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Rectal Analgesia for Labor and Delivery: An Historical Assessment

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Parturition is one of the most painful experiences a woman has to endure. Efforts to improve the quality of pain relief and insure the safety of both the mother and child in the early part of the 20th century included the use of rectal ether. During the 1920s there were minimum monitoring facilities for both mother and fetus, and advocates for pain relief in labor and delivery had to prove their methods safe and efficacious to a disbelieving public. One idea, the use of ether, not by inhalation, but instilled into the rectum, was developed in New York City by the pioneer physician anesthetist, James Gwathmey. He was instrumental in developing, publishing and extending the use of rectal ether as a part of labor analgesia. Gwathmey's efforts to convince his peers of the suitability of rectal ether analgesia, and their hesitancy in adopting the method, is a classic account of innovation, validation, and partial acceptance seen so often in the history of medicine.

Obstetric Analgesia: a Brief Overview

Tremendous cultural influences from the medical profession, religion, and the lay public have impacted obstetrical anesthesia more than other subspecialties in anesthesiology. In the 1840s and 50s, change in the religious connotation of obstetric pain, from one of divine punishment and inevitable suffering to tacit approval, came to pass, especially after Queen Victoria's chloroform analgesia for the birth of Prince Leopold.[1] Chloroform enjoyed a high popularity in obstetric analgesia. Eventually nitrous oxide and oxygen was recommended as a substitute for chloroform; however, it had the disadvantage of being rather expensive and practically requiring an expert for its successful and safe administration, so this method was unavailable for a large number of childbearing women.[2] Ether proved itself an excellent analgesic and anesthetic in the latter half of the second stage of labor and for actual delivery.[3]

After the American Civil War, women formed many groups to improve the social, political and legal status of women and children. The early feminist movement campaigned for reliable obstetrical analgesia and anesthesia. As the nineteenth century came to a close, this lay movement embraced the concept of twilight sleep, a combination of scopolamine and morphine. The National Twilight Sleep Association was formed in 1914 in USA. Thirteen years later the National Birthday Trust Fund was founded in Great Britain for the welfare of all women. Twilight sleep required an expert and was practiced in a few well-equipped institutions where surroundings could be made to suit the requirements and where an exacting technique was developed.[2] This analgesic regimen often resulted in restless and maniacal behavior of the patient, prolongation of labor and a greater incidence of operative deliveries. The direct depressing effect of drug on baby likewise resulted in an increased fetal mortality.[3]

Rectal analgesia: an overview

The use of ether rectally for anesthesia dates almost to its discovery as a surgical anesthetic. Between 1847 and 1884, the technique of instillation of either liquid or vapor ether in the rectum and the subsequent development of anesthesia was well known. Complications, including death from overdose and melena were reported. At the turn of the 20th century, Cunningham and Lahey reported 41 cases of rectal analgesia using vapor instead of liquid ether.[4] James Tayloe Gwathmey, a physician anesthetist working at the New York Lying-in Hospital, became interested in this technique. A demonstration by Professor George Bremer, the principal chief surgeon using rectal ether, prompted Gwathmey to pursue rectal analgesia for obstetrics. He sought the resources of Professor of Pharmacology George Wallace, New York University College of Medicine, and attempted to refine and simplify the technique.

Our first attempt at simplifying rectal anesthesia consisted in introducing a five percent solution of ether in normal saline into the rectum of a dog. The experiment was a failure, as not enough ether could be administered in this way to induce anes-

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Anesthesia History Association Annual Dinner Meeting

Roderick K. Calverley, M.D., Memorial Lecture
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Merel Harmel, M.D.
Professor and Chairman Emeritus
Department of Anesthesiology
Duke University Medical Center

Tuesday, October 20, 2009
6:00 PM to 9:00 PM

Windsor Court Hotel
La Chinoiserie Ballroom
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New Orleans, LA 70130

Harvey Cushing and Rana Pipens

To the Editor:

Many thanks for publishing the fine article by Theodore A. Alston, M.D., Ph.D., about the role of the frog in contributing to our understanding of many of the basic science underpinnings in anesthesiology.[1] May I suggest that we must also not forget the work of another pioneer in the neurological sciences[2] who has contributed so much to our specialty and who, like the author of this paper, also trod the storied halls of the many institutions associated with Harvard Medical School - Harvey Williams Cushing. In a paper published in 1901,[3] Cushing emphasized the importance of Ringer's work by using an infusion preparation of hind-leg vessels of the frog. Cushing's preparation is most aptly described by John Farquar Fulton in his superb biography of Cushing,[4] that "…he was able to prove that pure sodium chloride in a solution of 0.7%, abolishes the capacity of the muscles to respond to stimulation of its nerves, but if potassium chloride and calcium chloride, .03 to .06 percent, were added, the irritability of the muscle was restored and it would respond again to stimulation." From this, Cushing argued that solutions of saline administered to human subjects should have a carefully balanced ionic component.

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[2]Albin, MS. Harvey Cushing (1869-1939) and his mysterious paper on intracranial hypertension. In: The History of Anaesthesia, RS Atkinson, TB Boulton, Eds., Parthenon Publishing Group; Camforth, 1987, pp. 533-39.

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Analgesia. . . *Continued from Page 41*

thesia. Furthermore, the ether parted from the mixture too rapidly, and so experimentation along that line was abandoned. Later it occurred to me that mixing the ether with oil might be a solution. Experimenting with several kinds of oil, it was found that ether mixed well with oil in any proportion, without stratification, and that it parted from the oil only by vaporization. Experiments with oil-ether mixtures in the dog's rectum were entirely satisfactory from the start. Sphygmographic tracings taken from dogs that were given a mixture of three parts ether and one part oil showed that respiration, pulse, and carotid blood pressure were automatically maintained evenly. The experiment was repeated a number of times, with the same result; no untoward effects were observed in any case.[5]

In collaboration with Dr. Asa B. Davis, Chief Surgeon of the New York Lying-in Hospital, Gwathmey developed a new method known as the Gwathmey synergistic analgesia in obstetrics. Gwathmey's objective was to find a method of relieving childbirth pain which would in no way endanger the life or health of mother and child, would be simple to administer, inexpensive and in which well standardized drugs only were used. If the technique did not require the services of an expert for its administration, then the method could be used at home as well as in hospital. This ideal labor analgesic technique produced a state of relaxation and analgesia with consciousness and was used in several hundred cases of childbirth in the New York Lying-In Hospital before it was announced to the profession.[6]

Technique

Gwathmey initially used 5% ether in saline. This mixture resulted in failure as the ether parted from the saline rapidly resulting in explosive losses. Gwathmey then used an oil/ether mixture in a 1:3 ratio. After the instillation of rectal ether via McCormick's apparatus (Figure 1), analgesia occurred in 45 minutes and lasted from 2-6 hours. Most multipara patients required 1-2 instillation. In parturients with a tumultuous labor, amnesia was achieved using pentobarbital 0.1-0.2 g, but not to exceed 0.6 g rectally.

The oil-ether mixture was placed in the metal cylinder below the pressure bulb (A) (Figure 2). The 22 French red rubber catheter (F) was inserted into the rectum. The stop-cock (C) was opened and with several compressions of the bulb, the mixture flowed into the large intestine. The William H. Armstrong Company Flyer, also has several caveats to the administration. Rapid compression of the bulb, and presumably rapid instillation, could cause colonic spasm. The 22 French catheter was necessary since larger tubes cause the mixture to be instilled too freely and was responsible for a less than effective anesthetic. Additionally, it was necessary to ensure that the catheter did not coil in the rectum, but could be guided with a gloved finger beyond the rectum. Finally, the flyer recommended that the solution be administered between and not during contractions.

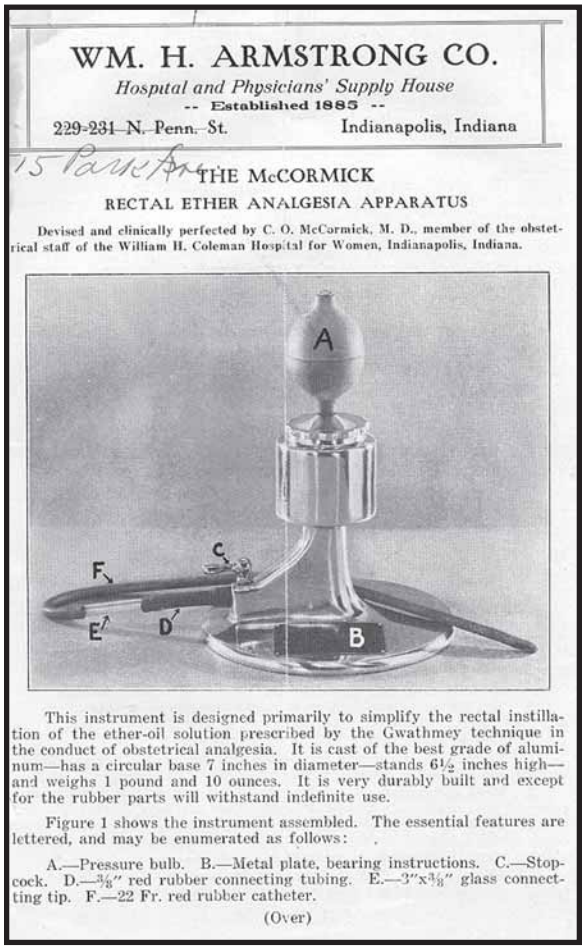
Fig. 1. McCormick Rectal Ether Analgesia Apparatus. Photograph courtesy of the Wood Library-Museum of Anesthesiology.

Gwathmey's method is summarized in Table 1. Note again that it is essential to ensure that the catheter was beyond the baby's presenting part. It was also important to have the colon "cleaned out," hence the need for the soapsuds enema.[7]

From New York to the World

Gwathmey was convinced that rectal ether was a superior method of obstetrical analgesia. He found that the advantages of rectal ether included no nausea, no vomiting, no stage of excitement and the ease of administration and ability to instruct the nurses about the procedure.[8] Gwathmey further affirmed that fetal outcome was good, with the majority of infants born crying, either an "A" or "B" (see Table 2).[9]

Other physicians began to employ this technique including Charles E. Hunt of Eugene, Oregon, who in 1924 started using this technique because it came closest to the ideal labor analgesic. Hunt developed a questionnaire that he sent to 180 leading obstetricians. The responses, he felt, would be representative of the most careful and better trained obstetricians of the country. One hundred twenty replies were received. Eighty-seven percent of those who answered were using Gwathmey's method, which represented the high popularity and wide acceptance of this technique. Eighty-two percent were favorably impressed. As compared to twilight sleep, 92% preferred this technique. The same



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THE McCORMICK

RECTAL ETHER ANALGESIA APPARATUS

Devised and clinically perfected by C. O. McCormick, M. D., member of the obstetrical staff of the William H. Coleman Hospital for Women, Indianapolis, Indiana.

This instrument is designed primarily to simplify the rectal instillation of the ether-oil solution prescribed by the Gwathmey technique in the conduct of obstetrical analgesia. It is cast of the best grade of aluminum—has a circular base 7 inches in diameter—stands 6½ inches high—and weighs 1 pound and 10 ounces. It is very durably built and except for the rubber parts will withstand indefinite use.

Figure 1 shows the instrument assembled. The essential features are lettered, and may be enumerated as follows:

A.—Pressure bulb. B.—Metal plate, bearing instructions. C.—Stop-cock. D.—⅜" red rubber connecting tubing. E.—3"x⅜" glass connecting tip. F.—22 Fr. red rubber catheter.

(Over)

Fig. 2. William H. Armstrong Company Flyer Circa 1925. Image courtesy of the Wood Library-Museum of Anesthesiology.

Table 1.

Cleansing enema	Soapsuds enema and then tap water
Magnesium sulphate	2cc 50% and morphin sulphate ¼ grains IM x 3 (2nd, 3rd dose no morphin)
Quinine alkaloid	Grains 20
Alcohol	Minims 45
Ether	Ounces 2½
Petro liq. heavy (or olive oil) q. s. ad	Ounces 4 (conversion factor)
Rectal ether	Placed by special pressure instillator
Catheter	Placed past the presenting part, avoid curling
Instillation of mixture	At the end of a contraction

percentage of effectiveness was claimed in 85-90%. Many thought the method to be the most outstanding advance in obstetrics in the previous 25 years and better than any other current method.[6]

Other physicians modified Gwathmey's technique. F.J. Schoeneck added morphine and scopolamine to the rectal ether, thus combing elements of twilight sleep with Gwathmey's methods.[10] Paul Harper found rectal analgesia invaluable in dry labor, thus demonstrating that this technique was in wide use, including complex cases.[11] Harold A. Peck published his results with this technique in a consecutive series of four hundred personally conducted cases. He had used the Watson's method to induce labor, which makes use of 30 grains of quinine in divided doses by mouth in addition to rectal instillation of ether and quinine. Peck's observations were similar to Gwathmey's. In addition Peck added that this method is certain in relieving pain and can be given at any stage of labor with impunity. Peck's practice was to use the drugs as soon as the patient complained of pain rather than wait for an arbitrary degree of dilatation. There was a higher incidence of forceps application in Peck's patients. Gwathmey stated the incidence of application of forceps was reduced by 50% using rectal ether.

Peck stressed, however, the comparative rarity of maternal and fetal complications. He divided the effect on patients as good, fair and poor. Effect was considered good when the patient was sedated until she was ready for delivery and had little recollection of events; fair when some sedation, somewhat more comfortable, requiring ether inhalation to get them comfortably to the delivery table; poor when little or no sedation. The average results were good in about 65% of cases for all groups, fair in 25%, and poor in 10%. The latter case was attributed to faulty technique, especially the application of the technique too late in a precipitate delivery. Fetal results were equally encouraging with 90% of newborns with a normal breathing pattern. Most of the asphyxiated babies recovered. In the rare event that deaths occurred there was almost always another cause attributed for the death besides the technique and no fetal death ascribed to the method.[12]

Outcome

In 1923, Gwathmey began using rectal ether for obstetric analgesia. At the end of seven years**,** in 1930, he was able to report twenty thousand cases from the Lying-In hospital and three other New York institutions with no increase in morbidity and mortality for either mother or baby resulting from the method. A study of the patient's charts demonstrated that the labor was not delayed, and faulty positions corrected themselves in about the same proportion of cases as in labor without analgesia. Hemorrhages after delivery were less than with inhalation of ether, and finally, the baby was rarely affected and usually was born crying. After analyzing over fifty thousand records covering the two four-year periods before and after introduction of the method, no increase was found in still births, forceps use, or cesarean operation. In the event of forceps or cesarean section, patients were in better physical condition after rectal ether than those from whom analgesia had been withheld during labor. In protracted labor there was increased comfort to patients under rectal ether analgesia.[2]

Table 2.

A	No inhalation, baby crying.
B	Inhalation, baby crying.
C	Inhalation, baby apneic, or asphyxia, slight relief to mother.
D	Failure

By 1942, more than one hundred thousand cases of oil-ether anesthesia in obstetrical cases had been reported in the United States with the consensus of opinion that the method was safe for the mother and child. The only strict contraindication to the method was in the presence of lesions of the bowel. This technique was routinely used in nephritis, eclampsia, and cardiac disease without untoward results.[5]

Disuse

The popularity of rectal analgesia faded, as the use of other agents and techniques proved to be better and more predictable. Demerol, penthrane, and trichloroethylene would supersede rectal ether use. As progress of labor was often assessed by rectal examination, colonic contents were often lost. Analgesia often needed to be supplemented in primiparous women with inhaled ether, nitrous oxide, or cyclopropane. Different techniques to alleviate the pain of labor were tried by others. Dr. Robert Hingson, who worked for United States Public Health Service Hospital, developed another analgesic technique. During the Second World War, while caring for pregnant wives of Coast Guard Seamen, he looked to find a safe and painless method to deliver infants of these women. Using a malleable needle placed sacrally deep to peridural ligament, Hingson developed continuous caudal anesthesia. This method proved safe and effective and was a direct descendant of epidural analgesia for labor and delivery.[13]

Conclusions

Gwathmey, a professional experimenter[14] and a life long proponent of oil-ether rectal anes-

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Analgesia. . . *Continued from Page 45*

thesia, was famous for the original water flow meter, Gwathmey's Water Sight Feed.[15] Along with Baskerville, he published an early comprehensive American textbook on anesthesia in 1914. The use of rectal ether for analgesia during labor and delivery is no different. Gwathmey saw a need for improvement in the current analgesic regimens of his day and set about to change them. As a physician, Gwathmey was concerned with the effects of anesthesia on both the mother and the fetus and reported on both while evaluating his technique. Over time, as somewhat less invasive and more reliable techniques for labor analgesia appeared, rectal ether fell into disuse. Yet, the criteria Gwathmey used to evaluate his technique in laboring patients remains as valid today as it was in the early twentieth century.

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Osler and Chloroform

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In Anthony Trollope's 1882 novel *The Fixed Period*, his protagonist emigrates from New Zealand to the neighboring fictional island of Britannula. There, citizens who had reached the author's own sexagenarian age were slated to avoid personal suffering and public expense by one year's "deposition" into a contemplative "college" prior to their euthanasia by chloroform. In his farewell address in 1905 at Johns Hopkins University, a prankster and soon-to-be Regius Professor of Medicine at Oxford, William Osler, M.D., noted that a "teacher's life should have three periods, study until twentyfive, investigation until forty, profession until sixty…." The 55-year-old Osler then, as he later explained, "jokingly suggested for the relief of a senile professoriate an extension of Anthony Trollope's … *Fixed Period*." Mischaracterized by the press as favoring geriatric euthanasia, Osler and "oslerizing" the elderly became fodder for cartoons (like the example above from the Wood Library-Museum Collection).

Intentional Hypoxic Anaesthesia

by J. George Thomson M.D.
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(deceased; born June 1, 1927, died May 30 2006)
and
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Implication Statement

This paper, a memoir by Thomson, illustrates observations pertinent to the history of anesthetic practice that may not be evident from either traditional historical sources or the literature of the time. Chief among these is the importance of advances in basic respiratory physiology, neurophysiology, and pharmacology to the safety of anesthesia.

To my friends and former colleagues in the Halifax Infirmary Department of Anaesthesia, I offer these recollections from retirement, more in the hope than the belief that they may provide an occasional moment of interest or entertainment.

"Forty years on, growing older and older, Shorter in wind, as in memory long…" (Harrow School Song)

"I grow old…I grow old…
I shall wear the bottoms of my trousers rolled…" (T. S. Eliot, Love Song of J. Alfred Prufrock)[1A]

A personal recollection of experiences with this form of anaesthesia, together with sundry philosophical observations on changes in anaesthesia during the last forty years, the whole embellished with literary and biblical quotations, and suitable to be read by children. (J. George Thomson, MB BS FRCP(C))

"And for to passé the tyme thys book shal be pleasaunte te rede in, but for to gyve faythe and byleve that al is trewe that is conteyned herin, ye be ay your lyberte." (Caxton, Preface to Malory's Morte d'Arthur, 1485)[2]

On January 22, 1666, Samuel Pepys attended a meeting of the Royal Society, and wrote in his diary – "But what, among other fine discourses, please me most, was Sir G. Ent about respiration, that it is not to this day known or concluded on among physicians, not to be done either, how that action is managed by nature or for what use it is. Here late, until poor Dr. Merritt was drunk; and so all home, and I to bed."[B,3,4]

Two hundred years after Sir G. Ent's puzzlement and poor Dr. Merrit's hangover, knowledge of respiration, oxygen, and the nature of hypoxia, was still far from perfect. A mid-nineteenth century correspondent to the Lancet wrote (rather defensively, perhaps) that of course his patients under chloroform were often blue, because chloroform contains carbon, and carbon, as everybody knows, is blue in colour.[C]

But it was nitrous oxide, rather than chloroform, that was most closely associated with hypoxia, and for many years up to and including my own professional lifetime, hypoxia was not only tolerated, but actively used in the production of anaesthesia.

Nitrous Oxide

"…a drowsy numbness pains my sense…" (Keats, Ode to a Nightingale)[1D]

If pure nitrous oxide is given until the patient becomes unconscious and then discontinued, there will be a period of about twenty seconds during which there will be enough anaesthesia or analgesia to pull a tooth, incise an abscess, or set a fracture. This was the basis of the so-called "smash-and-grab" technique, especially applicable to dental extractions.

This technique was still very much alive when I was a student,[E] and I used it a great deal during the early part of my career, mainly in emergency departments. One would start by turning the gas[F] on, and holding the mask a little off the face until analgesia set in, then holding it tight on the face until the patient became "dusky" (euphemism for cyanotic), or even developed "jactitations" (euphemism for anoxic convulsions). You then had about twenty seconds before the patient came round.

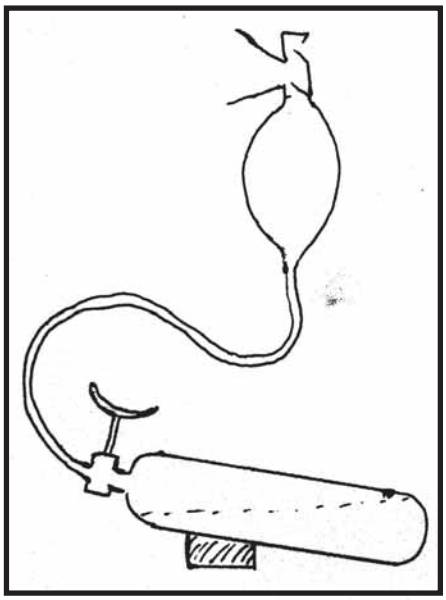

Fig. 1

This was regarded as very much a minor type of anaesthetic, and as a result one

Continued on Page 48

[A] Page 876.
[B] The reference to Dr Marriot is entirely missing from the 1953 edition (reference #2), but as quoted by Thomson in the 1900 edition.
[C] I have been unable to find this reference.
[D] Page 506.
[E] Middlesex Hospital Medical School 1950-54, where he served as a surgical dresser, a term that covers workers who provide a range of varied assistance tasks to operating theatre personnel. Common occupational titles also include theatre orderly, theatre wardsperson, or operations assistant. Surgical dressers (medical students) provided many anesthetics.
[F] Thomson uses "gas" to mean "nitrous oxide" throughout most of the paper.

Hypoxic. . . *Continued from Page 47*

had to be in very poor shape indeed to be rejected for this technique. It was not uncommon for a patient with advanced COPD, or a history of recent MI, to evoke a medical consult saying "fit for gas" (as being preferable to a more potent agent).

Many of these gas anaesthetics were given in dentists' offices by GPs, using a basic "gas machine," (Figure 1), which consisted of a pair of N_2O cylinders (one running, one reserve) lying somewhat tilted on the floor (so that liquid N_2O would not squirt out into the tubing). The cylinders were turned on and off by foot pedals, and the gas issued into high pressure tubing to the reservoir bag, at the other end of which were a pair of non-re-breathing valves and the mask.

At one stage, I encountered an early form of day-surgery facility, where tonsillectomies were done on school children as out-patients. A GP gave gas anaesthetics for this procedure, using the same method and apparatus that he used for dental extractions. As tonsillectomies (by guillotine) took forty seconds or so, as compared to twenty seconds for a dental extraction, he would simply administer N_2O for a longer time, so that the patient went from blue to black before he removed the mask and allowed the operation to proceed. Presumably, if the patient progressed to greyness the absence of bleeding was regarded if anything as being helpful. This doctor had ceased to practice by the time I arrived so that I was never privileged to see him in action.

[A] *Page 260.*
[B] *thiopental*
[C] *with 100% nitrous oxide*
[D] *General House Surgeon, George Eliot Hospital, Nuneaton, March – September 1954; Junior Resident, Obstetric and Gynaecological House Surgeon," George Eliot Hospital, Nuneaton, October 1964 – March 1955:"[He] has administered numerous anaesthetics. Several of these have been for emergency procedures such as application of forceps, inevitable abortion, etc. Others have been for routine operations, including appendectomies, …. In my opinion Dr. Thomson is quite competent to administer routine simple anaesthetics, although of course he will need instruction for the more complicated methods." From letter of recommendation, Edith Merry, Consultant Anesthetist, George Eliot Hospital, 2 February, 1954.*

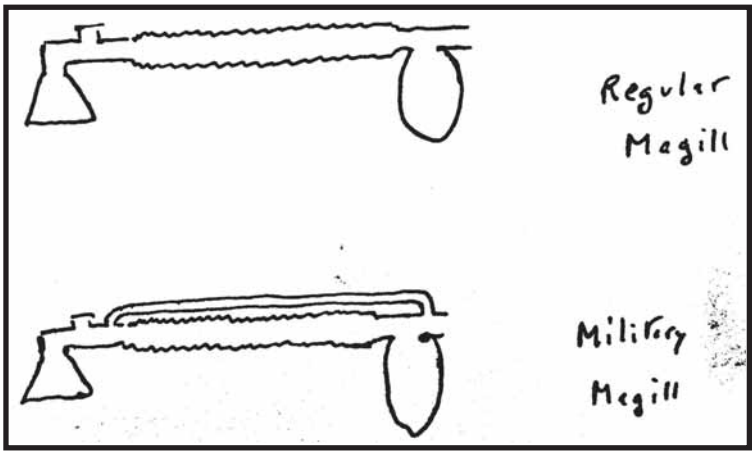

Fig. 2.

For more extended procedures, one could induce with 100% N_2O, and then add up to 10% O_2, at which level anaesthesia could be maintained precariously, but theoretically indefinitely. With practice, it was possible to become quite proficient at this, but it was essential to have an appropriate apparatus and circuit.

The Anaesthetic Circuit

"I wind about, and in and out…" (TENNYSON, The Brook')[5A]

There were two essentials for N_2O-O_2 anaesthesia; first, no re-breathing, as 90% N_2O and 10% O_2 leave no room for CO_2 or N_2; and secondly, small changes (± 2%) might be necessary to control the level of anaesthesia, and these changes had to be rapidly effective, or the patient would either wake up or go into convulsions.

In the case of the simple gas machine, non-re-breathing was assured by the presence of the valves, while control of percentage mixtures did not arise, as there was no oxygen on the machine. The addition of an oxygen cylinder, with flow-meters for O_2 and N_2O, enabled gas-oxygen anaesthesia to be given, while with the subsequent addition of a Boyle's ether vaporiser, the Boyle's machine was born.[6] Before the days of Pentothal,[B] a gas-oxygen-ether induction was much more pleasant for the patient than an open ether induction. The patient was gassed off to sleep,[C] the 10% O_2 was added and then ether was cautiously added. As the ether began to take effect, the proportion of oxygen could be gradually increased until the maintenance mixture of N_2O 80% - O_2 20% - Ether was reached.

Incidentally, in my student days any oxygen percentage above twenty was considered to be quite pointless if not actually undesirable, as, if the patient was not adequately oxygenated on this, the minute volume must be inadequate. This was before the days of general understanding of such esoterica as ventilation-perfusion relationships. Indeed, one textbook authority went even further, and suggested that any O_2 concentration above 6% was a ridiculous extravagance, as that is the difference between the inspired and expired concentration and that is all that need be provided.

Despite the advantages of the Boyle's apparatus, many anaesthetists would only use it until the desired anaesthetic depth had been achieved, and then switch over to open ether, with re-breathing under a towel, as prolonged use of a non-re-breathing circuit like the original Boyle was wasteful of anaesthetic and chilled the patient, while a degree of re-breathing was thought to be beneficial in conserving heat, water vapour, and anaesthetic. It also depleted oxygen and conserved CO_2, but this was either not considered to be harmful, or not considered at all.

I have seen patients undergoing abdominal surgery with deep open anaesthesia (ether with mask and towel) with slow bounding pulse, plum-coloured complexion, and blood oozing everywhere, with the anaesthetist indicating proudly that the patient was in good condition (i.e., not "shocked").

Then came Magill, who modified the original circuit by moving the bag back to the machine from near the patient's face; connecting it to the mask by wide-bore tubing to minimize resistance; and, most importantly, by eliminating the inspiratory one-way valve. During N_2O and N_2O-O_2 induction, re-breathing could still be minimized by using high flow rates, while during maintenance with ether added, the flow rate was reduced to permit re-breathing.

My first experience with the Magill circuit was as an intern,[D] when I gave a few gas-oxygen-ether anaesthetics for appendectomies. When I was drafted into the

army I was sent for three weeks crash training in a reasonably large military hospital,[A] where I learnt to intubate and use Pentothal and relaxants, and was also introduced to the McKesson intermittent-flow machine (of this more later). I was then posted to the British Military Hospital in Berlin,[B] which I found to my alarm was a small set-up designed to service one independent brigade, which was the total British military presence in Berlin. It was equipped with an all-purpose portable anaesthetic apparatus intended for both major surgery and straight gas-oxygen cases. I also found to my alarm that I was the sole anaesthetist. In fact, due to the isolated situation of Berlin, the nearest help and advice was 150 miles away in West Germany, with a large number of uncooperative Russians and East Germans in-between.

Had there been anyone to ask, I would have liked to ask about the Magill circuit provided, which had a narrow tube running parallel to the main wide-bore tube, between near the bag and near the expiratory valve (Figure 2). On further investigation, by sticking my finger in it, I was nonplussed to find the tubing completely obstructed by a metal septum (Figure 3). Nevertheless, I decided to use it anyway (I had nothing else to use), and to my relief I found it seemed to work very well, and in fact it was much easier to use than the regular Magill when it came to straight gas-oxygen anaesthesia. In retrospect, of course, what I was using was later to be classified as a Mapleson B,[7] designed to fit conveniently into the common gas outlet of the Boyle's machine without leaving any unattached loose ends (Figure 4).

The reason for the Mapleson B being easier to use than the Magill for un-supplemented gas-oxygen became apparent. In the Magill, any change made to the inspired mixture by adjusting the flow meters had to be transmitted through the machine above the vaporizers, and via the bag and length of the wide-bore tubing, before reaching the patient and becoming effective, i.e., the machine dead-space in this setup was considerable, residing mainly in the bag and wide-bore tubing.

With the Mapleson B, the bag and tubing were effectively by-passed, thus rendering changes in the mixture more rapidly effective, and the level of anesthesia easier to control.

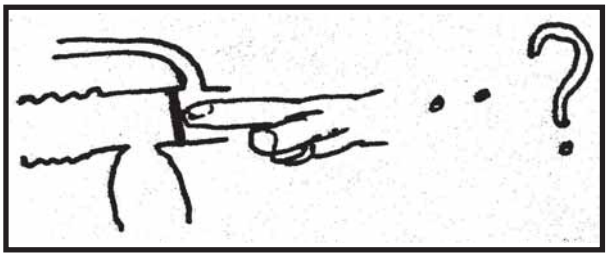

Fig. 3.

As an all-purpose circuit, the Mapleson B had two additional advantages. First, in the absence of a CO_2 absorber, it was more efficient in expelling CO_2 during controlled respiration (the reverse was true during spontaneous respiration) when compared to the Magill circuit. Secondly, if a leak should develop in the bag, the Mapleson B was much safer. In the Magill, the fresh gas could escape through the leak, and the rest of the circuit would become dead-space, with a potentially lethal accumulation of CO_2. In the Mapleson B, a leak in the bag would simply cause the circuit to neatly convert to an innocuous Mapleson D or Bain-type circuit, as the fresh gas flow is close to the patient (Figure 5).

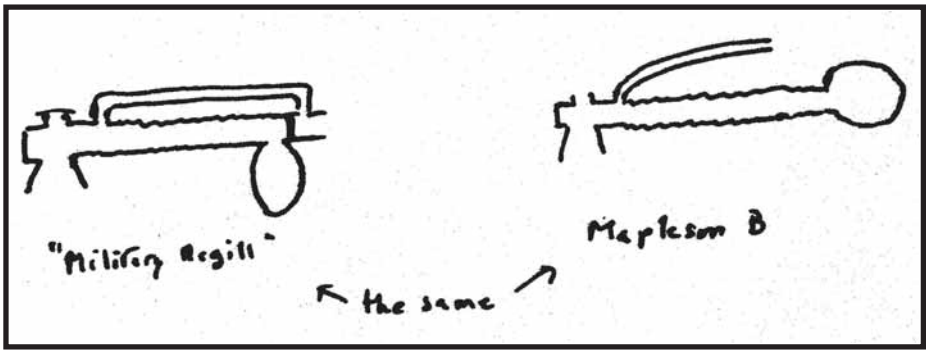

Fig. 4

Although the Mapleson B was an improvement on the Magill for gas-oxygen anaesthesia, the most efficient apparatus in this respect was the rather formidable and intimidating MacKesson machine.[8]

The MacKesson Intermittent Flow Machine

"Yon devilish yron engine…" (Spencer, Faerie Queen)[9]

The MacKesson (and also the Walton series, British machines working on the same principle) had a separate bag for each gas, and a mixing valve graduated in percentages.[10] A spring arrangement ensured that the pressures in the two bags were kept the same, so that the percentages indicated were accurate. The important part of the machine was that the wide-bore tubing of the Magill circuit could be replaced by narrow-bore tubing connecting the mixing valve and the mask, thus reducing the machine dead space to a very low figure. In a Boyle's machine, this would have caused an unacceptable degree of resistance to inspiration, but in the Mackesson, pressure-sensitive valves lifted with each inspiratory effort, delivering the gas mixture under pressure, to be shut off again as the pressure rose with the next expiration.

With this apparatus, the level of anaesthesia was surprisingly easy to control, and I found it possible repeatedly to maintain gas-oxygen anaesthesia for up to half an hour at a time, even in obese alcoholic warrant officers who had seen many years of hard service in bad stations.

Unfortunately, MacKesson, of Toledo, Ohio, the inventor of the machine, let his enthusiasm for un-supplemented gas and oxygen run away with him, and believed that any operation at all including those requiring abdominal relaxation, could be done using only nitrous oxide and oxygen. To achieve this, he advocated what he called "secondary saturation,"[C] which represented what must have been the ultimate form of intentionally hypoxic anaesthesia.

The Secondary Saturation Technique

"The darkness deepens, Lord with me abide…" (Lyte, Evening Hymn)[11]

The patient was induced with 100% N_20, until he went from pink to dusky to blue to black to grey, and then at the very last moment, just as he was on the point of departing this life, a single blast of pure

Continued on Page 50

[A] 1955, Royal Army Medical College, London.
[B] British Medical Hospital, Berlin, June 1955 –May 1956; transferred to British Medical Hospital, Hanover, Germany, June 1956 – March 1957.
[C] This refers to N_2O saturation, not O_2 saturation.

Hypoxic . . *Continued from Page 49*

oxygen was given. As soon as a trace of colour began to return, more 100% N_2O was given, and the whole ghastly process repeated four or five times if necessary, after which muscular relaxation was alleged to be sufficient for abdominal surgery to proceed.

In case any of my gentle readers are reluctant to "gyve faythe and byleve that al is trewe," I have attached photocopies of a paper by Prof. R. Macintosh of the University of Oxford, published in 1941, in which he enthusiastically endorses this technique.[A] By the time I was in medical school, the enthusiasm had waned considerably, although my teachers still mentioned it, albeit with pursed lips and raised eyebrows. Such a method of obtaining muscular relaxation could scarcely expect to survive the epochal work of Griffiths and Johnson in Canada.[13]

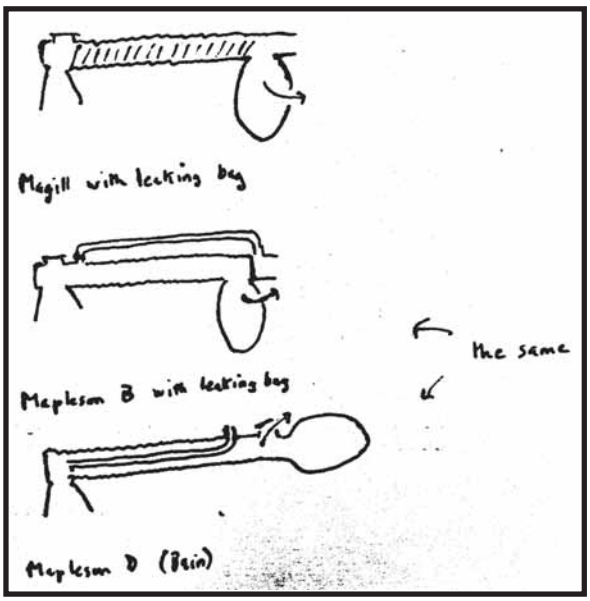

Fig. 5

The MacKesson was an impressive looking machine, with finely engraved numerals on the mixing dials, and I have been informed that some of the early models were decorated, appropriately, with cherubs. The sound of the machine in action, with its hissing, wheezing, and clanking of valves, was oddly reminiscent of the collapsible harmoniums that were sometimes used in the days of my childhood to accompany street corner services of the Salvation Army, Ember Day Bryanites,[B] and similar evangelical missions. It is sombre to reflect that, for some people, these were the last sounds heard on earth.

Return to Civilian Life

"I'll soldier no more, you may do as you please…" (Trad Sam, Sam, pick up thy musket)

I never attempted the secondary saturation while I was in the army, although in Berlin I would have been perfectly free to do so had I wished, as I was alone and unsupervised.

The reason for this was the severe shortage of trained anaesthetists, and for the same reason I was offered inducements to stay on in the Service. These included retaining certain benefits I had already been provided with, such as a suite of rooms and a manservant, and travel between Berlin and the West in a sleeping – car for the old Orient Express, which formed part of the military night train. This enabled me to pass through the Iron curtain in comfort, if not in absolute security, as the blinds had to be fastened down during the journey through the Soviet Zone, and given the prevailing state of hostility at the time, the Russians had indicated that they were entitled to open fire if they saw a light on the train.

Taking everything into consideration, I decided it was time I started to learn my job, and reverting to a much lower income and lifestyle, I became a junior resident in Britain,[C] where I became acquainted with many other aspects of anaesthesia which have since disappeared from the scene.

Mixtures of Anaesthetics

"A foul and pestilent congregation of vapours…" (Shakespeare, Hamlet Act II, scene ii, line 317)

It was not always considered important not to give more than one volatile agent at a time. One popular mixture that I was taught to give consisted of two parts of chloroform to three parts of ether administered on an open mask for guillotine tonsillectomies in children. This mixture was considered to be less cardiologically vicious than chloroform alone, and faster and more pleasant than ether alone. It was certainly preferable to the asphyxial nitrous oxide techniques mentioned earlier, but was given in much the same way. Once the child was asleep, the mouth was opened and a Boyle-Davis gag inserted, with no intubation.[6] The tonsils were guillotined out, and then the child turned on its side and the adenoids curetted. The whole thing took less than a minute.

For the longer procedure of tonsillectomy by dissection, $N_2O - O_2$ – Ether would be given through the side tube of the B-D gag. It was during such a procedure that I was involved in the only explosion of my career. The surgeon was using an electric portable suction in the corner of the room, when a spark from the motor ignited the contents of the bottle, which exploded with a tremendous bang, showering the room with shards of broken glass.

Air Pollution

"And the woodbine spices are wafted abroad…" (Tennyson, Maud)[5A]

[A] *I have been unable to find the quoted reference, but very similar wording is used (unattributed) by Elizabeth AM Frost in Eger's* Nitrous Oxide/N20.[12]

[B] *Thomson was a fan of the poet John Betjeman, who was, like himself, a wag beneath a dignified exterior. In the days when application forms of all kinds had a place for "Religion," it tickled Thomson to enter "Ember Day Bryanite," which perplexed the involved bureaucrats. The fictional sect was invented by Betjeman for the classic short story "Lord Mount Prospect." Its theological joke lies in the juxtaposition of "Ember Day"[14] with "Bryanite." Ember Days, from the Old English* ymbrendæg, *from* ymbrene*: circuit, anniversary +* dæg*: day, are days of solemn prayer to mark the four seasons, and probably predate Christianity in Britain. They were codified at the Council of Placentia of the Catholic Church, A.D. 1095, and remain in the Anglican liturgy. Thus they are not Bible-based, and are very much a creature of the established church. Bryanites, on the other hand, followers of William O'Bryan, were an especially radical branch of Methodism that believed that all liturgy should flow directly from the Bible. Ember Day Bryanites, if they existed, would thus be a hilariously incongruous chimera.*

[C] *Anaesthetic Registrar, Leicester Royal Infirmary, June 1957-1959. "Dr. Thomson has worked in Leicester for 2 years … he worked cheerfully and well, coping largely unaided with the emergencies… [He has had] considerable experience in thoracic anaesthesia." from letter of recommendation dated June 3, 1959.*

An atmosphere laden with volatile anaesthetics was regarded as normal for at least half my time in anaesthesia. Ether, in particular, permeated the whole of one's body, and an anaesthetist could be identified as such by the odour he exuded. On one occasion, I was picked off the floor at the end of a long tonsil list, having become semiconscious after inhaling ether over a period of several hours. Trilene was another notable offender, and when this agent was used for general anaesthesia it almost invariably produced headaches among the operating room staff.

Unexpected Emergence from Anaesthesia

"Tears, idle tears! I know not what they mean…" (Tennyson, The Princess)[1B]

This was much less likely during the days of deep ether anaesthesia than it is today, when patients may be narcotised and paralysed, but not necessarily completely asleep. This certainly could happen at times with the "Liverpool" technique, which involved heavy pre-medication, large doses of Pentothal, curarisation, and hyperventilation with $N_2O - O_2$ only, with no volatile agents added.[15-17] It had the advantage that the patient woke up within about a minute of turning off the nitrous oxide, so that a rapid return to the floor was possible. There being no such places as recovery rooms at that time.

Thoracic Surgery

"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 thereof…" (Holy Bible: Genesis 2:21)

With such a distinguished ancestry, perhaps it is not surprising that thoracic surgeons tend to have a somewhat authoritative manner (but then what about the Anaesthetist?). At the chest hospital where I worked for a couple of years, the Lord God was Sir Thomas Holmes-Sellors, who had consulting rooms in Harley Street, a fashionable town residence overlooking Regents Park, and a country estate in the Chiltern Hills, from which he would be driven to the hospital every day in his Rolls-Royce.[18,19] ("Sir" was in fact a very pleasant chap, as was his anaesthetist Brian Selleck, who was working on his cricoid's pressure technique while I was there).[20]

Although double-lumen tubes were available, they were not much used, and the average lung resection was done with the patient in a modified face-down position, the secretions being sucked out of the endo-tracheal tube instead of running over into what would have been the dependent lung. However, I occasionally had to insert a Carlen's tube into conscious patients' for the purpose of carrying out differential broncho-spirometry, and as midazolam was still thirty years away, I found i/v heroin to be very satisfactory, especially to the patients.

We also did closed mitral valvotomies, using a valvulotome on the surgeon's finger. Monitoring was minimal, with no EKG and no measurement of BP, even by cuff. "What's the use of trying to measure the blood pressure when there isn't any?" my boss would ask, as Sir struggled to disimpact his finger from the mitral valve. Despite the absence of a heart-lung machine, we also did closures of primary ASD's under hypothermia, with the patient anaesthetised with ether for maximal vasodilatation and immersed in an old iron bath tub filled with ice cold water. We still didn't measure the BP, but at least we measured the temperature.

The point of hypothermia, of course, was to slow down cerebral metabolism so that a longer period of asystole was possible. Dr Selleck told me that he had come across a fellow at another hospital who was trying an alternative method of slowing metabolism based on the principle that most metabolic processes are subject to the Law of Mass Action, and by allowing the end product (CO_2) to accumulate in sufficient quantities, metabolism should be slowed. This led to interesting speculation on whether if the CO_2 level got high enough, metabolism would actually go backwards and the patient would start to produce oxygen. In the event, it was found that while extremely high CO_2 levels did cause metabolism to come grinding to a halt, it stayed there, and further experimentation along these lines was strongly discouraged.

One of the scariest things I had to do as a resident was cardiac catheterisation in small children with congenital heart disease. This procedure was carried out in pitch darkness (image intensifier not invented) to cyanotic children (pulse oximeter not invented) to whom no oxygen could be given as it would have interfered with the shunt calculations.

Collapse on the Operating Table

"Come out, come out, thou bloody man…" (2 Samuel, 16:7)[C]

"Angels and ministers of grace defend us…" (Shakespeare, Hamlet. Act I, scene iv, line 39)

"Heilige Scheisse…" (Prof. Billroth of Vienna)[21]

(Billroth might well have said this. An entry in the Medical Annual for 1889 reads "Gastrectomy. This operation had been attempted once, but the patient died on the table. It is doubtful if the operation is either feasible or proper.")

At the time I was a medical student, there was no such thing as external cardiac massage, and the usual response to catastrophic situations was intravenous coramine or nikethamide.

The latest form of artificial respiration was the Holger-Nielsen[22] technique, in which the resuscitator sat astride the patient, who was prone, and alternately compressed his chest and elevated his shoulders – a method obviously not well adapted to use on the operating table.

Simple respiratory depression would frequently respond to the dilating of the anal sphincter, which can have a Lazarus-like effect on even the most obtunded patient. A more dramatic (not to say theatrical) variant on this, dating from much earlier times, was to insert the stem of a lighted tobacco pipe into the rectum, and them blow into the bowl. Tissot's "Advice to the People in General" (1765) contains an account of a successful use of this method in resuscitating a woman apparently drowned.[23] However, not only is the technique unattractive to persons of refined sensibilities, but the possible consequences to the resuscitator are almost too appalling to contemplate, and the method has ceased to be popular.

Such resuscitative methods as were available when I was a student tended to be regarded as strictly "First Aid," and therefore more suitably taught to police, firemen, etc. Our Professor of Physiology, Samson Wright, observed with some truth that lives had been lost through doctors pushing Boy Scouts out of the way.[24] Although CPR training has now become intensive and formalized, it could still be written in 1978 that "the angel of death always hovers near the scene of a cardiac arrest – often the dread messenger is disguised as a physician, bearing in his incompetent hands the equipment for endotracheal intubations" (Phibbs[25]).

The Image of Anaesthesia

Continued on Page 52

[A] *Page 454, Canto XXII, verse i.*
[B] *Page 647.*
[C] *Holy Bible, King James version (1611).*

Hypoxic. . . *Continued from Page 51*

"Tomorrow and tomorrow, and tomorrow,
Creeps in this petty pace…" (Shakespeare, Macbeth. Act V, scene v, line 19)

To early anaesthetists, immobilized at the head of the table, with mask and drop-bottle, hour after hour, day after day, with little to do but contemplate infinity, there must occasionally have seemed to be a certain tedium about their profession. They were subservient to the surgeons, who sometimes tended to indicate that the whole-time practice of anaesthesia could only appeal to those of limited ambition and uncomplicated intellect. This attitude, traces of which still persist in some quarters, in turn could evoke in some anaesthetists a range of responses that could vary from the mildly paranoid to the frankly autofloccinaucinihilipilificationalistical (41 letters, and a legitimate word that I have been waiting for a chance to use. See the Concise Oxford Dictionary under "flocci…")

Tact, diplomacy, and an equable temperament have always been important parts of an anaesthetist's stock-in-trade, if only because of the useful working rule that the patient's blood pressure tends to vary inversely with that of the surgeon. Nevertheless, one would have to be little lower than the angels not to have ever been irritated by some particularly egregious example of surgical arrogance.

At this distance in time, it is possible to reflect in tranquillity on those "old, unhappy, far-off things, and battles long ago" (Wordsworth – *The Solitary Reaper*),[1] especially as, for me, the battles have now ceased. In fact, it has been many years since I last had a serious contre-temps with a surgeon, most of whom have been considerate to the point of indulgence.

Apart from technological and pharmacological developments, the biggest change during my professional lifetime has been in the scope and image of anaesthesia as a specialty, and the continuing evolution of the "gasman" into the anaesthesiologist. Gone is the hoary old stereotype of the surgeon as an autocratic knife-throwing megalomaniac, attended by an odoriferous genuflecting nincompoop of an anaesthetist. Both surgeons and anaesthetists are today a different breed altogether. The resident embarking on a career in anaesthesia today will not only encounter clinical anaesthesia in all its aspects and subspecialties, but intensive care, emergency medicine, pain control, consultative work, and a wide field of medial practice, especially in cardiology and respirology, not to mention research, teaching, and administration.

When our profession began, the choices were more limited. One thinks of Horace Wells, early nitrous oxide pioneer, who had to decide between staying in anaesthesia or going into the performing canary business (a difficult choice that few of us these days have had to make). Presumably after weighing the relative merits of the two lifestyles as they were then, he opted for the canaries – not a good career move as it turned out. He failed, became a chloroform addict, and was jailed after assaulting a woman of easy virtue.[12] William Morton, of Boston ether dome fame, also tried to go into business by disguising his agent with aromatic oils and attempting to patent it under the name of "Letheon." He also failed, and his recognition as being the discoverer of anaesthesia was delayed until after his death from a stroke. Charles Jackson, Morton's bitter rival for that title, became insane after Morton's posthumous victory.[26] Such are the murky antecedents of our specialty.

By way of contrast, it excites little comment today when a member of our specialty is appointed Dean of a medical school, medical director-general of the armed forces, or a provincial minister of health, yet only forty years ago the mere idea of an anaesthetist being appointed to such positions would have been met with incredulity.

Perhaps the Muse of the Art of Anaesthesia (disreputable tart though she may have been in the past) has finally managed to totter up the Mountain-side to join her sisters on Parnassus. Perhaps, too, anaesthetists themselves, in full and literal Fellowship with their colleagues and friends the surgeons, can practise their kindly art untroubled by doubts as to their perceived value and their place in the scheme of things

"Let not ambition mock their useful toil,
Their simple joys, and destiny obscure…" (Gray, Elegy written in a Country Churchyard)[1A]

Acknowledgements

I am grateful to the Thomson family, and especially to Joyce R. W. Thomson, Library Director, Atlantic School of Theology, Halifax, Nova Scotia, for their kind assistance with events and dates in Dr Thomson's career.

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[A] *Page 443.*

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Regional Anesthesia and Cancer Recurrence

by Gerald L. Zeitlin, M.D., FRCA
Boston, MA

In the July 2009 issue of the journal *Anesthesiology* Dr. Daniel I Sessler writes an editorial titled Long-Term Consequences of Anesthetic Management. In the section under the heading Regional Analgesia and Cancer Recurrence one reads the following:

> "Available data thus suggest that regional anesthesia and analgesia help preserve effective defenses against tumor progression by attenuating the surgical stress response, by reducing general anesthesia requirements and by sparing postoperative opiods."

None of the studies on which this statement is based is older than the year 2000 A.D.

I would like to speculate that a similar though not precisely comparable suggestion was made 86 years earlier.

Even though its been quite a while
Since Prof. of Surg., Dr.George Crile,
At Cleveland thought up Anoci-Association,
It, at that time, (1914) caused a sensation.

His reason for using A-Noc-I?
"To block out noxious stimuli."
And prevent nasty shock,
"Before G.A., do a block."

If Dr. George were still alive,
His spirit(s) would grow and thrive,
To read Prof. Sessler's editorial,
In a way, now, Crile's memorial.

In penultimate Chapter XVIII,
Crile studied outcomes using A-Noc-I,
Before Anoci- (1908) 4.4% died,
After Anoci- (1913), only 1.8% were life denied.

Is it possible that Cleveland's Crile knew,
Behind his enigmatic smile,
Wondered if local, boosting cancer immunity
Was helping his surgical community?

Regional Analgesia and Cancer
(un)RecurrENCE;
The implications are more than immENSE.
If Crile were around today he'd say,
"I always knew Anoci- was the way."

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The C. Ronald Stephen Resident Essay Contest

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. Additionally this contest offers residents and fellows the opportunity to present their paper at a national meeting and to publish the results of their research. The Resident Essay Contest is named for Dr. C. Ronald Stephen an anesthesiologist who was a revered teacher, researcher, clinician and anesthesia historian. Dr. Stephen died at age 90 in 2006.

The essays must be written in English and be approximately 3,000 to 5,000 words in length. Judging will be in two stages. In the first stage the finalists will be chosen. These finalists will be announced at the AHA dinner meeting during the American Society of Anesthesiologists annual meeting. From these finalists, the winners will be chosen on the basis of both content and delivery during the spring meeting of the AHA. All the finalists will present their papers in a session of the AHA attended by a panel of judges. The panel of judges will make their final decision based on originality, appropriateness of topic, quality of the research, and delivery. Because the final judging will be at the time of the presentation at the spring meeting of the AHA, all who enter must agree to attend the meeting at which the presentations are made. Essays must be submitted by the 10th of September 2010, in order to be eligible for presentation at the spring AHA meeting of the following calendar year. If not received by that date they will be considered for the next year's contest.

The first, second, a*nd* third place winners receive $500 $200 and $100 respectively. Awards will be made during the AHA spring meeting. The three winners are required to submit their essays to the peer-reviewed Bulletin of Anesthesia History for possible publication.

To enter, essays should be sent to:

William Hammonds, MD, MPH
Professor, Department of Anesthesiology and Perioperative Medicine
Medical College of Georgia
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Augusta, GA 30912
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Entries must be received on or before September 10, 2010.

Lewis H. Wright Memorial Lecture: Lucian Leape, M.D., to Present 'Patient Safety: Are We Making Progress?'*

by Susan A. Vassallo, M.D.
Chair
Lewis H. Wright Memorial Lecture Committee
Wood Library-Museum of Anesthesiology

The Lewis H. Wright Memorial Lecture is sponsored annually by the Wood Library-Museum of Anesthesiology (WLM) and honors its namesake who was a pioneer in American anesthesiology. Dr. Wright was committed to enhancing the stature of anesthesiology as a clinical science and as an advanced medical specialty. He was a founding member of the WLM Board of Trustees and later served as its president emeritus. In 1973, the New York State Society of Anesthesiologists endowed this lectureship to honor Dr. Wright, who died the following year.

This year's distinguished guest is Lucian Leape, M.D., Adjunct Professor of Health Policy, Department of Health Policy and Management, Harvard School of Public Health. Dr. Leape graduated from Harvard Medical School in 1959, completed an internship and residency in surgery at the Massachusetts General Hospital and a fellowship in pediatric surgery at Children's Hospital, Boston. He served as Professor of Surgery at Tufts Medical School and Chief of Pediatric Surgery at New England Medical Center from 1973 to 1987. For the past two decades, Dr. Leape has championed the "patient safety movement." He is recognized as one of the movement's key leaders, and his research has shaped the way we now identify and prevent medical errors.

Dr. Leape's interest in this subject grew from his research conducted for the Harvard Medical Practice Study initiated in 1987.[1] This analysis was a review of 30,000 hospital records in New York State. Of the 4 percent of patients who were injured during their medical care, two-thirds of the hospital records revealed evidence of error, and drug complications were the most common adverse event. At that time, research about error in medicine was sparse and somewhat disorganized – Dr. Leape found more developed theories of error in the literature outside of health care. Dr. Leape's 1994 review article "Error in Medicine" described the medical approach to prevention of error and then applied theories from psychological and human research factors. He catalogued types of error and recommended realistic techniques to decrease medical mistakes, such as reduced reliance on memory, increased information access, error proofing, and standardization and training.[2] In the following years, Dr. Leape applied the systems theory as a method of preventing adverse drug events. In 1998, Dr. Leape and his colleagues demonstrated the efficacy of a physician order entry, or POE, system and team intervention in decreasing the rate of serious medication errors made by physicians.[3]

Lucian Leape, M.D.

Dr. Leape was a member of the Institute of Medicine's Committee on the Quality of Health Care in America, which published the report *To Err is Human: Building a Safer Health System.*[4] This seminal review was a "wake-up call" to health care policy directors, physicians, nurses and, of course, the public. It concluded that 44,000-98,000 patients in U.S. hospitals die each year from medical errors. The Institute's concerns prompted the nation's leaders to question current hospital practices and ask, "How can we do better?"

Throughout his career, Dr. Leape has advocated for a non-punitive systems approach to the prevention of medical errors and has argued that patient safety should be a national priority. He was one of the founders of the National Patient Safety Foundation (NPSF), the Massachusetts Coalition for the Prevention of Medical Error, and the Harvard Kennedy School Executive Session on Medical Error. Dr. Leape received the John M. Eisenberg Patient Safety Award from the Joint Commission on Accreditation of Healthcare Organizations (The Joint Commission) in 2004. The NPSF established the Lucian Leape Institute in 2007 to support and advance patient safety research.

This year's Wright Memorial Lecture is titled "Patient Safety: Are We Making Progress?" The talk will review the accomplishments made since the 1999 Institute of Medicine report and ask some provocative questions:

- "Are hospitals any safer in 2009 than in 1999?"
- "What needs to be done to accelerate progress in safety initiatives?"
- "Can hospitals ever become high reliability organizations?"
- "Will changes proposed for our health care system facilitate or hinder our efforts to improve safety?"

The Wood Library-Museum is honored to have Dr. Lucian L. Leape as the 2009 Lewis H. Wright Memorial Lecturer. His analysis of medical errors has helped us to understand why errors occur and why we often do not recognize our own failings. His research has provided effective recommendations for the recognition and prevention of adverse drug events. As we pass the 10-year mark since the publication of *To Err is Human*, it is fitting that we reflect upon progress in the patient safety movement and chart a course for the next decade. We thank Dr. Leape for providing insights for leading the way and for being both a colleague and a friend to anesthesiologists.

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**Lewis H. Wright Memorial Lecture: Lucian Leape, M.D., to Present 'Patient Safety: Are We Making Progress?' is reprinted with permission of the American Society of Anesthesiologists, 520 N. Northwest Highway, Park Ridge, Illinois 60068-2573.*

Book Review

Doctor Squibb – The Life and Times of a Rugged Idealist by Lawrence G. Blochman. New York: Simon and Schuster, 1958, reprint 1988. ISBN 0-671-67865-5.

by Paul G. Firth, M.B., Ch.B.
Massachusetts General Hospital
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Most anesthesia historians will be familiar with the extensively documented discovery and early use of ether. Perhaps a lesser number will know the details of the less dramatic but undeniably important developments that followed – the evolution of methods of producing ether of consistent quality. Morton and Jackson played well-recognized roles in the discovery of ether, but the contributions of another pioneer, Edward Robinson Squibb – the subject of Blochman's little-known book – have largely been ignored by history.

E.R. Squibb, M.D., (1819-1900), received his medical degree from Philadelphia's Jefferson Medical College in 1845, the year before Morton gave his first public demonstration of ether in Boston. Following almost five years at sea as an assistant surgeon in the US Navy, he returned to attend post-graduate lectures at his medical school in 1851. Watching many ether anesthetics, he was struck by the marked variability in effect of this potent wonder drug. Was it idiosyncratic – or was it the quality of the drug? Appointed to the Navy's pharmaceutical supply laboratory in Brooklyn, NY, he had the opportunity to search for the answer. Squibb had worked as a pharmaceutical apprentice to support his premedical studies. Putting his earlier experience into practice, he discovered that commercially available supplies of ether varied greatly in the quantities of contaminant water, alcohol and sulphuric acid. A key problem in the production of ether was its flammability – this not only made production of consistent concentrations difficult, but it posed a severe fire hazard. Squibb devised a still that distilled ether by steam rather than direct flame, thus eliminating the fire hazard. In stark contrast to the efforts of Morton and Jackson, he made no attempt to patent his discovery. Rather he published a detailed account in the American Journal of Pharmacy in 1856. As Squibb later noted 'nothing short of the greatest careless or inattention can interfere with the uniformity of the product.' Results justified his pride: with some minor modifications, this distillation design remained in use for over a century. The problem of ether production had been solved.

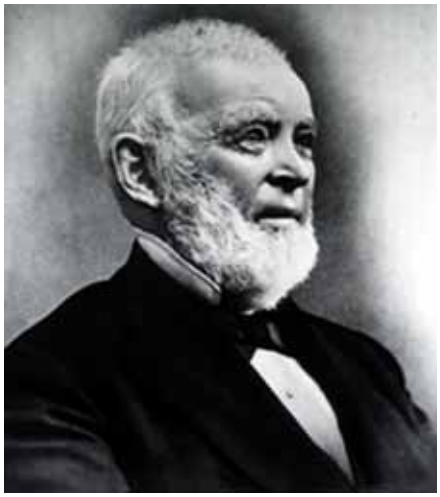

Fig. 1. Edward Squibb. His scars were incurred in an ether fire. The image is provided by the U.S. National Library of Medicine.

Much of the material for this bibliography comes from the detailed diaries Squibb kept for over half a century. For a diary to be of wider interest, the diarist must either be of stature himself, or record events of import beyond his life. Squibb's achievement was not only important to the evolution of safe anesthetics, but his life played out against a background of the rapid developments of American medicine and society in the latter part of the nineteenth century. The themes of the early medical and pharmaceutical politics that provide much of the book's backdrop will be easily recognizable to the modern observer of current medicine.

By contrast, that other great diarist, Samuel Pepys, only managed nine years of chronicles of a different era, that of London from 1660 to 1669. But while Pepys's famous accounts provide insight into important events such as the Plague and the Anglo-Dutch war, the diaries of the two men are similar in another respect: fire. Pepys provided an eyewitness account of the great fire of London of 1666, and had to rush back to his home to rescue his diaries from the threat of incineration. Squibb also had to rescue his journals from destruction in 1858 when the commercial laboratory he had recently founded caught fire. Ironically, ether was involved. Squibb had employed a teenaged boy to assist in the production, using his safe steam sill. Unfortunately the boy dropped a bottle of ether next to a candle he used to light the room during overtime evening hours. The flame leaped across the room, stored bottles of ether exploded, and the laboratory was soon an inferno. Rushing through the flames to rescue his journals, Squibb suffered severe burns to his hands and face. Effective plastic surgery and skin grafts for burns were still decades away. Although Squibb suffered the effects of facial and hand scarring for the rest of his life, he had preserved the records of his work for posterity. He rebuilt his laboratory, Squibb Laboratory going on to become one of the greatest of the pioneering American pharmaceutical firms. Consistent quality ether was a mainstay of sales.

Blochman's biography was written with the assistance of the Squibb Corporation, a latter conglomerate that emerged from the original Squibb Laboratories. Officially sanctioned biographies risk descent into hagiography, but Blochman gives sufficient detail and anecdotes to provide a picture of a complex man of strengths and faults. There is a wealth of medical detail from a tumultuous fifty years that will also give the anesthetic historian a broader perspective on the medical world and environment in which anesthesia practice evolved.

This pioneering anesthetist and pharmacist strove to make ether and chloroform available to clinicians at a reasonable and affordable cost. The modern anesthesiologist will be pleased to discover that his biography follows this dictum. Copies of the book, now out of print, are easily available at on-line book stores such as Abebooks.com or Alibris.com, the book itself often making up less of the total cost than the expense of shipping. While this may not provide the fiscal stimulus current politicians desire, the parsimonious Squibb would no doubt approve.

Hypoxic. . . *Continued from Page 49*

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Wright. . . *Continued from Page 54*

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AHA 2010 Call for Abstracts

The 16th Annual Spring Meeting of the Anesthesia History Association will be held April 8-10, 2010, in Winston Salem, North Carolina.

The Brookstown Inn
200 Brookstown Avenue
Winston Salem, NC 27101
Reservations: 1-336-725-1120
Reservations CANNOT be made over the internet for the meeting rate—more to come later

The abstracts are for twenty-minute papers on historical aspects of anesthesia, critical care medicine, and pain management. Abstracts on medical humanities or ethical topics that relate to the history of one or more of these broad areas are also invited. Abstracts should be no longer that one 8½" by 11" sheet of paper; text should be in 12-point font size. If possible, abstracts should indicate the research problem, sources used, methodological approach and may contain no more than ten references.

Abstracts may be submitted by regular mail or electronic mail (in plain text format). Disc submission in Word is also permitted. Abstracts submitted in electronic format may be made available to registrants in advance of the meeting and on the AHA WWW site as decided by the Organizing Committee. ALL accepted abstracts will be included in material distributed to meeting registrants. Individuals who wish to organize a paper session around a theme should contact the committee as soon as possible.

The submission deadline for abstracts is February 2, 2010.

Send abstracts, inquiries etc., to:

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