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Many men, three wars, and one question: Foundations for the modern understanding of Pain

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This article won first place in the Anesthesia History Association's 2005 Resident Essay Contest, and has been peer reviewed for publication in the April 2007 issue of the Bulletin of Anesthesia History.

"One's mind, once stretched by a new idea, never regains its original dimensions."
– Oliver Wendell Holmes

Religious beliefs and spiritual ideas have provided physicians a focus for treating pain, almost since medicine's beginnings. It was not until the Renaissance period, in the 17th century, that these beliefs would be challenged.

Then, changing ideas about medicine evolved which emphasized observation, experimentation and objective quantification. During this period one man would change the understanding of pain from a soul/holistic approach, to one separating body, mind, and soul.

Rene Descartes, French philosopher and scientist, postulated that the mind and soul were completely different entities from the body, entities which could not possibly affect the body. His theory related painful stimulation and reaction in the body. Descartes viewed the pain system as a straight-through channel from the skin directly to the brain. The body was envisioned as a machine, which reacted to external stimuli. His famous work, which explained his views, was the effect of fire on the skin, as depicted in Figure 1.

The impact of Descartes' work would reduce thinking about the mind, and its relation with the body, and the perception of pain well into the 20th century. However, Descartes' work was a positive step for science, medicine and humankind. He inspired many scientists to continue working toward a better understanding of pain.

Charles Bell and Francois Magendie, a Scottish anatomist and neurosurgeon and a French physiologist, respectively, showed how the ventral nerve roots in the spinal cord were related to motor effects, while the dorsal horns were primarily sensory. During the 19th century, Muller's Law of specific nerve energies, postulated that different nerves reacted differently to unlike stimuli. Max von Frey's work on pain spots in the hand, and Sir Charles Scoot Sherrington's studies defined the concept of nociception.

Fig. 1. René Descartes. Renatus Des Cartes de homine. Lvgdvni Batavorvm: Petrvm Leffen & Fransciscvm Moyardvm, 1662. Obtained with permission from the UCLA Louise M. Darling Biomedical Library's website and is from the John C. Liebeskind History of Pain Collection.

Silas Weir Mitchell, an American physician, often called, "the Father of American Neurology, lived through the bloodiest war in American history: The American Civil War. Wounded veterans, surviving the battlefields, provided Mitchell with a large variety of injuries, creating a hands-on laboratory in which to study pain. Along with William Williams Keen, general surgeon, and George R. Morehouse, another early American neurologist, Mitchell first applied the terms causalgia, reflex sympathetic dystrophy and secondary paralysis to pain. In 1864, their findings were detailed in the work, "Gunshot Wounds and Other Injuries of the Nerves and Reflex Paralysis". These descriptions were later amplified by Dr. Mitchell in his book, Injuries of Nerves and Their Consequences (1872).

While observing his patients and the evolution of their pain symptoms, he concluded an extraordinary observation, one that even he considered bizarre. He wrote:

> Perhaps few persons who are not physicians can realize the influence which long-continued and unendurable pain may have on both body and mind... Under such torments the temper changes, the most amiable grow irritable, the soldier becomes a coward, and the strongest man is scarcely less nervous than the most hysterical girl.
> Perhaps the older books are full of cases in which, after lancet wounds, the most terrible pain and local spasms resulted. When these had lasted for days or weeks, the whole

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C. Ronald Stephen Resident Essay Award

2007

The Anesthesia History Association (AHA) sponsors an annual contest for the best essay on the history of anesthesia, pain medicine or intensive care. This contest is open to all residents and fellows in anesthesiology. The purpose of the contest is to promote interest in the history of anesthesia and to advance professionalism in the specialty.

The essays must be written in English and be approximately 3,000 words in length. The first-place winner receives a $500 award, the second-place winner receives $200 and the third-place winner $100. The preliminary judging is done before the ASA Annual Meeting in October. That preliminary judging is used to pick the best five to 10 essays. These preliminary winners are invited to present their essays at the AHA Spring Meeting, and three winners are chosen on the basis of the content and presentation. The presentations of awards are made during the AHA Spring Meeting. Winners are required to submit their essays to the quarterly Bulletin of Anesthesia History for publication.

Residents and fellows are encouraged to enter the contest for 2007. Submissions may be sent to:

William D. Hammonds, M.D.
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Entries must be received on or before September 1, 2007

Book/Multimedia Education Award

The Anesthesia Foundation announces the Book/Multimedia Education Award to be presented 2008 at the American Society of Anesthesiologists Annual Meeting. This prestigious award will be awarded for excellence and innovation in books or multimedia with significant impact on the science and practice of anesthesiology, critical care, or pain medicine.
No more than two-author submissions are eligible.

The award is $10,000 (to be divided if there are two authors), plus expenses for first author and guest to attend the Academy of Anesthesiology 2009 Spring meeting in St. Petersburg, Florida.

Deadline for receipt of contributions is November 15, 2007.

For further information and specific criterion please contact:
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In Errata

In the January 2007 issue of the *Bulletin of Anesthesia History*, Dr. Gerald Zeitlin was mistakenly listed as the author of the book review on For Fear of Pain: British Surgery, 1790-1850 by Peter Stanley. The true author of this book review is Dr. Vincent Kopp. The book review with the correct byline has been reprinted in the April 2007 issue. The Editorial Staff apologizes for the error.

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The *Bulletin*, formerly indexed in Histline, is now indexed in several databases maintained by the U.S. National Library of Medicine as follows:
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2. Journal Articles: Old citations to journals have been moved to PubMed (www.ncbi.nlm.nih.gov/PubMed), NLM's web-based retrieval system, where they may be searched separately along with newly created citations.
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Men. . . *Continued from Page 1*

> surface became hyperanesthetic, and the senses grew to be only avenues for fresh and screaming tortures... Nothing can better illustrate the extent to which these statements may be true than the cases of burning pain, or, as I prefer to term it, 'Causalgia,' the most terrible of all tortures which a nerve wound may inflict.[1]

Today we wonder why this discovery could baffle Mitchell. However, in his time, like others before him, his understanding was that the body was a machine which reacted to external stimuli. The mind did not affect the body. So why were these patients, heroes of war, acting in such way? Could the human body actually be related to its mind and could it cause the bodily feeling of pain without external stimulation?

Reading Mitchell's book, one understands the dedication and commitment he possessed. It is not possible, from the vantage point of today, to imagine what Mitchell must have felt. One can imagine his satisfaction with these new ideas, but at the same time he must have been terrified of proposing another mistaken belief. Mitchell reveals none of these conflicts in his writings.

He would extend his early observations of battlefield medicine, and he continued examining patients with a scientific approach, one that would lead him to yet more discoveries, including the following:

> We have some doubt as to whether this form of pain ever originates at the moment of the wounding. . . Of the special cause which provokes it, we know nothing, except that it has sometimes followed the transfer of pathological changes from a wounded nerve to unwounded nerves, and has then been felt in their distribution, so that we do not need a direct wound to bring it about. The seat of the burning pain is very various; but it never attacks the trunk, rarely the arm or thigh, and not often the forearm or leg. Its favorite site is the foot or hand. . . Its intensity varies from the most trivial burning to a state of torture, which can hardly be credited, but which reacts on the whole economy, until the general health is seriously affected....The part itself is not alone subject to an intense burning sensation, but becomes exquisitely hyperanesthetic, so that a touch or tap of the finger increases the pain. Exposure to the air is avoided by the patient with care which seems absurd, and most of the bad cases keep the hand constantly wet, finding relief in the moisture rather than in the coolness of the application...As the pain increases, the general sympathy becomes more marked, the temper changes and grows irritable, the face becomes anxious, and has a look of weakness and suffering...At last the patient grows hysterical, if we may use the only term that describes the facts.[2]

He believed there was a clear connection between the mind and body. Pain leads to changes in behavior, and in some instances to insanity. His use of the word "hysterical" and "girl" in reference to the description of a man, in that era, would be of great offense. However, these were the only words that he felt were appropriate.

After recognition of this phenomenon by medical practitioners, amputation became the gold standard therapy for patients experiencing severe pain with only slight external stimuli or no stimulation at all.

Mitchell came to a decisive observation about amputation, based on patient's response to that treatment:

> *Sensory hallucination* – No history of the physiology of stumps would be complete without some account of the sensorial delusions to which persons are subject in connection with their lost limbs. . . Nearly every man who loses a limb carries about with him a constant or inconstant phantom of the missing member, a sensory ghost of that much of himself, and sometimes a most inconvenient presence, faintly felt at time, but ready to be called up to his perception by a blow, a touch, or a change of wind.[3]

Phantom limb pain became an interesting topic in his search to understand pain mechanisms, but that subject merits a separate paper. Mitchell performed various experiments in his quest to understand causalgia. Even though a comprehensive explanation did not emerge, his research would influence others to continue the search. It would be another more recent war that would help Rene Leriche to provide the next significant step forward in the understanding of pain.

Rene Leriche, a French surgeon, saw many soldiers with peripheral nerve injuries during World War I. In his book, La Chirurgie de la Douleur, he detailed his findings on causalgia and phantom limb. He mentions the work of Mitchell along with the observation that no one had seen much of these injuries in Europe. Skepticism towards Mitchell findings, remained. However, Leriche wrote:

> ...the majority of French surgeons, in August,1914, would certainly have had no suspicion of the existence of causalgia, though it was a matter of quite common occurrence during the American Civil War; and, alas! was about to become so once more for them. It was not long, indeed, before, on all the war fronts, it became evident that many wounds of the soft parts of the limbs were followed by a painful syndrome of a very peculiar type.[4]

Perhaps Leriche's greatest contribution was his description of sympathetic dysfunction related to the patient's symptoms. Even though it was described earlier, by other scholars and physicians, Leriche did more meaningful work in describing sympathetic dysfunction. He called it "the wound of the sympathetic." He was one of the first to perform sympathetic nerve blocks on these patients with good results. Leriche speculated that, because the pattern of nerve damage followed the pattern for vasculature supply, perhaps the damage was to the sheath of the vessel itself. He wrote:

> ...And remembering that the sympathetic, in its distribution to the limbs, follows the course of the arteries, I asked myself whether, in those cases of nerve injury complicated by arterial wounds, it was not the injury to the sheath of the vessel that determined their painful and trophic features.[5]

Leriche had a patient who had a bullet wound on his right axilla. He decided to remove the patient's brachial artery adven-

1. Mitchell SW. Injuries of Nerve and Their Consequences. Philadelphia: J.B. Lippincott Co. 1872, p.196.
2. Ibid., p.197.
3. Ibid., p. 348.
4. Leriche R. The Surgery of Pain. London: Bailliere, Tindall and Cox. 1939 (translated by Archibald Young), p. 172.
5. Ibid., pp.172-173

titia. The patient's symptoms greatly improved and Leriche went on to publish his observation. At first he relates that there was great disbelief of his work but later on, it became widely adopted:

> ...I was a little uneasy as to the reception which might be accorded to this new conception, which had not previously occurred to anyone. My feeling of disquiet was justified, for its reception was chilly enough...a few months later...the theoretical considerations to which I have already alluded, the sympathetic origin of causalgia has come to be admitted by everybody.[6]

With the work of Mitchell and Leriche as foundations, yet another war brought forward additional significant contributors to the understanding of pain. William K. Livingston, an American general surgeon, emphasized his work on the understanding of visceral pain. He wrote, in his book, The Clinical Aspects of Visceral Neurology:

> My interest in the subject began as an interne when I first witnessed the opening of a colostomy with a cautery. The fact that the patient experienced no pain during the procedure impressed me, and led me to a study of the phenomena of visceral sensibility...I found myself drawn into a rapidly enlarging field which has since engaged much of my time and attention.[7]

However, World War II would present Livingston experiences in the effects of war on injured soldiers. His experienced were described in his book, Pain Mechanisms. Reading this text evokes admiration. He challenged old and new theories. His detailed explanation of findings, treatments and reactions helps to understand the importance of his work. In his book's (Pain Mechanism) foreword, Ronald Melzack, an emerging pain expert, wrote the following:

> The field of pain research and theory has suddenly come alive-full of new concepts and therapeutic approaches. No one in this century has contributed more to this breakthrough than William Kenneth Livingston. Pain Mechanisms, which he published in 1943, was the first major critique of the traditional specificity theory of pain and marked the beginning of new ideas that evolved to produce the remarkable explosion of research and new forms of treatment that have occurred...[8]

Livingston was a firm believer in keen, detailed observation and treatment in the clinical setting. He believed this required the same dedication and rigor as should be applied in the research laboratory. He further emphasized that there needed to be strong communication between clinic and laboratory to promote better understanding and treatment of pain. (Figure 2)

> It is probable that neither the clinician nor the anatomist will ever be able to supply a final answer to the questions that have been enumerated. Perhaps the physiologist can do it when his investigations have progressed further. Until the physiologists accepts this challenge and can tell us the "why" and "how," we clinicians can go a long way toward establishing a practical, if not complete, answer, and in so doing may discover methods of treatment not only for the pain syndromes under immediate scrutiny but for other disease processes as well.[9]

Livingston also felt that theories should be based on objective findings not on old beliefs. This would lead him to refute many theories, specially the most accepted theory for centuries: Descartes' theory of straight-through transmission with the reflex response serving as a protective mechanism.

> ...His thesis that pain, accompanied by protective muscular spasm, is Nature's "warning signal," forms the basis on which pain is interpreted as a conservative and beneficent mechanism. Unfortunately, however, pain does not always stop, once it has accomplished its defensive purposes. And, as will be emphasized in subsequent chapters, when pain exceeds its protective function it becomes destructive.[10]

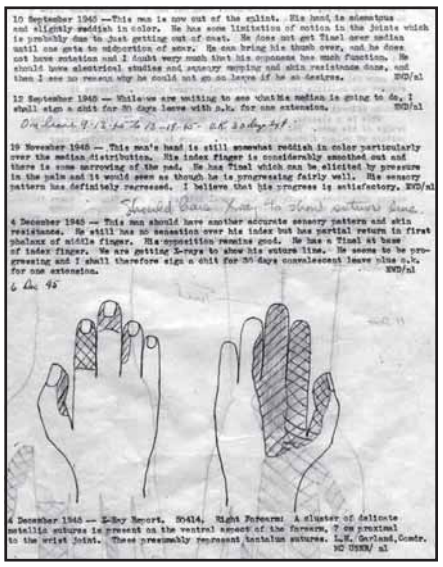

Fig. 2. Livingston's case note from WWII, describing a peripheral nerve injury. Reprinted with permission from The William Livingston Papers, John C. Liebeskind History of Pain Collection, Louise M. Darling Biomedical Library, UCLA.

Rereading Livingston's work 60 years later, one could easily conclude his writings and research were advanced. They could profitably be learned, even today, by anyone pursuing a better understanding of pain. Livingston's teaching and collection of case reports influenced the development of the Gate Control Theory for pain, and the McGill Pain Questionnaire.

In 1965 Ronald Melzack, a Canadian psychologist, and Patrick Wall, a British physician and physiologist, published in the journal *Science*, their paper, "Pain Mechanisms: A New Theory." Now commonly called the Gate Control Theory, it described a gating mechanism by which, at the level of the spinal cord, fast conducting fibers and slow conducting fibers elicit excite or inhibit transmission. The fast fibers are the sensory fibers that the cord interpreted as touch, whereas the slow conducting fibers are interpreted as pain. Perhaps the most influential paper written in the study of pain, it produced a broad positive response within the scientific community. The Gate Control Theory is widely understood now, but has undergone considerable modifications (Figure 3).

There is a direct connection between Ronald Melzack and William Livingston. Beginning in 1953, in the laboratories at the University of Oregon, Portland, they worked together. After a year at the labora-

Continued on Page 6

6. Leriche R. The Surgery of Pain. London: Bailliere, Tindall and Cox. 1939 (translated by Archibald Young), p. 175.
7. Livingston WK. The Clinical Aspects of Visceral Neurology: with Special Reference to the Surgery of the Sympathetic Nervous System. Illinois/Maryland: Charles C. Thomas. 1935, p. vii.
8. Livingston WK. Pain Mechanisms: A Physiologic Interpretation of Causalgia and Its Related States. New York. Plenum Press, 1976.
9. Ibid., pp.11-12.
10. Ibid., pp.44-45.

Men. . . *Continued from Page 5*

tory facilities, Melzack was asked by Livingston to work in the pain clinics. Melzack, much like Weir Mitchell, had a keen interest in the differing descriptions by patients about their pain. The McGill Pain Questionnaire, still used today worldwide, was the direct result of Livingston and Melzack's collaboration.

The relationship between mind and body, and their influence on pain helped developed John Bonica's multi-disciplinary approach. Bonica's, an anesthesiologist, approach to the pain patient supported the new ideas about pain mechanisms. Those ideas consist of multifactorial sensory inputs which both the body and mind perceive. Interaction among pain stimuli, past experiences, a patient's health, and the environment all affect the overall response to both pain and therapy.

Many minds contributed to the development of Pain Medicine. They were influenced by three different wars. The modern understanding of pain and its treatment resulted from the experiences gained in treating war wounded patients.

What is very hard to imagine, is where would the study of pain be today if these men had not researched common questions: What, if anything, causes a patient to have pain without external stimuli?

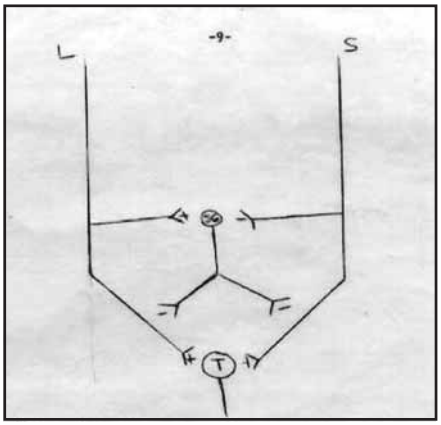

Fig. 3. Gate Control Theory sketch work. Obtained with permission from the UCLA Louise M. Darling Biomedical Library's website and is from the John C. Liebeskind History of Pain Collection.

What is causalgia and how do you explain it? Pain patients have been criticized and accused of psychosis. Analyses of their painful conditions, coupled with science, led to better understanding and to better, more integrated relationships of pain responses and their treatment.

Acknowledgement

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References

1. Mitchell SW. Injuries of Nerve and Their Consequences. Philadelphia: J.B. Lippincott Co. 1872.

2. Leriche R. The Surgery of Pain. London: Bailliere, Tindall and Cox. 1939 (translated by Archibald Young).

3. Livingston WK. The Clinical Aspects of Visceral Neurology: with Special Reference to the Surgery of the Sympathetic Nervous System. Illinois/Maryland: Charles C. Thomas. 1935.

4. Livingston WK. Pain Mechanisms: A Physiologic Interpretation of Causalgia and Its Related States. New York. Plenum Press; 1976.

5. Rovit RL, Couldwell WT. A man for all seasons: W.W. Keen. *Neurosurgery* 2002;50(1):181-190.

6. Olshansky SS. William James on Phantom Limbs. NEJM 1955;253:70-71.

7. Yamamoto D. (1998) The relief of pain and suffering. John C. Liebeskind History of Pain Collection at the Louise M. Darling Biomedical Library, UCLA.

8. www.library.ucla.edu/libraries/biomed/his/painexhibit/ (11 July 2005).

9. Meldrum M. (1999) Travels in the East: A Livingston Story. *APS Bulletin*. www.ampainsoc.org/pub/bulletin/mar99/history.htm (11 July 2005).

10. Lewis R. (2005) A sketch of the subjective. *The Scientist*. www.the-scientist.com/2005/03/28/S5/1 (11 July 2005).

YEAR 2008 LAUREATE OF THE HISTORY OF ANESTHESIA

Doris K. Cope, M.D., Chairman
www.WoodLibraryMuseum.org

Nominations are invited for the person to be named the fourth Wood Library-Museum Laureate of the History of Anesthesia in the year 2008. Deadline for receipt of nominations is July 1, 2007.

This program, established in 1994, has as its purpose increased recognition of the richness and importance of the history of our specialty by recognizing the work of scholars who have made singular contributions to the field. The honor is awarded every four years by the WLM Laureate Committee to an individual who has a demonstrable record of contributing over the years outstanding, original materials related to the history of our specialty as reflected by articles published in peer-reviewed journals, and/or in monographs. The first Laureate, Dr. Gwenifer Wilson of Sydney, Australia was honored in 1996. The second Co-Laureates were Norman A. Bergman, M.D, F.R.C.A., and Thomas B. Boulton, M.D., Ch.B., F.R.C.A. in 2000. The third Laureate was Donald Caton, M.D. in 2004.

The Laureate Program is international. Nominations are sought by physicians, not just anesthesiologists, as well as medical historians from the international history community.

Additional information may be obtained by contacting the WLM Laureate Committee at the Wood Library-Museum, 520 N. Northwest Highway, Park Ridge, Illinois 60068-2573. Please see the WLM website – www.WoodLibraryMuseum.org – for more information.

Triumph and Tragedy – The Lives of Three Pioneers of Anesthesia from New England

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This article has been peer reviewed and accepted for publication in the Bulletin of Anesthesia History.

While many have argued as to who is most deserving of recognition for the discovery of anesthesia, it is clear that the work of several individuals in the 1840s marked its birth.[1-3] Few medical specialties can trace the roots of their foundation to such a narrow historical period. Major milestones in the use of general anesthesia for dental and surgical procedures are listed in Table 1. Anesthetics were first employed during dental practice not only because tooth extraction was performed very commonly, but also because of the short duration and the superficial extent of the procedure.

Table 1

Time line of major milestones related to the discovery of anesthesia.

1842 – William E. Clarke uses ether for dental extraction.
1842 – Long uses ether during surgery, about 2 months after Clarke.
1844 – Wells uses nitrous oxide during dental surgery.
1844-46 – Jackson and Morton collaborate.
1846 – Morton demonstrates ether during surgery.

Recreational use of nitrous oxide and ether was common in the early to mid 19th century, and it was inevitable that someone would take advantage of, and discover, the sedative, analgesic and anesthetic properties of these agents. Three pioneers from New England were amongst those claiming to have discovered anesthesia. William Thomas Green Morton of Boston, Massachusetts, was the first person to publicly demonstrate the effectiveness of ether as an anesthetic for a surgical procedure.[3-5] Charles Thomas Jackson, also of Boston, a physician and chemist, was teacher and advisor to Morton. He claimed that Morton followed his suggestion to use ether as an anesthetic.[6] Jackson wished to get credit as the discoverer of anesthesia because he considered Morton's role to be that of a technician following instructions. Horace Wells of Hartford, Connecticut, observed the analgesic effects of nitrous oxide on participants in a demonstration, and arranged to have one of his own teeth removed painlessly under its influence the very next day. He used nitrous oxide extensively in his dental practice and claimed that he ought to be credited with the discovery of anesthesia.[7,8]

It is interesting that the two individuals who deserve most credit for the first use of anesthesia did not seek credit as aggressively (Clarke did not seek credit at all), and were not from New England. Medical student William E. Clarke of Rochester, New York, administered ether for dental extraction two months before Crawford Williamson Long of Athens, Georgia, who performed the first successful surgical operation under general anesthesia with ether.[9,10] These events occurred two and four years before Wells' and Morton's achievements, respectively. Unfortunately, Long did not publish a report of this accomplishment for seven years, thereby denying himself much of the credit he deserved.[11] The three New Englanders, Morton, Jackson, and Wells, fought for recognition as discoverers of anesthesia. This is the story of triumph and tragedy in their lives. We also explore various factors that contributed to the suffering they experienced.

The birth of anesthesia in the 1840s

The historical period preceding the understanding of disease processes and pathophysiology was marked by medical experimentation as well as opportunism. Almost half a century earlier in the 1790s, Humphry Davy conducted extensive experimentation with the inhalation of nitrous oxide. Initially unsure whether it was a stimulant or a depressant, he is famous for his understated suggestion, "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place."[12] Unfortunately neither he, a chemist, nor those who read his 600-page treatise followed up on this recommendation. The stimulating and exhilarating effects of nitrous oxide did not receive mention again until 1819.[13] Many traveling demonstrators provided entertainment by administering nitrous oxide or ether vapors to members of the audience. One individual who began his career as a laughing gas salesman was Samuel Colt, the inventor of the revolver.[1,14] Horace Wells (Figure 1), a dentist from Hartford, Connecticut, watched a demonstration of nitrous oxide by Gardner Quincy Colton on December 10, 1844. During the event, a local shopkeeper, Samuel Cooley, while under the influence of nitrous oxide, injured his leg but claimed that he felt no pain. Intrigued by the prospect of using this agent for pain-free dental extraction, Wells persuaded Colton to administer nitrous oxide to him the very next day, while dentist John M. Riggs removed one of Wells' teeth painlessly. Colton also taught Wells how to manufacture nitrous oxide and administer it using a bladder. Wells describes his experience with nitrous oxide in a pamphlet he published,

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Pioneers. . . *Continued from Page 7*

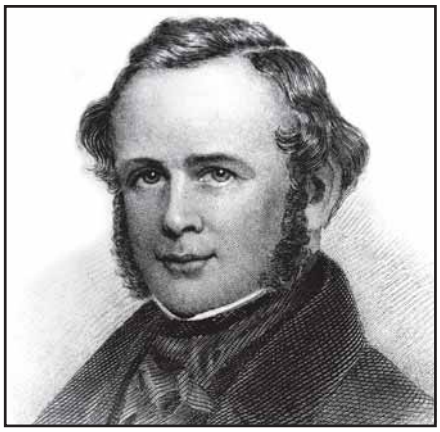

Fig.1. Portrait of Horace Wells. Courtesy, Wood Library-Museum of Anesthesiology, Park Ridge, Illinois.

> I accordingly procured some nitrous oxide gas, resolving to make the first experiment on myself, by having a tooth extracted, which was done without any painful sensations. I then performed the same operation for twelve or fifteen others, with the like results.' He goes on to explain further, 'In the fall of 1844, after I had tried several experiments with nitrous oxide gas with perfect success,—then wishing to use a substitute which would be attended with less trouble in its preparation,—I advised with Dr. E. E. Marcy, of this city, at which time we discussed the comparative merits of nitrous oxide gas and rectified sulphuric ether. Knowing that both had the same effects upon the system, so far as causing insensibility to pain was concerned, the object of the discussion was to ascertain which would do least harm. I had, previous to this, inhaled ether, as well as nitrous oxide gas, and found their effects upon the nervous system to be precisely the same; but I found it very difficult to inhale the vapor of ether in consequence of the choking sensation. For this reason, and for the reason that Dr. Marcy and myself came to the conclusion that nitrous oxide gas was not so liable to do injury, I resolved to adhere to this alone.[7]

Having used this technique successfully on 15 of his own patients, he traveled to Boston to demonstrate the technique at Massachusetts General Hospital in January 1845. Using nitrous oxide prepared by a local manufacturer, perhaps a weaker mixture, Wells administered the agent to a student and then proceeded to extract one of his teeth. Unfortunately for Wells, the patient screamed although he did not remember feeling any pain. Onlookers felt cheated, Wells was subjected to much humiliation, and his demonstration was considered a hoax. He returned to Hartford and continued using nitrous oxide in his practice.

Wells was aware that nitrous oxide first produced excitement that was followed by depression and unconsciousness. In 1847, he published a letter describing his experience with nitrous oxide in dentistry.[7] In it he states that, "It is very unfortunate that there should be more than one claimant for the honor of the discovery; but so it is: and the only alternative now is, for the man who considers himself entitled to this honor to present his proofs, that a discriminating and impartial public may 'give credit' to whom credit is due."[15] As fate would have it, this credit was not to come during his lifetime, and he never did recover from the humiliation he suffered in Boston. Decades later, Henry Jacob Bigelow, writing in support of Morton, clearly stated that nitrous oxide was not a reliable anesthetic due to its lack of potency — "From all this it will be seen that Wells did not, as has been claimed for him, 'discover that the inhalation of a gaseous substance would always render the body insensible to pain during surgical operations,' but only that it would occasionally do so, and until long after the ether discovery, his experiments were not 'surgical operations,' but only tooth-pulling."[16] Wells was aware of the effects of nitrous oxide and ether, and his contribution was pushing the use of nitrous oxide to the point of loss of consciousness, being constantly aware that excessive amounts of drug could easily result in catastrophe.[17]

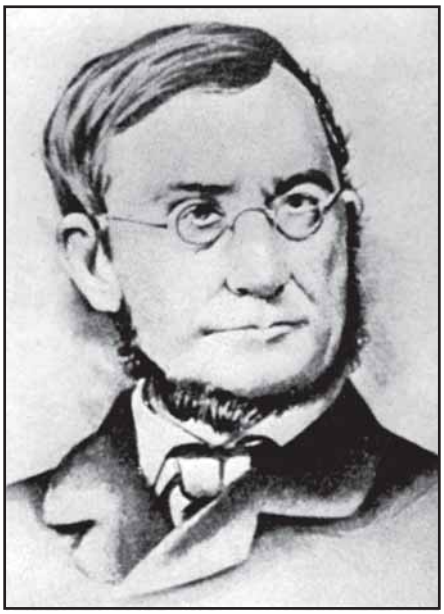

Fig. 2. Portrait of Charles Thomas Jackson. Courtesy, Wood Library-Museum of Anesthesiology, Park Ridge, Illinois.

Charles Thomas Jackson (Figure 2) was a man of many talents – chemist, geologist, mineralogist, and physician. After graduating from Harvard Medical School in 1829, he continued studies in Paris before returning to the US and establishing a private medical practice in Boston in 1832. He abandoned medicine in 1836 and established a laboratory for chemical analysis. Morton was a student of Jackson's, and it was Jackson who suggested to Morton not only that ether, being more potent, be used as an anesthetic, but also that the use of highly purified ether would produce greater depth of anesthesia.[6] Jackson was not present at Morton's demonstration on October 16, 1846, claiming to have been busy. He always seemed to be an indirect participant who later wished to receive full credit. Two weeks earlier, although he offered Morton tips on how to use ether earlier that day, he was once again absent when ether was used during a dental extraction on Eben Frost on September 30, 1846. When asked about this later, Jackson merely stated, "The case was reported to me the next morning."

William Thomas Green Morton (Figure 3) grew up in rural New England and enrolled at the College of Dental Surgery in Baltimore, Maryland in 1840. Due to financial difficulties, he left Baltimore and studied under Wells, starting a dental practice with his help in Farmington, Connecticut. He moved to Boston in 1843, and though he formed a brief partnership with Wells, it was dissolved when it was found to be unprofitable. Wells returned to Hartford, and Morton enrolled as a student at Harvard Medical School. As part of his courses Jackson demonstrated to medical students that inhalation of sulphuric ether could produce unconsciousness. Morton used ether on himself and also on animals. After the successful use of ether for dental extraction on September 30, 1846, he received generous coverage in the local newspapers. One report stated, "An ulcerated tooth was extracted from the mouth of an individual without giving him the slightest pain. He was put into a kind of sleep, by inhaling a portion of this preparation, the effects of which lasted for three quar-

Table 2

Interactions amongst Morton, Wells, Jackson, and Long.

Morton – Wells
Wells taught Morton dentistry, helped him set up a practice, and was briefly his business associate. Wells consulted with Morton about how best to use nitrous oxide. Morton secured permission for Wells to demonstrate nitrous oxide at Massachusetts General Hospital, and was present during the failed demonstration.

Morton – Jackson
Jackson was a teacher of Morton's, and demonstrated that unconsciousness could be produced by ether during lectures at Harvard Medical School. Morton and Wells secured Jackson's help in authentication of a dental device they wished to market. Morton lived for a time in Jackson's home; Jackson suggested to Morton that using purified ether would result in greater depth of anesthesia.

Morton – Wells - Long
Morton, Wells, or both, visited Georgia to observe how ether was used by Long during surgical procedures.

ters of a minute, just long enough to extract the tooth."[18] It went on to add, "This discovery is destined to make a great revolution in the arts of surgery and surgical dentistry."[18] He also received an invitation to demonstrate his discovery during a surgical operation at Massachusetts General Hospital on October 16, 1846. Though unprepared and tardy, Morton was successful in the first public demonstration of ether anesthesia. The skeptical audience that had already viewed one disastrous

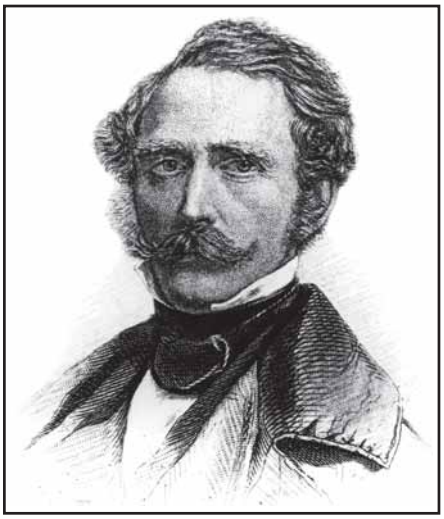

Fig. 3. Portrait of William Thomas Green Morton. Reference #3, courtesy, Wood Library-Museum of Anesthesiology, Park Ridge, Illinois.

demonstration was swept out of disbelief by Morton. John Collins Warren, the stern and equally skeptical surgeon was forced to admit, slowly and emphatically, "Gentlemen! this is no humbug."[4] Morton was compared to Edward Jenner, and in London, the *Lancet* stated, "The discovery of Dr. Morton – more striking to the general than to the scientific mind – will undoubtedly be placed high among the blessings of human knowledge and discovery."

Interactions in the 1840s

The relationship between these protagonists is complex and spans many years and is summarized in Table 2.[1,3,4,6,7,19] Horace Wells taught Morton dentistry and even helped him set up a dental practice in the suburbs of Hartford, Connecticut. In addition, Morton and Wells briefly become business partners and visited Boston to explore the possibility of marketing a dental prosthesis they had developed. In Boston, they sought and received assistance and an endorsement from Jackson, known for his chemical analysis laboratory. To complicate matters further, an undated and unsigned letter written by Long mentions that two individuals from Boston visited Georgia to observe his technique of administering ether in 1844.[14] The letter adds that Morton or Wells may have learned about the successful use of ether during this visit. In 1844, Horace Wells successfully used nitrous oxide during dental extractions. Before his failed demonstration at Massachusetts General Hospital, Wells had consulted physicians and dentists in Boston. Morton was one of the individuals consulted by Wells prior to the demonstration. In fact, Morton helped Wells secure permission to demonstrate his method at Massachusetts General Hospital and, along with Jackson, was present during Wells' failed demonstration. Morton learned from this experience that an agent more potent than nitrous oxide would be needed to be reliable, and he had already observed Long use ether without difficulty. Morton's personal experience with ether may have started much earlier with ether frolics in Rochester, New York, where he was a student with Clarke, who is known to be the first person to administer ether for dental extraction in 1842. Clarke's use of ether was not made public for over 40 years.[9,10] In the summer of 1845, Morton personally witnessed many painless dental extractions by Dr. John Riggs, while Wells administered nitrous oxide. He remained unconvinced about its potency and began experimenting with ether. Jackson suggested to Morton that purified ether would likely achieve the greater depth of anesthesia necessary for surgical procedures. There is some disagreement about the amount of discussion and collaboration that took place between Morton and Jackson over the use of ether as an anesthetic and about the type of equipment that would be necessary to administer ether to a patient.[1,3]

After October 16, 1846

News about Morton's demonstration spread rapidly, both within and outside the United States.[20-26] However, the concept of anesthesia did not take root immediately, in part because Morton would not reveal the exact composition of the chemical used in the vaporizer for several months after his public demonstration. Even after he did so, Morton and Jackson patented the use of ether for general anesthesia [Patent #4848].[3,19] Morton placed advertisements in journals inviting surgeons to observe anesthetics, offering to provide trained individuals to provide anesthesia, and notices in newspapers warning against the unlicensed use of his patented drug.[27,28] Such an attempt at commercialization of a medical discovery, as universal as it is today, was unheard of at the time, and the medical establishment opposed it. The code of ethics of the American Medical Association specifically forbade seeking profit from medical discoveries and many physicians and dentists were appalled by this opportunistic behavior.[29] Despite their efforts neither Morton nor Jackson succeeded in benefiting financially from their claims regarding the discovery of anesthesia. In addition, neither was successful in being recognized as the sole discoverer of anesthesia.

Incredible as it may sound, there were more than a few who opposed the use of anesthesia; these included the clergy, the

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military and the ignorant. Representatives of the Church quoted the Bible [Genesis 3:16] warning that pain was divine punishment and that man had no right to interfere — "To the woman He said; I will greatly multiply your sorrow and your conception; in pain you shall bring forth children." In an uncanny twist, Sir James Young Simpson, an obstetrician who introduced the use of chloroform during labor, put the clergy on the defensive by quoting from the same source [Genesis 2:21] where God himself is seen as the first anesthetist and surgeon, — "And the LORD God caused a deep sleep to fall upon Adam, and he slept; and He took one of his ribs, and closed up the flesh in its place." Even this was insufficient to put a stop to these incessant attacks, even from within the medical community, when Dr. Ashworth remarked, "Dr. Simpson surely forgets that the deep sleep of Adam took place before the introduction of pain into the world, during his state of innocence."[30] Use of ether was labeled as quackery by the Philadelphia Medical Examiner, while others tried to use it to cure insanity. There was a report of "one individual treating himself with ether for neuralgia, and becoming insane."[31] In another instance, a resident physician reported "This gentleman had a strange delusion that he could expand the powers of his mind ad infinitum, if he could obtain a free supply of ether, and he pursued this delusion so earnestly that his mind became disoriented, and, in fact, he suffered paroxysms very nearly allied to delirium tremens."[32] Yet another physician warned readers about the dark side of ether — "That the inhalation will and does, in many cases, produce the desired insensibility there is no doubt: but there is a question involved in this matter of serious import. That it has in some instances been productive of evil, I think no one can successfully deny; and I believe even its warmest advocates admit that it is not without its danger."[33] In Britain and elsewhere the intensity of the opposition finally began to diminish after Queen Victoria received chloroform during the birth of Price Leopold. In addition, a charismatic priest named Thomas Chalmers encouraged women to accept analgesia during labor, and the path was cleared for such use in Britain. In the US, the military tried to discourage the use of anesthesia, with John Porter stating that in patients who receive anesthesia — "wounds do not heal as well."[34] He believed that it was not manly to need anesthesia for amputation, and felt that gangrene was not heard of until the advent of anesthesia. Even the notable French neurophysiologist François Magendie was opposed to the use of surgical anesthesia, believing that it weakened the patient. Considering the opposition it faced, it is indeed surprising how quickly use of anesthesia became the norm.

What did Wells, Jackson, and Morton want?

There is little doubt that greed, and the need for recognition caused Morton, Jackson, and Wells each to claim credit for the introduction of anesthesia. Clarke and Long, who had both independently used anesthesia successfully in 1842, were least involved in this struggle and thus minimally affected by any lack of recognition. Congress had offered a monetary reward of $100,000 to be paid to the discoverer of anesthesia.[3] It is likely that we may not have learned of Long's contributions had he not also attempted to receive credit. Although Wells lived only for a couple of years after Morton's demonstration, Jackson and Morton were involved in heated debate over priority in the discovery of anesthesia. This controversy and internecine conflict continued for almost 20 years. Morton's interest in financial gain from this discovery is evident from his attempts to hide the true identity of his mixture, his securing a patent for the use of ether, and repeated attempts to secure substantial rewards for his contributions. Jackson did not need the money, but his personality predisposed him to seek fame and wealth. It is difficult to know what affected Wells more — his failed demonstration, or Morton's success. A recent book offers this scathing commentary on Morton, "The present inquiry will reveal W.T.G. Morton not as a benefactor, but as a scoundrel. At his feet, and at no other's, can be laid the disappointment, heartbreak, and tragedy that accompanied one of the greatest advances in all of medicine. Clearly, it is another of the bitter ironies of history that Fate chose such an unworthy and ill-prepared agent to preside as midwife at the birth of the death of pain."[3]

Tragedies

Wells (1815-1848)

After the failed demonstration in Boston in 1845, Wells returned to Hartford and continued using nitrous oxide in his dental practice. After Morton's success in 1846, Wells was distracted, disillusioned, and angry. He found it difficult to concentrate on the practice of dentistry, being especially upset about Morton seeking financial benefit by securing a patent. Later that year, he sailed for Paris and remained there for three months. Returning in March 1847, he tried to resume dentistry but quit practice within a year. It was during this time that chloroform's anesthetic properties were discovered, and the drug was frequently used in obstetrical practice. Anger and depression led Wells to begin abusing this drug. Early in January 1848, Wells moved to New York City, and attempted to establish a practice there. He made the brief and most unfortunate acquaintance of an unsavory man who thought nothing of sprinkling sulphuric acid on women they passed by on the streets. The next day, after awakening from chloroform induced sleep, Wells described events thus, "In my delirium, I seized it [the phial containing sulphuric acid] and rushed into the street and threw it at two females. I may have thrust it at others, but I have no recollection further than this."[1,15] He was arrested for this reckless act on January 22, 1848. Remorsefully, he confessed that these actions had occurred while he was delirious, and later appeared quite coherent to prison physician John C. Covel. Wells convinced prison authorities to allow him to visit his home briefly in order to collect a few personal belongings. During this visit, while the prison guard was inattentive, Wells pocketed a bottle of chloroform and a razor. Within a couple of days, violent fluctuations in mood led him to commit suicide. He had placed a handkerchief soaked in chloroform in his mouth, tied another handkerchief around his face, and used the razor to inflict a deep, 6-inch long wound that severed major blood vessels in his left groin.[1,35]

Morton (1819-1868)

After successfully demonstrating the anesthetic properties of ether, Morton tried to conceal the identity of the chemical he was using, referring to it as "Letheon."[36] Others quickly determined its true identity, and soon ether was being used both in the United States, Canada, and in Europe.[22,24,25] Morton's life before 1840 included many shady business dealings, and he was wanted by the police in several states, mostly for fraud, embezzlement of funds and impersonation. He could certainly be considered a con artist and a cheat. His frantic and unsuccessful efforts to collect financial rewards over the next two decades are beyond the scope of this essay, but have been reviewed extensively.[1,3,5] His financial status was often reported to be desperate, but there is evidence to suggest that he transferred at least some

assets to his family to protect them from creditors. In the hot summer of 1868, Morton traveled to New York City to dispute claims made in an erroneous article in the *Atlantic Monthly*.[37] It reported that John Collins Warren (the surgeon at the first public demonstration of ether at Massachusetts General Hospital on October, 16, 1846), thought little of Morton, and that Morton had worked under the supervision of the discoverer of anesthesia – Charles T. Jackson. Morton tried without success to arrange meetings with several influential people in New York, to effectively repudiate this false claim. Summer was particularly harsh that year, and Morton fell ill a few days after his arrival in New York. By the time his wife arrived to assist in his care, heatstroke had left him febrile, agitated, and irrational. One evening, against his wife's wishes, delirium led him to insist on transferring to another hotel. While driving through Central Park in a carriage, during a brief stop, an enraged and incoherent Morton jumped out and leapt into a nearby pond. Two men helped him out of the water and tried to calm him while they waited for transportation to a hospital. The carriage arrived an hour later, but Morton did not survive the transfer.[38] Next day, the *New York Post* included him in their list of heatstroke victims, "Professor W.T.G. Morton, of Boston, found insensible at One hundred and tenth street and Sixth avenue, and died on the way to St. Luke's Hospital."[39]

Jackson (1805-1880)

Jackson's life after October 16, 1846, was plagued by controversy and dispute. Although trained as a physician, he remained a stranger to clinical medicine – being more a scientist and geologist. One of his weaknesses was that he did not personally follow through on ideas discussed with Morton, and Samuel Morse. Combined with his pugnacious nature, this failure to take important subsequent action in bringing ideas to fruition and discovery made him seek undeserved credit for the discovery of anesthesia and the development of the telegraph, an invention clearly associated with Morse. Jackson and Morse were passengers on the Sully during a transatlantic voyage. Topics of science were discussed off and on throughout the 45-day journey, and the idea of transmitting information through the medium of electricity was brought up by other passengers as well. Although Jackson did nothing more than participate in these discussion, it did not prevent him from claiming credit for inventing and developing telegraphy. Moreover, his name appears in controversies surrounding the introduction of collodion and the conduct of research on the digestive actions of the stomach. Although Jackson had his supporters, many judged him harshly, some even questioning his sanity. Unlike Morton, Jackson was well off financially, thanks to a generous inheritance and also due to professional fees collected for his analytic and geologic efforts. Jackson's sister, Lydia, was married to Ralph Waldo Emerson, the prominent minister, lecturer, and writer. Although Emerson was sympathetic to Jackson's cause, he was unable swing the tide of opinion in Jackson's favor. Jackson spent over two decades wrestling for a favorable verdict, but to no avail. In the 1860s, the nation was engulfed in the Civil War, and few people were interested in this ongoing dispute between Morton and Jackson. In 1873, he suffered a fall and temporarily lost consciousness. This stroke left him agitated, confused, and unable to care for himself. Considering his condition both untreatable and terminal, his family transferred him to the McLean Asylum in Belmont, Massachusetts. However, even death would did not come to Jackson easily. Alone and isolated from friends, family, and colleagues, Jackson suffered for seven additional years in the asylum before death spared him further agony at the age of 75.[1] In relief, and with scorn, one of his former colleagues, T.T. Bouvé, informed the Boston Society of Natural History thus, "Not in sadness, alas, did the friends of his earlier years learn of the final departure of him whom they had respected and loved."[1]

Causes of controversy and tragedy

One wonders if controversy over recognition for discovery or invention often results in such tragedy, or whether the lives of Morton, Wells, and Jackson represent an aberration. The history of medicine is full of instances where discoverers were not correctly or completely identified. Frederick Grant Banting and John Mcleod received the Nobel Prize in 1923 for work related to the discovery of insulin and its role in diabetes mellitus. Coworkers Charles Best and James Collip were not awarded the prize, and considerable controversy persists about the appropriateness of this decision. In another example, James D. Watson and Francis Crick are recognized as the discoverers of the structure and role of deoxyribose nucleic acid [DNA]. However, the efforts of collaborators Maurice Wilkins and Rosalind Franklin have been largely overlooked. Although Wilkins shared the Nobel Prize with Watson and Crick in 1962, Franklin's role was overshadowed because of delays in recognition and her untimely death; since the Nobel Prize is never awarded posthumously. In both instances, the individuals who were denied credit – Best, Collip, and Franklin – went on to have productive careers. Best remained friends with Banting, and Franklin spent her last days in the home of Crick while terminally ill with ovarian cancer.

The behaviors exhibited by Wells, Morton and Jackson are quite uncommon these days. In part, this may be due to the existence of formal procedures for inventors and discoverers to register and protect their legal and intellectual rights. In addition, the disciplines of psychology and psychotherapy as we know them today, did not exist in the mid-19th century; Sigmund Freud's work did not even begin until much later in the century. Society looked down upon sufferers of mental illness, the victim often being abandoned by friends and family. Historical circumstances prevented our protagonists from recognizing their own denial and anger as normal responses to adversity, or simply accepting an unfavorable verdict and getting on with their lives. Examination of the 'big picture' would have allowed them to behave rationally and seek realistic outcomes.

Summary

Of the men who truly deserve recognition for the discovery of anesthesia, only Clarke and Long went on to have normal careers and life spans. Long was, in fact, the first person to use general anesthesia for a surgical operation. We shall never know whether it was his lack of ambition, his indifference towards rewards and recognition, his strong religious beliefs, or his supportive family that allowed Long to accept with fortitude the results not only to themselves but also their loved ones? An intense desire for recognition, fame, and wealth offers only part of the answer. Most likely, it was their inability and unwillingness to accept the judgment of their peers and the rest of the world. This immaturity, an absence of a suitable framework for resolution of their claims, and the non-existence of psychological treatment compelled these ambitious individuals to seek recognition without giving up, and to engage in self-destructive behavior without considering consequences. If recognition must be given to individuals other than Clarke and Long, we propose the following. Wells deserves credit for the first use of nitrous

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oxide for painless dental extraction, Jackson for suggesting to Morton that ether could be used as an anesthetic, and Morton for the first public demonstration of ether anesthesia.

References

1. Fenster JM. Ether Day. New York, HarperCollins, 2001.
2. Alper MH. The ether controversy revisited. *Anesthesiology* 1964;25:560-3.
3. Wolfe RJ. Tarnished Idol. San Anselmo, California, Norman Publishing, 2001.
4. Rice NP. Trials of a public benefactor. New York, Pudney and Russell, 1859.
5. Bigelow HJ. Insensibility during surgical operations produced by inhalation. *Boston Medical and Surgical* Journal 1846;35:309-17.
6. Anonymous. Massachusetts Medical College – Dr. Jackson's remarks [communication]. *Boston Medical and Surgical Journal* 1847;36:180.
7. Wells H. A history of the discovery of the application of nitrous oxide gas, ether and other vapors, to surgical operations. 1847. Hartford, J Gaylord Wells.
8. Wells H. The discovery of ethereal inhalation. *Boston Medical and Surgical Journal* 1847;36:298-301.
9. Lyman HM. Biography of eminent American physicians and surgeons. Indianapolis, Carlton & Hollenbeck, 1894, p 89.
10. Lyman HM. The discovery of anesthesia. *Virginia Medical Monthly* 1886;13:369-92.
11. Long CW. An account of the first use of sulphuric ether by inhalation as an anesthetic in surgical operations. *Southern Medical and Surgical Journal* 1849;5:705-13.
12. Davy H. Researches, chemical and philosophical; chiefly concerning nitrous oxide, or dephlogisticated nitrous air, and its respiration. London, J. Johnson, 1800.
13. Kleiman M. Histoire de l'anesthesie. *Anesth.et analg* 1939;5:122-38.
14. Keys TE. The history of surgical anesthesia. Huntington, New York, Robert E. Krieger Publishing Company, 1978.
15. Archer WH. Life and Letters of Horace Wells: Discoverer of Anesthesia. *Journal of the American College of Dentists* 1944;11:2.
16. Bigelow HJ. A History of the Discovery of Modern Anaesthesia, A Century of American Medicine. Philadelphia, Henry C. Lee, 1876, pp 73-112.
17. Wolfe RJ, Menczer LF. I awaken to glory. Boston and Hartford, The Boston Medical Library in The Francis A. Countway Library of Medicine; and The Historical Museum of Medicine and Dentistry, 1994.
18. Unknown. *Boston Daily Journal* 2, 10-1-1846.
19. Jackson CT, Morton WTG. The patent Letheon - Jackson and Morton's specification. *Boston Medical and Surgical Journal* 1847;36:194-8.
20. Channing W. A case of inhalation of ether in instrumental labor. *Boston Medical and Surgical Journal* 1847;36:313-8.
21. Hayward G. Some account of the first use of sulphuric ether by inhalation in surgical practice. *Boston Medical and Surgical Journal* 1847;36:229-34.
22. Anonymous. Employment of sulphuric ether vapor in Montreal, Quebec, and Sherbrooke [Commentary]. *Boston Medical and Surgical Journal* 1847;36:228.
23. Warren JM: Inhalation of ether. Boston Medical and Surgical Journal 1847; 36: 149-62.
24. Anonymous. Use of letheon in London. *Boston Medical and Surgical Journal* 1847;36:96-101.
25. Fisher FW. The ether inhalation in Paris. *Boston Medical and Surgical Journal* 1847;36:109-13.
26. Peirson AL. Surgical operations with the aid of the 'New Gas.' *Boston Medical and Surgical Journal* 1846;35:362-4.
27. Notice. Important information for the public at large. *Daily Evening Transcript*, Boston, 3. 12-4-1846.
28. Morton WTG. Advertisement. *Boston Medical and Surgical Journal* 1847;35:17.
29. T.E.B. Insensibility produced by ethereal inhalation [letter to the editor]. *Boston Medical and Surgical Journal* 1846;35:445-8.
30. Dr. Ashwell. Pain related commentary [letter to the editor]. *Lancet* 1848;53:291.
31. Anonymous. Ethereal intoxication. *Boston Medical and Surgical Journal* 1847;36:183.
32. Wintle FT. Etherization. *Lancet* 1847;52:162-3.
33. Dr Parmele. Value of ethereal inhalation. *Boston Medical and Surgical Journal* 1847;36:48.
34. Porter JB. Medical and surgical notes of campaigns in the war with Mexico. *American Journal of Science* 1852;23:33.
35. Unknown. Distressing case of suicide. *New York Tribune* 2, 1-25-1848.
36. Cox AL. Experiments with the Letheon in New York. *Boston Medical and Surgical Journal* 1846;35:458.
37. Unknown. The discovery of etherization. *Atlantic Monthly* 718-725, 6-21-1868.
38. Unknown. The death of Professor Morton. *New York Herald* 5, 7-17-1868.
39. Anonymous. Heavy Mortality in this city. *New York Post* 2, 7-16-1868.

Book Review: Recent Books

For Fear of Pain: British Surgery, 1790-1850 by Peter Stanley, The Wellcome Series in the History of Medicine, Amsterdam – New York, N.Y., Rodopi B.V., 2003.

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The transformative power of anesthesia is even better understood against the backdrop of painful surgery than it is against modern reference marks. In his excellent book, For Fear of Pain: British Surgery, 1790-1850, Peter Stanley creates a detailed overview of surgery in Britain before anesthesia. In it he shows how, during the run-up to universal acceptance of chemical anesthesia as a human and humanitarian necessity, surgeons, medical students, patients, and British society in general during the Georgian through early Victorian periods coped with and subsequently recast the realities of what are regarded as unthinkable brutalities today. Most importantly, perhaps, Stanley's book draws a sympathetic picture of how this era of human endeavor contains important legacies from which we may continue to draw lessons today.

Students of the history of anesthesia know the definitive work regarding treatment of the emergence and acceptance of chemical anesthesia in the world is Martin S. Pernick's A Calculus of Suffering: Pain, Professionalism, and Anesthesia in Nineteenth Century America (New York, Columbia University Press, 1985).

While not nearly so comprehensive as Pernick's study, Stanley's nonetheless covers much of the same ground with a British accent and Scottish economy, though the author himself is Australian. Each of the eleven chapters, and the Prologue, Introduction, and Epilogue, reads like a standalone essay on a particular aspect of surgery before anesthesia without sacrificing its status as a distinct chapter in a whole story. One could read this book back to front, as I did, beginning with "'The rights of pain': The Acceptance of Anaesthesia" - the chapter where I thought my greatest interest would lie -as readily as from front to back - or anywhere in between - without losing the sense of medicine's ambivalence over both the infliction and relief of surgical pain.

For instance, the first chapter, "'Surgeons and operators': The Surgeon's World" reveals the contemporary British medical scene to be no more or less refined or regulated than our own corresponding Jacksonian period in America. It can be skipped at no cost to the experienced medical history student except the risk of missing some entertaining stuff extracted from source materials such as private practitioners' journals, diaries and ledgers or public records. For instance, using a contemporary's words, Stanley describes the early nineteenth century medical world as "'mixed, jumbled, brayed and blended,'" one in which nearly four thousand qualified or "regular" physicians, surgeons, apothecaries and druggists served Londoners in competition with thousands more "irregulars" such as "'corn-doctors, horse-doctors, tooth-doctors and quack-doctors.'" Similarly, in the same chapter, we read: "The army employed just 142 surgeons in 1793 but over 950 by 1815" and that the East India Company's "Bengal presidency directory" listed 155 surgeons in 1793, a number which increased to 379 by 1837. These facts, while reassuring us that Stanley's research was thorough, illuminate Stanley's central theme as the accumulation of enough highlights might brighten a scene.

Indeed, it is the "characters, aspirations and achievements of the prominent surgeons of Britain and especially their relations with their pupils and patients …" that Stanley intends to form "…the core of this study." And it is in this goal's service that the primary source materials used reveal glimpses of the souls of the surgeons whose portraits hang in the halls and galleries of British hospitals and museums and the patients who, most anonymously, rest in British graveyards. Through trenchant observations recorded by journalists and diarists – both truculent and tender – real human suffering and heroism is displayed. From such sources Stanley constructs wonderful images, like this one from Chapter 9, 'Our little patient': Surgeons and Children:

"Astley Cooper, the most celebrated operating surgeon of his time, is recorded to have lost control of his emotions only once. A Quaker friend brought him his grandchild, a toddler, to ascertain whether Cooper could cut off a naevus – a birthmark. The child smiled so sweetly at Cooper that he turned away and burst into tears. Cooper's reaction, while uncharacteristic of both him and his colleagues, is understandable. And yet, both Cooper and other surgeons did, of course, operate upon children. Painful surgery performed on children is the most distressing aspect for modern readers: as it was for contemporaries."

From such tales and details Stanley limns his portrait of the era. Yet it is from those found in the Epilogue, 'Long fixed in the memory: The Legacy of Painful Surgery,' that one gets the most vivid sense of the impact painful surgery had on the people - great and forgotten, patients and surgeons - who experienced this necessary barbarity.

"The trauma of performing, undergoing or even hearing painful surgery surely did not simply evaporate with the introduction of chloroform," Stanley reminds us.

One gets the sense that a long hangover afflicted the profession after the era, that a sort of collective post traumatic stress disorder continued to influence technique and attitudes well past chemical anesthesia's introduction. In one anecdote we read:

"In 1841, the year before his death, Charles Bell described the sight of a patient on the table. He recalled 'the limbs stiffened though (sic) agonizing pain; the face turgid, the eyes prominent and suffused….' Elsewhere we read that within fifty years of anesthesia's introduction a conventional view of the era – one that we might recognize today - had already developed. In 1896, for instance, the editor of the British journal The Hospital, mark-

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Stanley. . . *Continued from Page 13*

ing anesthesia' fiftieth anniversary, opined that "Anaesthesia…had enabled 'a class of men' to practice surgery who 'would not have been willing – would not, indeed, have been able – to practice surgery at all' before 1846;" and that the surgeon of the painful surgery era was "at best, a 'cultured man, with the skill of the competent butcher.'"

So harsh are the judgments of history that we sometimes denigrate the vanquished – in this case the heroic surgeons and stoic patients of the era - while aggrandizing the victors, the come-lately 'artists' who went on to develop ever more elegant surgeries under the leisure and comfort of chemical anesthesia. If honest, as Stanley's asks us to be, modern readers of history must acknowledge that the era of painful surgery also has its simulacra in other unmet challenges yet facing the medical profession, such as better post-operative pain management or even access to medical services and medical justice.

As a final thought it is useful to think of perhaps another benefit of the era of painful surgery. In English classes it is often taught that the great Romantic poet, John Keats (1795-1821), demurred from continuing his medical education after witnessing surgery, in 1814. If true – and there is no reason to doubt that it is not – might one not be justly tempt to count among the benefits of painful surgery the redirection of Keats's talents away from medicine toward the poet's profession? And if so, might one also be forced to acknowledge that but for the absence of the transformative power of anesthesia, "Ode to a Grecian Urn" or "To Autumn" might never has been written?

Perhaps it is a stretch to think this way. Yet who can say how many others, like Keats, though in their other fields of endeavor, might have been dissuaded from medicine, too, because of it horrors, to a different lasting benefit for humanity? Looking back, then, in our horror and condescension on the era of painful surgery, perhaps we should use such thoughts to help us heed Peter Stanley's injunctions against judging over harshly those who born on the wrong side of some historical bright line. If there is a lesson to be learned from For Fear of Pain, it might just be that complacency, not daring, perpetuates more harm than good.

Book Review: Books from the Past

Cage-birds by H. E. Hervey, Penguin Books (U.K. & U.S.A.), 1940.

By Thomas B. Boulton, M.D., F.R.C.A.
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Book Editor comments: We are honored that Dr. Tom Boulton agreed to review Cage-birds, detailing the extraordinary adventures of Sir Robert Macintosh as a young man during the First World War. Dr. Boulton is Past President of the Association of Anaesthetists of Great Britain and Ireland. He is the author of an absorbing history of that Association and is its former archivist. As Consultant Anaesthetist at Reading and Oxford he knew Sir Robert well.
Those readers who are interested in the difficult struggles to achieve independence and respect by academic departments of anesthesia during the last century would do well to read A History of the Nuffield Department of Anaesthetics, Oxford, 1937-1987 by Jennifer Beinart. The are great parallels to the book This is no Humbug about our own Massachusetts General Hospital, which will be reviewed in a subsequent issue of the Bulletin.

Robert Reynolds Macintosh (1897-1989) was elected as the first Nuffield Professor of Anaesthetics at the University of Oxford, England in 1937.[1] He was therefore, arguably, the first Professor to occupy an endowed chair of anaesthetics in the world.[1,2] Ralph Waters (1883-1979) of the University of Wisconsin was appointed Head of Anesthesia, in 1927, and Full Professor in 1933, but his appointments were

Professor Sir Robert Macintosh, D.M., F.R.C.A. hon. Photograph courtesy of the Association of Anaesthetists of Great Britain and Ireland.

in the Department of Surgery. The money for the endowment for the Henry Isaiah Dorr Chair of Research and Teaching of Anesthesia at Harvard Medical School was available from 1929, but the chair remained unoccupied until Henry K. Beecher (1904-1976) was elected in 1941. This was largely because of prejudice against the recognition of anesthesia as a separate medical specialty.[1,2] However, whatever the priorities, these three, Waters, Macintosh and Beecher, were the undoubted founders of anaesthetics as an academic medical specialty.[1-3]

The Nuffield Chair of Anaesthetics at the University Oxford was endowed by the automobile manufacturer and philanthropist William Morris, Lord Nuffield, (1877-1963). Lord Nuffield donated immense sums to hospitals and medical charities and to the University of Oxford. In the mid nineteen-thirties he was in the process of arranging to endow Nuffield Chairs in Medicine, Surgery and Obstetrics for the newly founded Postgraduate Medical school in the University of Oxford when, to the surprise of the University authorities, he insisted on the foundation of an additional Nuffield Chair of Anaesthetics as a condition of the total endowment. The University hierarchy were as reluctant to recognise anaesthetics as an academic dis-

cipline as was the Harvard Medical School, but they had no choice but to accept. Moreover Lord Nuffield proposed that Macintosh (Mac) should be elected to the Chair. At that time Mac, in private practice in London, was by no means regarded as a national leader of British anaesthesia. However he had administered a dramatically pleasant anesthetic employing one of the then new intravenous barbiturate agents to Nuffield, who had had unfortunate previous experience with inhalational anesthesia.[1,3]

Perhaps not altogether surprisingly, Mac faced a great deal prejudice in the early years both from the University of Oxford and from the British anaesthesia fraternity. His appointment proved to be an inspired choice however. Mac was a strong character and a born leader. He had visited Waters even before his appointment, and he modelled the Oxford Department on that at Wisconsin. In particular he saw the value of recruiting academics from other disciplines, such as physics and pharmacology, into his Department

Cage-birds by H. E. Hervey, the book under review, concerns an episode in Mac's life when at the age twenty he was a Prisoner of War (POW) in the Great War 1914-1918, as a young army officer, well before he qualified in Medicine at Guy's Hospital, London, in 1927 after the war. During his incarceration, and even earlier, he showed much of the courage and organisational ingenuity which, in later years, characterised his long tenure of the University Chair of the Nuffield Professor of Anaesthetics (1937-1965).

Mac was the son of a socially prominent New Zealand Family. He was a keen sportsman and well educated in the tradition of the early twentieth century in the belief of loyalty to the British Empire. Not surprisingly Mac sailed for England in December 1915 at the age of eighteen to join the British army to fight in the Great War. He was commissioned as a Second Lieutenant in the Royal Scots Fusiliers and, a year or so later as a Lieutenant, he transferred to the nascent Royal Flying Corps (R.F.C.) to train as a pilot. H. E. (Tim) Hervey (1896-1990), a similarly educated young Englishman, who became the author of the book Cage Birds, had joined the R.F.C. in 1915. Hervey was awarded the Military Cross and was mentioned in despatches (was given a citation) for gallantry before being shot down by anti-aircraft fire over enemy lines in France in April 1917.[4] Mac was also mentioned in despatches, but fell victim to the German air ace Paul Strähle on May 22nd 1917 and joined Hervey as a P.O.W. at Freiburg. From then on Hervey and Mac were inseparable companions in attempting and organizing escapes.[1] Hervey recorded that "Mac would try anything once"; may be this, too, was reflected in the pioneer days of modern academic anesthesia!

Cage-birds gives an account of the experiences of commissioned officer prisoners of war during the Great War of 1914-1918. It was written by Hervey early in the Second World War of 1939-1945, when he was once again in uniform as an administrative officer in the Royal Air Force (R.A.F.). The book was published in 1940 when the continental Europe was overrun, and the United Kingdom stood alone against the German onslaught. The slim volume of 125 pages, "complete and unabridged," was published in the famous Penguin series of paperbacks. These books, which were priced at one schilling (£UK 0.05: $USA 0.20) did so much to popularize serious reading, both modern and classical, from the thirties onwards. Your reviewer's copy is a reprint of April 1942, published at the time of the darkest days of the Second World War. It is printed on inferior wartime paper. The book was rescued from the section on ornithology in a second-hand bookshop!

The volume begins with an introduction by Mac. He is full of praise for Hervey's exploits both as an aviator and as an escaper, but remarkably modest about his own achievements. The book, though centred on the details of Harvey's (and Mac's) personal experiences, incidentally provides a fascinating gazetteer of escapes and attempted escapes from a number of locations by some of the eight thousand officers from the United Kingdom and the British Empire who were prisoners. They include the activities of the Canadian William Bishop, who had won the Victoria Cross, and the "Zeppelin straffer" Robinson.

The inviolable rules for escaping indicate that the remnants of military chivalry remained amongst the officer class of European nations in those days. Prisoners were sometimes allowed to go for walks outside the places of confinement "on parole"; having given their word not to escape, and none did so. Escape attempts while confined or under guard were expected and acceptable, and if unsuccessful resulted in several weeks of solitary confinement in "jug." Violence against guards during an escape, or if detected subsequently, was absolutely unacceptable.

The varied locations in which P.O.W. officers were imprisoned in Germany were interesting and varied. As their expertise as escapers was recognized by the Germans Hervey and Mac were incarcerated further and further into Germany. First at Freiburg about twenty miles from the Swiss border in the historic University building with its traditional European continental quadrangular design, then in a military fort at Zorndorf over two hundred miles from the frontier, and finally, until the Armistice in 1918, at a former holiday resort complex at Clausthal in the Harz Mountains. In the late nineteen seventies Mac was given a conducted tour of Freiburg by the local Professor of Anaesthetics. "And that," said the Professor with pride, "is our ancient University building." "I know", replied Mac quietly. "I was imprisoned in it." There was a long pause for reflection but, finally, Mac's host came clean. "Professor Macintosh," he said, "my uncle was the Commandant." Subsequently at the World Congress of Anaesthesiologists in Hamburg in 1980, in a session for the pioneers, Mac was unexpectedly presented with a photograph of the Commandant in the magnificent full dress uniform of the Kaiser's army (personal recollection). Fortunately Mac had a rather more benign recollection of the Commandant than Harvey appears to have had, judging from his book!

At Zorndorf the British contingent was joined by the youthful Lieutenant Brian Horrocks of the Middlesex Regiment, who had a formidable reputation for escaping, but had so far been recaptured. Harvey, Mac, and Horrocks became firm friends and confederates. Horrocks became the well known Lieutenant-General Sir Brian Horrocks (1895-1985) who became the successful Commander of the British 30th Army Corps in the 1944 invasion of Normandy. Escape from the fort at Zorndorf proved to be almost impossible because of its massive concrete construction. The prisoners spent their time preparing documents and civilian clothes for their next move. Mac dedicated himself to learning German from a Russian P.O.W..

Mac was involved in many attempts to escape in many different ways, but he and his companions were frustrated by unexpected obstacles or by being caught in the act. In fact he got away as far as the German-Swiss frontier on two occasions, before being recaptured by the Border Guards as the result of strokes of bad luck on both occasions. The first of these escapes was in company with Tim Hervey from the University building in Freiburg. They broke

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From the Literature

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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; I interpret those categories very broadly. Some will concern individuals important in the history of the specialty [i.e., Harvey Cushing or William Halsted] who also achieved in other areas or widely-used equipment such as the stethoscope. 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" on the Anesthesia History Association webpage at www.anes.uab.edu/anesthesia_history_association.htm. I urge readers to send me any citations, especially those not in English, that I may otherwise miss!

BOOKS

Bacon DR, McGoldrick KE, Lema MJ, eds. The American Society of Anesthesiologists: A Century of Challenges and Progress. Wood Library-Museum, 2005. 226pp. Illus. [rev. Mackay P. *Anaesth Intens Care* 34: 403-404, 2006; Waisel DB. *Anesthesiology* 105:863, 2006]

Baker B. Australia's First Anaesthetic Department 75 Years at the RPA. Camperdown, N.S.W.: Jobson Foundation, 2005. 172pp. [Illus., names index; rev. Clarke GM. *Anaesth Intens Care* 34, suppl. 1:46, 2006]

Bock D. The Communist's Daughter. Alfred A. Knopf, 2007. 287pp. [Novel based on the life of Norman Bethune]

Brown K. Catalyst. Brolga Publishing, 2006. 354pp. [Autobiography; rev. Cass N. *Anaesth Intens Care* 34, suppl. 1:46, 2006]

Carr DB, Loeser JD, Morris DB, eds. Narrative, Pain and Suffering. Seattle: IASP Press, 2005. 362pp. [proceedings of a 2003 conference; rev. Cramond T. *Anaesth Intens Care* 34:691-692, 2006]

Cousin M-T. L'Anesthesie-Reanimation en France. Des origins a 1965: Volume 1: Anesthesie; Volume 2: Reanimation. L'Harmattan Editions, 2005. 680pp. [French; rev. Defalque RJ. *Eur J Anaesthesiol* 23:718, 2006]

Dormandy T. The Worst of Evils: The Fight Against Pain. Yale University Press, 2006. 560pp. [rev. Holmes MS. *NEJM* 355:1506-1507, 2006]

Jeffreys D. Aspirin: The Remarkable Story of a Wonder Drug. Bloomsbury, 2004. 335pp. [rev. Giguere RJ. *Chemical Heritage* 24(3):47-48, fall 2006]

Johnson S. The Ghost Map: The Story of London's Deadliest Epidemic—and How It Changed the Way We Think About Disease, Cities, Science and the Modern World. Riverhead/Penguin, 2006. 352pp. [John Snow and cholera; rev. Mullen T. *USA Today* 17 October 2006, p. 7D; Schmid RE. *Birmingham (Alabama) News* 7 January 2007, p. 6F; Sarver A. In These Times 19 December 2006; Shapin S. *New Yorker* 6 November 2006; Howard P. American.com 16 February 2007; *Publishers Weekly* 21 August 2006; History Book Club selection]

Kamen P. All in My Head: An Epic Quest to Cure an Unrelenting, Totally Unreasonable, and Only Slightly Enlightening Headache. Da Capo, 2005. 351pp. [rev. *Publishers Weekly* 6 September 2005]

Karch SB. A Brief History of Cocaine. 2nd ed. CRC Press, 2006. 188pp. [rev. Nunes EV. *NEJM* 355:1182, 2006]

Lamont-Brown R. Humphry Davy: Life Beyond the Lamp. Sutton Publishing, 2004. 199pp. [rev. Kauffman GB. *Chemical Heritage* 24(4):42-43, winter 2006-7]

Merskey H, Loeser JD, Dubner R, eds. The Paths of Pain 1975-2005. Seattle: IASP Press, 2005. 549pp. [rev. Finley A. *Can J Anesth* 53:853, 2006; Rowbotham DJ. *Br J Anaesth* 97:430, 2006]

Ortega RA, ed. Written in Granite: An Illustrated History of the Ether Monument. Plexus, 2006. 71pp. [Illus.; rev. Wildsmith JAW. *Br J Anaesth* 98:155-156, 2007]

Snow SJ. Operations without Pain: The Practice and Science of Anaesthesia in Victorian Britain. Palgrave, 2005. 288pp. [rev. Zuck D. Reviews in History www.history.ac.uk/reviews/paper/zuck.html; author's response at www.history.ac.uk/reviews/paper/zuckresp.html]

Yentis S. A View from the Head End: Medical Cartoons to Ease the Pain. tfm Publishing, 2006. 128pp. [rev. Cass N. *Anaesth Intens Care* 34:406, 2006]

Zorab JSM, ed. Three Pioneer British Anaesthetists [Careers in Anesthesiology series, volume IX]. Wood Library-Museum, 2005. 99pp. [rev. Cooper MG. *Anaesth Intens Care* 34:689, 2006; Sprigge JS. *Br J Anaesth* 97:429-430, 2006; Southorn PA. Anesthesiology 105: 1285-1286, 2006

ARTICLES AND BOOK CHAPTERS

Ball C, Westhorpe RN. Cyclopropane. *Anaesth Intens Care* 34:701, 2006 [cover note; 1 illus., 4 refs.]

Ball C, Westhorpe RN. Muscle relaxants-reversal agents. *Anaesth Intens Care* 34:415, 2006 [cover note; 1 illus., 7 refs.]

Baranick A. B.B. Sankey, honored leader in the field of anesthesiology. *Cleveland Plain Dealer* 20 February 2007 [obituary with portrait ran in the paper on 15 and 16 February 2007]

Barnett R. "The future of the midwife depends on her power to relieve pain." The rise and fall of the Analgesia in Childbirth Bill (1949). *Int J Obstet Anesth* 16:35-39, 2007 [27 refs.]

Baskett P, Simpson P, Carter J. Obituary: John Stanley Mornington Zorab. *Anaesthesia* 61:1024-1025, 2006 [portrait]

Bottiger BW, Baskett P. Tribute to Henning Ruben, MD, FFARCS (I). *European Society of Anaesthesiology* 23:13, summer 2005 [Illus.]

Brodsky JB. The evolution of thoracic anesthesia. *Thoracic Surg Clin* 15:1-10, 2005 [6 illus., 66 refs.]

Budko AA, Shabunin AV, Gribovskaia GA. N.I. Pirogov: "one has to tell the truth" - the celebrated military surgeon worked for many years on the Medical Council of the Ministry of the Interior. *Voen Istor Zh* 2:66-68, 2002 [Russian]

Campagna JA. The end of religious fatalism: Boston as the venue for the demonstration of ether for the intentional relief of pain. *Surgery* 138:46-55, 2005

Cass NM, Brown TCK. The Monash computer-controlled electromyography. *Anaesth Intens Care* 34:569, 2006 [cover note; 1 illus., 8 refs.]

Chang K. C. Frederick Mosteller, a pioneer in statistics, dies at 89. *New York Times* 27 July 2006

Cheney FW. An early example of evidence-based medicine: hypoxemia due to nitrous oxide. *Anesthesiology* 106:186-188, 2007 [Classic Paper Revisited series; illus., 9 refs.]

Cunningham A. Tribute to Jeremy Swan (1922-2005). *European Society of Anaesthesiology Newsletter* 25:11, winter 2006 [Illus.]

Deschner B, Robards C, Somasundaram L, Harrop-Griffiths W. The history of local anesthesia. In: Hadzic A, ed. Textbook of Regional Anesthesia and Acute Pain Management. McGraw-Hill Medical, 2007, pp 3-18 [12 illus., 88 refs.]

Doctor killed, 2 hurt in Lima tanker crash; Inferno from SUV-truck collision melts road, cuts power to 1,400. *Toledo Blade* 16 November 2006 [anesthesiologist Matthew J. Heider, 44]

Dooley S. Physician found dead at hospital. *Quad City [Davenport, Iowa] Times* 29 August 2006 [anesthesiologist Jon Faeth, "dead of an apparent suicide"]

Dr. Kenneth Bruns: Longtime physician in St. Louis area. *St. Louis Post-Dispatch* 23 October 2006 [anesthesiologist died 18 October 2006]

Dr. Marc Balin. *Willoughby [Ohio] News-Herald* 29 October 2006 [Dr. Balin, 88, a native of Warsaw, Poland, was "the first anesthesiologist in Lake County" and died 17 October 2006]

Flannery MA. Civil War Pharmacy: A History of Drugs, Drug Supply and Provision, and Therapeutics for the Union and Confederacy. Pharmaceutical Products Press, 2004. 358pp. [Includes anesthetics; rev. Higby GJ. *Bull Hist Med* 80: 774-775, 2006]

Giesecke M. Saying goodbye to Betty P. Stephenson, M.D.—1927-2006. *ASA Newsletter* 70(11): 15-16, November 2006 [portrait]

Gonzalez de Pablo A. Animal magnetism in Spanish medicine (1786-1860). *Hist Psychiatry* 17: 279-298, 2006

Goodman R. Dr. Edward Lowe lived 14 years with new heart. *Cincinnati Enquirer* 14 September 2006 [portrait; retired pediatric anesthesiologist died 8 September 2006]

Greenspan RE. Medicine: Perspectives in History and Art. Ponteverde Press, 2006. 596pp. [Illus.; surgery chapter includes anesthesia; rev. Skinner P. ForeWord September/October 2006; Schwartz RS. *NEJM* 355:2408, 2006; Boyer MH. *JAMA* 296:2146-2147, 2006

Ikeda S. The Unitarian Service Committee medical mission: contribution by the United States to post-World War II Japanese anesthesiology. *Anesthesiology* 106:178-185, 2007 [4 illus., 22 refs.]

Jackson K. They Called Them Angels: American Military Nurses in World War II. University of Nebraska Press, 2000; paperback ed. 2006. 211pp. [Some anesthesia; rev. Lusk B. *JAMA* 296:1663, 2006]

John William 'Bill' Temple, M.D. *Fond Du Lac [Wisconsin] Reporter* 14 September 2006 [anesthesiologist died 10 September 2006]

Kim OJ. Experimental sciences in surgery: Harvey Cushing's work at the turn of the twentieth century. *Korean J Med Hist* 15:49-76, 2006 [53 refs.]

Knape HTA. Jan F. Crul: born Batavia, Indonesia July 31, 1922-died Nijmegen, the Netherlands April 28, 2006. *European Society of Anaesthesiology* 27:5, summer 2006 [portrait]

Larson MD. History of anesthesia. In: Stoelting RK, Miller RD, eds. Basics of Anesthesia. 5th ed. Churchill Livingstone, 2006, pp 3-10 [6 illus., table, 18 refs.]

Lee YK. Early history of anaesthetics in Singapore. *Singapore Med J* 47:251-253, 2006 [table, 24 refs.]

Li JJ. Laughing Gas, Viagra, and Lipitor: The Human Stories Behind the Drugs We Use. Oxford University Press, 2006 336pp. [Illus.]

Liu EHC, Lee TL. The teaching of anaesthesia in Singapore. *Ann Acad Med Singapore* 34:140C-142C, 2005 [6 refs.]

Maxwell D. Obituary. Benedict John Barry – 9.2.1936-6.9.2006. Founding editor of *Anaesthesia and Intensive Care*. *Anaesth Intens Care* 34:709-710, 2006 [portrait]

Mayhew J. Peere C. Lund, M.D., F.A.C.A., March 15, 1917-October 8, 2005. *ASRA News* February 2006, p. 11 [Illus.]

Medical Mavericks. Part 1: Anaesthesia. Hosted by Dr. Michael Mosley. BBC4 7 February 2007 [rev. Duff J. *Glasgow Sunday Herald* 27 January 2007; Whtelaw P. *The Scotsman* 8 February 2007; Johns I. *The Times London* 8 February 2007; Wollaston S. *The Guardian* 8 February 2007]

Obituary [Dr. Sania Haroun-Bizri]. *Middle East J Anesthesiol* 18:667-670, 2006 [She died 15 February 2006]

Oransky I. A statistical giant: C. Frederick Mosteller. *Anesthesiology News* 32(12):32, December 2006 [portrait]

Ortega RA, Rengasamy SK. Using digital media to keep anesthesia history alive. *J Anesth* 19:350-352, 2005 [15 refs.]

Ortega RA, Zombricki ER. Ether monument is finally restored! *ASA Newsletter* 71(1):29-30, January 2007 [Illus., 1 ref.]

Pearce JMS. Virginia Apgar (1909-1974): neurological evaluation of the newborn infant. *Eur Neurol* 54:132-134, 2005 [Illus., table, 11 refs.]

Petermann H. Laughing gas: pleasure gas and inhalation anesthetic—experience and action as decisive factors in the history of anesthesia. *Sudhoffs Arch Z Wissenschaftsgesch Beih* 54:227-237, 2004 [German]

Ramsay JG. Remembering John Arthur Hinckley, 1932-2006. *Society of Cardiovascular Anesthesiologists Newsletter* 6(1):1-2, February 2007

Reed TT Jr. Beloved doctor killed in wreck. *Jackson* [Tennessee] Sun 7 February 2007 [portrait; anesthesiologist Ronald A. Homra, 59; see also "Local doctor killed in wreck." *Jackson* [Tennessee] Sun 6 February 2007]

Slutsky A, Stewart T, Laupacis A. William John Sibbald: in memoriam. *Intens Care Med* 32:1945-1946, 2006

Sprung CL, Martin CM, Slutsky AS. William J. Sibbald: in memoriam. *Crit Care Med*

35:1-2, 2007 [portrait, 27 refs.]

Sneader W. Drug Discovery: A History. John Wiley, 2005. 468pp. [Includes anesthetics; rev. Slater LB. *Chemical Heritage* summer 2006;24(2):43]

Straus E, Straus A. Medical Marvels: The 100 Greatest Advances in Medicine. Prometheus Books, 2006. 425pp. [Includes anesthesia, aspirin, blood transfusion; rev. Bagchi S, et al. *JAMA* 296:706-707, 2006]

Tan SY, Sung H, Wong C. Medicine in stamps: Crawford Long (1815-1878): father of modern anaesthesiology. *Singapore Med J* 46: 598-599, 2005 [illus., 10 refs.]

Ulman YI. The early steps of chloroform anaesthesia in Turkey during the Ottoman Empire in the 19th century. *Ann Fr Anesth Reanim* 24:377-382, 2005 [43 refs.]

Vondas J. Anesthesiologist proud to call American home. *Pittsburgh Tribune-Review* 20 October 2006 [portrait; Ashok Navalgund died 18 October 2006]

Whalen FX, Bacon DR, Smith HM. Inhaled anesthetics: an historical overview. *Best Pract Res Clin Anaesthesiol* 19:323-330, 2005

Zerwas JM. Lessons from a legend: Betty Pearce Stephenson, M.D. January 31, 1927-September 17, 2006. *ASA Newsletter* 70(11):3, 16, November 2006 [Illus.]

This Month in Anesthesia History*

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

1755 April 15: Samuel Johnson's Dictionary of the English Language is published. The work is considered a landmark of its kind, but does not contain the word "anaesthesia" which was in limited use in English at the time. Used by the ancient Greek and Romans, the word did appear in several English language dictionaries before Johnson's, including Phillips, The New World of Words: or, Universal English Dictionary (6th. Ed., 1706), followed by Bailey, Universal Etymological English Dictionary (1721); James, Medical Dictionary (1743); and the New and Complete Dictionary of Arts and Sciences (1754).

1760 April 13: Thomas Beddoes is born at Shifnal, Shropshire, England. He received his M.D. from Oxford in 1786. In the late 1780s Dr. Beddoes began attempts to implement Joseph Priestley's idea for the therapeutic applications of "factitious airs" or gases. By 1798 Beddoes had established the Pneumatic Institute in Clifton, England, and hired the teenage Humphry Davy as Research Director. Their experiments with nitrous oxide and many other gases began the following year. In December 1799 Beddoes published a pamphlet which is the first extensive description of some of these experiments—the first human inhalations of nitrous oxide—and which preceded Davy's famous book by six months. Among numerous other medical and political works, Beddoes authored the classic Observations on the Nature of Demonstrative Evidence [1793], the first work in English to discuss the great German philosopher Immanuel Kant's Critique of Pure Reason. His son, Thomas Lovell Beddoes [1803-1849], was also a physician and author. Beddoes died in Clifton, near Bristol, on December 24, 1808.

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.

1790 April 17: Benjamin Franklin dies in Philadelphia. In addition to his many other achievements, Franklin participated in the first investigation of the animal magnetism claims of physician Franz Anton Mesmer. In 1781 Mesmer left Vienna and relocated in Paris, where the popularity of his claims of healing continued. Wolfgang Amadeus Mozart performed a musical play in Mesmer's honor; Queen Marie Antoinette was also a follower. However, King Louis XVI did not fall under Mesmer's spell and asked the French Academy of Sciences to investigate his therapeutic claims. Franklin was one of the many notables appointed to this commission. [See. for instance, McConkey KM, Perry C. Benjamin Franklin and Mesmerism, revisited. *Int J Clin Exp Hypn* 50(4):320-331, October 2002] Mesmer's life is depicted in the 1994 film Mesmer starring Alan Rickman.

1799 April 17: In a letter published in Nicholson's Journal, Humphry Davy announces to the world that nitrous oxide can be inhaled by humans. "I have this day made a discovery," he wrote, "which, if you please, you may announce in your Physical Journal, namely that the nitrous phosoxyd or gaseous oxyd of azote, is respirable when perfectly freed from nitric phosoxyd (nitrous gas)." This observation resulted from work on various gases done by Davy, Dr. Thomas Beddoes and others at Beddoes' Pneumatic Medical Institute in Clifton, near Bristol, England. In July of 1800 Davy published his massive book on this gas research, Researches, Chemical and Philosophical; Chiefly Concerning Nitrous Oxide, or Dephlogisticated Nitrous Air, and its Respiration.

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 by the locals for 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] Andersen died in Copenhagen on August 4, 1875.

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.

1824 April: "Medical Report: Of late our city has been in some danger from another disease, which, as it must have a title, I shall take the liberty of styling an Artificial Epidemic. It has been recently ascertained that the vapour of Vitriolic Ether, when inhaled into the lungs, produces effects upon the brain and nervous system similar to those of the nitrous oxide gas. This fact was no sooner made public than a thousand experimenters started up, including all ages and both sexes. The smell of Ether prevailed every where. Even the little school boys were seen clubbing their pennies to purchase a vial of the exhilarating fluid, which put into a prepared bladder and eagerly passed from one to another, in some unfrequented spot. We might perhaps feel amused at the ridiculous capers supposed to be cut by these groups had no serious consequences resulted from it. But

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having ourselves witnessed the serious indisposition of several young ladies, which could be ascribed to breathing Ether, and heard of two well attested cases in which this practice proved fatal, it behoves us to condemn the use of this fluid by inhalation as highly pernicious and dangerous." —The Port-Folio April 1824, p 326 [The Port-Folio was a Philadelphia newspaper published from 1801 until 1827]

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. "Nevertheless, 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 Keep administers the first obstetric anesthetic in the United States in Cambridge, Massachusetts. Dr. Keep was a prominent physician of the Boston area and the first Dean of Dentistry at Harvard. The patient was Fanny Longfellow, wife of poet Henry Wadsworth Longfellow. In his journal entry for April 1, the famed poet and scholar had noted, "Went to town the first time for several weeks and had a conversation with Dr. Keep about the sulphuric ether and its use." Under ether anesthesia, Fanny did not lose consciousness but felt no pain during the birth of her daughter. She later wrote about her experience, "I am very sorry you all thought me so rash and naughty in trying the ether. Henry's faith gave me courage...I feel proud to be the pioneer to less suffering for poor, weak womankind. This is certainly the greatest blessing of this age and I am glad to have lived at the time of its coming and in the country which gives it to the world..." [See Clark RB. Fanny Longfellow and Nathan Keep. *ASA Newsletter* 61(9), September 1997]

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 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. In his case book, Snow noted, "Administered chloroform to the Queen in her confinement...Here Majesty expressed great relief from the application...the Queen appeared very cheerful and well [after expulsion of the placenta], expressing herself much gratified with the effect of the chloroform." [See Ellis RH, ed. The Case Books of Dr. John Snow. Wellcome Institute for the History of Medicine, 1994, p. 271]

1856 April 12: Dr. Marshall Hall [1790-1857] describes artificial respiration in The Lancet.

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. [He died March 24, 1909]. In 1916 a fascinating account of his experiences under ether anesthesia was published posthumously: "I seemed to traverse whole epochs of desolation and bliss. All secrets were open before me...." he wrote. [Under ether. Personal experiences during an operation. *Interstate Medical Journal* 23:45-49, 1916]. Synge's account is part of a large body of literature related to anesthesia and mystical experiences.

1887 April 27: George Thomas Morton, son of William T.G. Morton, performs first appendectomy.

1898 April: Henry 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." [abstract for Bacon DR, Lema MJ, Yearley CK. For all the world to see: anesthesia at the 1939 New York World's Fair. *J Clin Anesth* 5:252-258, 1993]

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 Darrell 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 sulfa pills 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 crewman 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 To-

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into a church, which had a common wall with the University building, and made a daring escape through a window and across an alleyway when the sentry was at the end of his beat. The second time Mac made his escape by jumping from a train as it left Berlin when he was under escort while being transferred from Zorndorf to Clausthal. He then made good use of the German that he had learnt in Zorndorf by buying a ticket to the nearest town to the border.

Mac was also in uniform again in the Second World War in the R.A.F. as an Air-Commodore (U.S.A. equivalent. Brigadier-General). He was an impressive figure wearing the wings of the former R.F.C.. This time he was in the R.A.F. Medical Branch as Consultant Adviser in Anaesthesia. He was responsible for organising the training in anaesthesia of many young physicians in the United Kingdom and British Dominion and Allied armed services. These included Lucien Morris and the late Ronald Stephen (1916-2006). Mac also advised and developed suitable equipment for military operations, including the Oxford vaporiser (manufactured by Lord Nuffield at his automobile factory) and other ambient air draw over apparatus, and the Macintosh Laryngoscope blade. In addition he conducted drowning survival research in collaboration with his colleague Squadron-Leader Pask.[1,3] Robert Macintosh received the honor of knighthood in 1955.[1]

References

1. Sykes K, Bunker J. Anaesthesia and the Practice of Medicine. Historical perspectives. London: Royal Society of Medicine Press, 2007, pp. 35-104.

2. Kitz RJ, Lowenstein E. The Henry Isaiah Dorr Professorship at Harvard University. The world's oldest endowed chair of anesthesia. *Bull Anesth Hist* 2000;18(2):1-13, 25.

3. Maltby JR. Notable Names in Anaesthesia. London: Royal Society of Medicine Press, 2002, pp. 120-2, 154-6, 160-3.

4. White RGI. Obituary. Tim Hervey. Never say don't fly. *The Guardian* 1990 June 6th, p. 41.

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kyo [1943] and Run Silent, Run Deep [1958] and on the 1950s television series, The Silent Service. This event was also featured on the Cavalcade radio program episode "Pharmacist's Mate" broadcast on May 23, 1943, and starring Will Geer. Lipes' obituary appeared in the *New York Times* on April 20, 2005.

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