Sheffick de Gutierrez. His tomb is in La Recoleta cemetery in Buenos Aires.

Surgeon par excellence, Gutierrez in the summit of his professional career, “gambled” his fame and professional reputation by engaging in the study of a relatively new technique of what was, at the time, a specialty branched out of the surgical trunk. Soon he was lecturing on it. He was visited by local and foreign colleagues coming to learn his approach. Some may say “it is just a hanging drop,” but having made that simple observation, it took a special individual with scientific curiosity and an inquisitive mind to figure out why and what did actually happen. That would have been meritorious alone, but Gutierrez went back to the anatomy lab and tried to figure out the physiological reasons for that event. In the clinic, he mastered the technique, recognizing its potentials and its shortcomings, developed what can be considered a dose/effect response, noticing the consequences from changing either the volume or the concentration, pointing out the necessary dose required to block the visceral reflexes elicited as the abdominal cavity was entered.

Initially, Gutierrez called this form of anesthesia “epidural,” as Sicard and others had called it, then at some time he began to address it as “metamerica” in agreement with Pages who wanted to imply that it was segmental, referring to the block of sensory dermatomes. As he realized that the site of action he then addressed it as “peridural” since the local anesthetics truly surround the dural sac. When it became evident that there was need to stipulate if the anesthetics were injected in or out of the sac, he proposed to called them “intra-dural” and “extradural,” respectively, discounting the misnomers of “spinal” anesthesia for the former and epidural for the latter.

By correlating the topographical relation of the site of emergence of each of the nerve roots, to the spinning process that serve us as anatomical landmarks, Gutierrez related the level of the puncture to the level of analgesia obtained from a certain dosage and noted that the sympathetic chain would be affected as the local anesthetics exit through the lateral foramina (Figure 13). He also realized that intra-abdominally the parasympathetic nervous system may be stimulated by manipulation of the viscera, so he determined what sensory level would need to be blocked, in order to prevent undesirable vagal stimulation.

With this confidence of the seasoned teacher he guided other surgeons, trainees and medical students in the intricacies of this technique. He was eager to show that it worked in the hands of everyone that it worked in the hands of everyone that knew him personally. He trusted us with important documents, photographs and valuable information about the Gutierrez family. Many other colleagues contributed information, anecdotes and documents, among them are Dr. Alberto Gonzalez Varela and his collaborators of the Museum of the Argentinean Federation of Associations of Anesthesiologists, Dr. Alberto Torrieri, Director of Residency Training Program, Dr. Oreste Luis Cerazo, Dr. Herbert Ferrari and Pablo Rusca, Librarian of the Library of the AFAA. Through Dr. Vicente Gutierrez we were able to have access to libraries of the Academy of Medicine and the Academy of Surgery from Buenos Aires.

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By Fred J. Spielman, M.D.

Professor

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Moving Boldly Forward: A History of Neuroanesthesia

Today thousands of patients will undergo neurosurgery. The surgery often requires invasive and elaborate monitoring, complex anesthetic delivery devices, challenging airway manipulation, and detailed knowledge of neuroanatomy and physiology. Success in the operating room should inspire anesthesiologists to be appreciative that they have the tools, knowledge, and skills to routinely deliver safe care for the most challenging operations. We are indebted to the pioneers of neuroanesthesia.

The oldest form of neurosurgery is trephining. Multiple holes, four or five centimeters in diameter, were cut or drilled into the skull. Examples have been discovered all over Europe and parts of Africa and Asia, as well as North and South America. The holes were made by cutting, scraping, or boring with a sharp stone. The cavities were created to allow devils, spirits, or supernatural elements to escape, thereby facilitating the cure for convulsions, developmental delay, insanity, or infection. Hippocrates trephined to treat blindness and headaches. Researchers are unclear how or if anesthesia was employed. In Peru, coca leaves may have been chewed and spit into the wound to be used as a local anesthetic. Possibly pressure on the carotid artery was used to produce a state of unconsciousness. The Greek word for carotid artery means the "artery of sleep."

Significant advances in neurosurgery required safe and adequate anesthesia. Despite the use of narcotics, nitrous oxide, cannabis, alcohol, and herbs no reliable and potent anesthetic available was until 1842 when ether was first-employed by Dr. Crawford Long. Neurosurgery became recognized as a specialty towards the end of the nineteenth century. In 1884 Sir Rickman Godlee was the first surgeon to successfully remove a brain tumor. In 1886 Arthur Barker drained a brain abscess. By the turn of the century progress in neurosurgery was hastened by the discovery of antiseptics, functional anatomy of the central nervous system, and advanced diagnostic techniques. Shortly after the advent of aggressive brain surgery, it became apparent that in no other branch of surgery could inattentive anesthesia hinder the surgeon or jeopardize the patient more easily. The inherent challenges of anesthesia for neurosurgery were quickly appreciated. Patients with diseases of the central nervous system are frequently prone to develop significant disturbances of respiration and circulation, and manipulation of the brain markedly increases the magnitude such disorders. The operative site so close to the patient's airway requires that the anesthesiologist must be present. In addition, operative approaches often require a patient to be placed in a position unfavorable to the maintenance of the airway.

Sir Victor Horsley (1857-1917), one of the founders of neurosurgery as a specialty in Great Britain, experimented with chloroform and ether in animals. He concluded that ether was not to be recommended because it produced a rise in blood pressure and an increase in blood viscosity. He was also concerned about postoperative excitement, headache, and vomiting which he ascribed to ether. Chloroform was responsible for a decrease in blood pressure, but this was not recognized as a disadvantage since a reduction in brain swelling would follow. Ether was favored in the United States. Harvey Cushing did not trust the effects of chloroform on the blood pressure. The preferences for the two anesthetics can be explained, in part, by the fact that chloroform was first employed in Edinburgh while ether was introduced in America. Horsley's success with neurosurgery in London at the National Hospital for Nervous Diseases greatly influenced Harvey Cushing's (1869-1939) career in Boston at the Massachusetts General Hospital. Cushing's contributions to anesthesia were significant and everlasting. An intraoperative death of one of Cushing's patients in 1893 stimulated him to introduce the "ether chart," a record of vital signs during surgery. In 1895 he stated, "I still feel that one of the most important elements in the giving of an anesthetic is to have the anaesthetist keep during its administration a detailed chart of pulse, respiration, and blood-pressure." His record keeping also included details of the patient's preoperative drugs, pupillary size, and the amount of anesthetic delivered. In 1900 Dr. Cushing visited Italy and met Scipione Riva-Rocci (1863-1937) who had introduced the blood pressure cuff in 1896. Cushing immediately recognized its advantages and introduced the new method of sphygmomanometry monitoring in the operating room. The reaction to Cushing's requirement for better surveillance
promoted the Harvard Medical School to issue the following concern: "The adoption of blood-pressure observations in surgical patients does not at present appear to be necessary as a routine measure (1904)."

Cushing became a champion of local anesthesia for neurosurgery. He is credited as being the first person to use the term "regional anesthesia." His enthusiasm for local anesthetics was stimulated by the high rate of intraoperative deaths. Students at both Johns Hopkins and Harvard Medical Schools were permitted to administer anesthesia with little or no training. He was an advocate for anesthesiology, writing in 1918, "regardless of the drug to be employed, it is essential that it be administered by an expert--preferably by one who makes this his specialty."

Cushing was not alone in his zeal for local anesthesia. In 1904 and 1905, cocaine and procaine, respectively, were first employed for surgery. In 1909 Braun removed a recurrent brain tumor under local anesthesia using procaine mixed with epinephrine. After the First World War many prominent neurosurgeons endorsed the use of local anesthesia. They preached that it was more suitable than general anesthesia because local anesthesia decreased intracranial tension and bleeding. Surgeons also believed that less vomiting and respiratory complications were associated with local anesthesia. In 1918 Cushing stated, "General anesthesia encourages the use of rougher methods, which a patient under local anesthesia would not tolerate, and which therefore are in all likelihood harmful."

Colonic absorption of ether insufflated via the rectum had been used since 1847. Cunningham and Lahey (1905) stressed that for cranial surgery it had the advantage of moving the site of anesthetic administration away from the head. "In operations upon the head the absence of the ether cone not only lessens the technical difficulties of the operation, but also minimizes the chances of sepsis and lessens considerably the time necessary to perform the operation." Other presumed advantages of rectal ether were the elimination of the excitement stage, no bronchial secretions, and quick recovery. Writing in the Annals of Surgery (1928), neurosurgeon Charles Frazier described the use of rectal ether for removal of brain tumors, laminectomies, and subtemporal decompressions. At the conclusion of the operation, the bowel was irrigated with one pint of warm water, four ounces of olive oil, and four to eight ounces of black coffee.

The management of the airway and ventilation during neurosurgery was a great challenge to the pioneer anesthesiologist. The routine use of endotracheal intubation and muscle relaxants were two of the most important advances in neuroanesthesia. They enabled the anesthetist to be in control of ventilation. Hypoventilation and increased intracranial pressure was avoided. The anesthesia care provider could maintain a safe distance from the surgeon and provide a smooth induction and emergence. This was especially the case with patients placed in the prone or sitting position.

During the past five decades researchers and clinicians in neuroanesthesia have contributed much to the safety of all patients undergoing an operation. Discovery, innovation, and enhancement have occurred in the areas of deliberate hypothermia, induced hypotension, acute normovolemic hemodilution, central venous monitoring, and transesophageal Doppler and echocardiography. In 1981 an editorial in The New England Journal of Medicine praised anesthesia work for its contributions to patient safety. "The development of neuroanesthesia and microsurgical techniques has reduced postoperative morbidity and mortality to the point at which surgical treatment may be the safest course (even) in most patients with asymptomatic unruptured intracranial aneurysms." The key to success is, in large part, unchanged from 1930 when Dr. Z. Mennell, writing on the challenges of neuroanesthesia in the British Journal of Anaesthesia, stated, "gentleness and speed on the part of the surgeon, clear air way with intra-tracheal ether on the part of the anaesthetist and knowledge, confidence and calmness in both, spell success in this often and difficult and trying work."

The painting that accompanies this essay shows Dr. Ernst von Bergmann (1836-1907) ready to commence a neurosurgical operation. Dr. von Bergmann was an innovative surgeon, one of the first to specialize in cranial procedures. His experience as a medical officer in three military battles contributed to his knowledge and proficiency. In 1888 he published Surgical Treatment of Diseases of the Brain. This textbook contained chapters on the treatment of tumors of the brain, trephining for epilepsy, ventricular puncture for the relief of increased intracranial pressure, and the management of deep abscesses. Little is known about the artist Franz Skarbina (1849-1910). He was born in Berlin and attended the Berlin Academy. He continued his training in Paris where he had his first exhibitions and won several prizes. In spite of the fact that none of the operating team is wearing gloves, Dr. von Bergmann introduced an exacting and uniform aseptic practice and developed techniques for instrument sterilization. The nurse at the right delivers instruments from a sterilizer. To her right a male nurse pours sterile irrigation fluid into a bowl. The anesthetist monitors the patient's status with a finger on the carotid artery. The artist has placed the surgeon at the center of action. He is an authoritative figure, taller and broader than others. He commands the attention of everyone while he teaches. The painting was completed in 1906, one year after Cushing proclaimed neurosurgery as a separate surgical specialty. The painting was on display in a Berlin museum but vanished during World War II.

Suggested Readings
MedNuggets

By Fred J. Spielman, MD
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Spinal anesthesia has come to stay, and it behooves us to learn all we can about it and to use it, not indiscriminately, but in properly selected cases.

- F. Webb

Southern Medicine and Surgery 92:504, 1930

From time to time drugs are introduced which are heralded as perfect, but most of them quickly die out and are forgotten.

- R. Blair Gould

Anaesthesia 6:108, 1951

Anesthesia in rectal surgery is like golf. Each man in a foursome may use a different club to reach the greens and likewise the same club would not be used under all circumstances. It seems that there should be a certain amount of flexibility in anesthesia for rectal surgery. Every now and then it becomes necessary to substitute some other anesthesia in place of your favorite one.

- R. I. Brashear

American Journal of Surgery 79:147, 1950

Recent years have seen the introduction of numerous electronic devices reputed to "monitor" cardiac activity, to "warn" the anesthetist of impending cardiac arrest and even to treat cardiac arrest should this catastrophe occur. Some of these devices have been introduced to the accompaniment of advertising material which may give a false sense of security to the user of these remarkable inventions. This advertising would lead one to believe that as long as the light shines or the bell rings or the needle moves, the cardiac action is satisfactory.

- David A. Davis

American Surgeon 24:647, 1958

The development and progress of surgery is inseparable from the advance of anesthesia, and it is to the interest of surgeons to encourage men trained in the basic sciences and in medicine to specialize in anesthesia.

- Charles F. McCuskey

New Orleans Medical and Surgical Journal 85:1, 1932

We do not believe in fussing with patients under spinal anesthesia. We do not ask them how they feel every few minutes, nor do we note their blood pressure every so often. We determine the blood pressure before and after the injection, and again only when the patient shows symptoms of collapse.

- Joseph J. A. McMullin

Surgery Gynecology and Obstetrics 45:651, 1927

It may well be perceived that every patient is a law unto itself as far as the effect of the anesthetic upon the circulatory mechanism is concerned, inasmuch as his particular organic makeup is different from every other and that what may be minimum dosage for one in particular might be maximum or toxic for another.

- William C. Woolsey

New York State Journal of Medicine 11:338, 1911

Well trained nurse anesthetists under the supervision of physician anesthetists can and do give most satisfactory and safe inhalation anesthesia and serve to maintain anesthesia costs at lower levels, a point of no small importance to the patient, the hospital, the surgeon, and the progress of anesthesia.

- Frank H. Lahey

Surgery, Gynecology and Obstetrics 59:943, 1934

According to the new technic, a solution of 2.50 per cent of pentothal is injected into the manubrium of the sternum. It offers several advantages, for instance the possibility of producing anesthesia in persons whose veins are not on the surface, of injecting repeated doses without requiring any apparatus of fixation of the needle and for keeping it passable, and the possibility of easy control during anesthesia.

- Foreign letters- Italy

Journal of the American Medical Association 134:825, 1947

The specialty of anesthesia holds out the prospects of a tremendous economic saving in the cost of operating and the expense of maintaining hospitals. Through the use of newer anesthetics, perfected methods and medical specialists in anesthesia, the patient’s stay in the hospital may be so shortened that in a given year under this new dispensation, almost a fourth more surgical or obstetrical patients may be handled without adding another bed or nurse or member of the staff. No matter what such anesthesia costs it pays for itself three times over.

- F. H. M c m e c h a n

Current Researches in Anesthesia and Analgesia 8:7, 1929

The fundamental basis for the importance of regional anesthesia lies in the fact that through nerve injections we may voluntarily bring about the isolation of any organ or region from the remainder of the body. Thus the subject comes to encompass every specialty and separate domain of medicine.

- E.M. Livingston

American Journal of Surgery 23:210, 1934

Today, the anesthesiologist finds himself mired in an endless amount of new information, and I am sure that many of us often wish we could screen out the discussions that are really vital.

- Editorial

Anesthesiology 15:560, 1954

Anesthetists frequently have not been accorded proper recognition, financially or otherwise, for the important part they play in the care of patients. They resented being relegated to the position of a technician. Yet far too often they have been content to be only technicians and have not been willing to equip themselves to assume the role of a real consultant who not only can carry out a skillful, technical procedure but also, by virtue of a background of fundamental knowledge of physiology, pharmacology and even medicine and surgery, can render a valuable opinion as a consultant.

- Casimir Harris


In order that medical men and women shall devote their time and study to anes-
From the Literature

by A.J. Wright, M.L.S.
A associate professor of Anesthesiology
Director, Section on the History of Anesthesia
University of Alabama at Birmingham

Note: I have examined most of the items listed in this column. Books can be listed in this column more than once as new reviews appear. Older articles are included as I work through a large backlog of materials. Some listings are not directly related to anesthesia, pain or critical care but concern individuals important in the history of the specialty. I also include career profiles of living individuals. Non-English materials are so indicated. Columns for the past several years are available as "Recent Articles on Anesthesia History" in the "Anesthesia History Files" at www.anes.uab.edu/anesthist.htm. I urge readers to send me any citations, especially those not in English, that I may otherwise miss!

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Join the party and celebrate ASA's 100th birthday. ASA Newsletter 69(1):10-11, January 2005 [portrait]


This Month in Anesthesia History*

1578 April 1: William Harvey, the English physician who first described blood circulation, is born.

1760 April 13: Thomas Beddoes is born. In the late 1780s Dr. Beddoes began attempts to implement Joseph Priestley's idea for the therapeutic applications of "factivitious airs" or gases. By 1798 Beddoes had established the Pneumatic Institute in Bristol, England, and hired the teenager Humphry Davy as Research Director. Their experiments with nitrous oxide began the following year. Beddoes authored the classic Observations on the Nature of Demonstrative Evidence [1793] and numerous other works.

1770 April 7: English poet William Wordsworth is born. In 1799 Wordsworth, when both were living in Bristol, asked Humphry Davy to read and suggest revisions to the manuscript for the second edition of Lyrical Ballads, the classic collection of poetry by Wordsworth and Samuel Taylor Coleridge. During this period Davy and Thomas Beddoes were engaged in their studies of nitrous oxide and other gases. Wordsworth later became Poet Laureate and authored The Prelude among many other poems.

1805 April 2: Danish author Hans Christian Andersen is born in Odense. Andersen was a frequent traveler and kept a diary during his trips. In August, 1847, he visited Edinburgh, Scotland, for several days. Several dinners were arranged for the locals by this famous author, and on the night of August 17 Andersen and numerous others dined at the house of prominent physician James Young Simpson. In his autobiography, Andersen wrote that "...in the large circle which was gathered there several experiments were made with breathing in ether. I thought it distasteful, especially to see ladies in this dreamy intoxication...there was something unpleasant about it, and I said so, recognizing at the same time that it was a wonderful and blessed invention to use in painful operations..." Simpson did not discover the anesthetic properties of chloroform until November of that year. [See Secher O. Hans Andersen and James Young Simpson. Br J Anaesth 44:1212-1216, 1972]

1807 April 18: British physician and writer Dr. Erasmus Darwin dies. The grandfather of Charles Darwin, Erasmus was a member of the famed Lunar Society of scientists and industrialists who provided financial and other support to Dr. Thomas Beddoes' investigations of the medical uses of gases in the 1790s. Darwin was a prolific author on medical and scientific subjects and developed a theory of evolution decades before Charles.

1829 April 12: Dr. Jules Cloquet amputates a breast from a woman asleep under hypnosis.

1830 April 5: Henry Hill Hickman dies. Six years earlier Hickman had attempted anesthesia in a series of experiments on animals using carbon dioxide gas. Scientists in both France and England [including Humphry Davy!] failed to recognize Hickman's achievement. "Neverthe-less, he deserves the credit of having been the first of the modern investigators to prove by experimentation on animals that the pain of surgical operation could be abolished by the inhalation of a gas." [Keys TE. The History of Surgical Anesthesia. Krieger, 1978, p.19].

1847 April 7: Physician/dentist Nathan Cooley Keel administers the first obstetric anesthetic in the United States. The patient was Fanny Longfellow, wife of poet Henry Wadsworth Longfellow. Under ether anesthesia, Fanny did not lose consciousness but felt no pain during the birth of her daughter.

1852 April 29: First edition of Peter Mark Roget's famous thesaurus is published in England. After graduation from medical school in Edinburgh, Roget spent 1799 in Bristol working with Thomas

*For the full calendar, go to www.anes.uab.edu


M.Goldrick KE. A hero for all seasons. Ambulatory Anesthesia 119(4):1, 5, October 2004 [portrait; Leroy Vandam]


Tan PSK, Gernvik A, Pinsky M. In memoriam: Iqbal Mustafa, MD, PhD, FCCM. Crit Care Med 33(2):475, 2005 [illus.]


Vlessides M. Wine, whiskey and laudanum...analgesics of choice for Lewis and Clark. Anesthesiology News 31(3):1, 36, March 2005

Wainwright M. The talented Mr. Priestley is finally honoured at home. The Guardian February 9, 2004


Welch RA. Spotligh on...Lawrence S. Berman, M.D.—ever-vigilant, at work and at sea. ASA Newsletter 69(1):19-20, January 2005 [portrait]


Beddoes and Humphry Davy on their famous nitrous oxide research. Roget later wrote the Encyclopedia Britannica entry on Beddoes and near the end of his life created the thesaurus for which he is so well known. Roget also invented the slide rule and the pocket chessboard and did research on vision physiology later used as the basis for motion pictures.

1853 April 7: Dr. John Snow chloroforms Queen Victoria for the birth of Prince Leopold. This event removed much of the stigma then associated with pain relief in childbirth in Great Britain.


1869 April 8: The great neurosurgeon Harvey William Cushing is born in Cleveland, Ohio. In 1894 Cushing and his fellow "house pup" at the Massachusetts General Hospital, E.A. Codman, developed the first anesthesia record.

1871 April 16: John Millington Synge, Irish dramatist and poet [Riders to the Sea] is born. In 1916 Synge published a fascinating account of his experiences under ether anesthesia: "I seemed to traverse whole epochs of desolation and bliss. All secrets were open before me...."

1873 April 16: John Hillard describes induction of nitrous oxide anesthesia with face mask and maintenance of anesthesia with nasopharyngeal insufflation.

1923 April 7: First brain tumor operation under local anesthesia performed by Dr. K. Winfield Ney at Beth Israel Hospital in New York City.

1939 April 30: The New York World's Fair opens. Included in the opening ceremonies was an address by President Franklin D. Roosevelt via a brand-new medium, television. "The 1939 New York World's Fair [also] presented a unique opportunity for the newly recognized specialty of anesthesiology to be presented to the general public. With funding supplied by the Winthrop Chemical Company of New York City and careful planning, a committee of physician-anesthetists was able to design a display that illustrated all aspects of the physician-anesthetist's role in health care: general "gas" anesthesia, regional techniques, pain management, resuscitation, and oxygen therapy. Further information was offered concerning training of physicians in the specialty, and speculation involving the future mission of anesthesiology was presented. Surprisingly, issues and discussions concerning the fashion in which anesthesia was to be presented at this exhibit remain germane to current presentations of the specialty to the general public. Although no record remains of the public's response to the exhibit, the World's Fair was an international showcase and an important opportunity for public recognition of anesthesiology."


2005 April 17: Lt. Commander Wheeler B. Lipes dies in New Bern, North Carolina. In September 1942 Pharmacist's Mate Lipes was aboard the submarine Seadragon on patrol in the South China Sea and about a week's journey from the nearest Allied port. A young seaman named Darrel Dean Rector developed appendicitis, and Lipes, who had observed several appendectomies as a laboratory technician in a naval hospital, became the surgeon. Metal spoons were bent at right angles to use as muscle retractors, and sulfanilamide were ground up and used as the antiseptic. An ether mask was made from a tea strainer covered with gauze, and the ship's communications officer, Lt. Franz P. Hoskins, became the anesthetist. The surgery was successful and one of two such operations performed aboard U.S. submarines during World War II. Seaman Rector was later one of 78 crewmen lost aboard the submarine Tang when it was struck by a torpedo in October 1944. George Weller of the Chicago Daily News won a Pulitzer Prize for his article about the surgery, which was featured in such films as Destination Tokyo [1943] and Run Silent, Run Deep [1958] and on the 1950s television series, The Silent Service. Lipes' obituary appeared in The New York Times on April 20, 2005.

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The image of anesthesia is not only created by anesthesiologists, but the image created by the failure of medicine to permit the reflection of anesthesia in an undistorted mirror.

-John B. Dillon
Journal of the American Medical Association 190:999, 1964