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FROM THIS POINT IN TIME: SOME MEMORIES OF MY PART IN THE HISTORY OF ANESTHESIA

John S. Lundy, M.D.

Seattle, Washington

Read at the meeting of the American Hospital Association, San Francisco, California, August 30 to September 2, 1965.

The first incident in the history of anesthesia as it affected me took place on the afternoon of a hot day in June, 1906, in Fargo, North Dakota, in the second-floor office of Dr. John H. Rindlaub, thirty-seventh president of the North Dakota State Medical Association. My father, the late Dr. F. G. Lundy, had helped to draft the constitution and bylaws of this organization in 1889. But an event which seemed far more important to me occurred that afternoon, for Dr. Rindlaub removed the tops of my tonsils in his office. To assist him he called in a chronically alcoholic practitioner who occupied an office on the same floor. This personage without warning soaked a cloth in ether and put it over my face; I instantly removed myself to the open window and gave my first lecture on the administration of ether. I gave the two men the choice of doing it my way or watching me jump out the window. My terms were that the cloth would be elevated above my face and that the ether would be allowed to impregnate it gradually, so that I could breathe more air as anesthesia was started. To this they agreed. Since that time I have frequently taught what I realized at the age of 12 years and found to be of paramount necessity, which is that the patient must be able to tolerate the inhalation of ether as an anesthetic agent.

In 1910, at the age of 16 years, I attended a clinic in Grand Forks, North Dakota, at which the late Dr. J. A. Heidbrink, of Minneapolis, was demonstrating his new gas machine for use in dental extractions. When I saw a man recover from anesthesia and laugh immoderately, I said to myself: "So that was laughing gas." While I was in high school I administered anesthetic agents in the office of Dr. B. D. Lemery of Inkster, North Dakota (my birthplace), at his request, for minor operations. He had me use what was known as the A.C.E. mixture, meaning one part alcohol, two parts chloroform and three parts ether, and he showed me that I must maintain a free airway by keeping the patient's tongue out of the way. About 1860 a Dr. George Farley suggested the A.C.E. mixture, and the Englishman, Thomas Nunneley, is remembered as a proponent of it. Later I shall tell of my current use of this mixture.

My father had obtained a microscope in the early days of the Territory of Dakota, where he held license No. 55. With this instrument he had shown Dr. Lemery, then a boy, the hay bacillus (B. subtilis), swimming in a drop of water. Dr. Lemery, thus stimulated, proceeded to study medicine, and obtained the degree of doctor of medicine in 1904 from the Northwestern University Medical School in Chicago.

I administered a few anesthetic agents during my high-school years. I attended the University of North Dakota from 1913 to 1917, and maintained a close connection with Dr. Lemery. Then, from 1917 to 1919, I was a student in the Rush Medical College of the University of Chicago. I administerd some anesthetic agents in the Presbyterian Hospital there for several of the surgeons, among them Dr. David Wilson Graham and Dr. Arthur Dean Bevan. Dr. Isabella Herb supervised me.

Dr. Bevan obtained an internship for me in Harper Hospital in Detroit Michigan, where I worked from April 1, 1919, to April 1, 1920. Incidentally, during that period I administered several general anesthetic agents by means of a gas machine. I was then the only intern there, in fact, who could use a gas machine. Dr. James Shannon, a dentist, was head of the Department of Anesthesia.

In October, 1920, I began the general practice of medicine in Seattle, Washington. Curiously, on the very day I leased some office space from Dr. O. C. Christman, in the Joshua Green Building, he asked me if I could administer anesthetic agents; I replied that such was the one thing I knew I could do. He engaged me for the next morning, and so it was that I began to practice medicine by producing general anesthesia in the Columbus Hospital on October 20, 1920.

In 1921 I obtained a used No. 1 Gwathmey gas machine. This was a portable apparatus; it could hold two cylinders each of nitrous oxide and oxygen. I transported this machine and cylinders of the gases back and forth to nine hospitals in Seattle for three years. This machine is now on exhibit in the Paul Wood Library and Museum of the American Society of Anesthesiologists, Park Ridge, Illinois. It was Paul Wood and I who introduced the word anesthesiology into medical parlance.

In 1923 I had Foregger of New York City build a portable four-gas machine, and I called it the "Seattle model" of the Gwathmey-type gas machine. It held one cylinder each of nitrous oxide and oxygen, oxygen, carbon dioxide, ethylene and an etherizer. This was the first such machine.

In May, 1923, ethylene gas was first used as an anesthetic agent in Chicago; but as I learned later, it was also thus employed at about that time by William Brown in Toronto. In Seattle I obtained a supply of the agent in September of the same year. In September, 1923, I administered ethylene to the first infant to receive it, for an operation by Dr. H. E. Coe for pyloric obstruction in the Children's Orthopedic Hospital in Seattle. Soon three more operations were done with the aid of this agent, two in the Children's Orthopedic Hospital and one in Providence Hospital, also

in Seattle. I reported these cases in the February 9, 1924, Journal of the American Medical Association. On February 5, 1924, I administered ethylene for anesthesia for an operation on the gallbladder by Dr. Tom Joyce in St. Vincent's Hospital in Portland, Oregon; that was the first time that gas had been used for anesthesia in Oregon.

At about this time Foregger made the five-place gas machine for nitrous oxide and oxygen, oxygen, ethylene, carbon dioxide and ether. With the aid of this machine I was able to make the patient breathe more satisfactorily and to bring about more effective use of the anesthetic agents then available. As usual, my critics objected to the carbon dioxide as poisonous, yet we cannot live without it in small amounts, and I did not exceed the safe limit of 5%. This phase of the work is no longer of interest to current workers, but it served me well for a considerable number of years.

In January, 1924, the King County Medical Society held its annual banquet for the retiring president. Dr. William J. Mayo was the speaker. I had just been elected secretary of the society by a margin of one vote, and since I have always possessed a spirit of adventure, I exercised the prerogatives of my modest office to secure a seat opposite Dr. Mayo at the dinner. During the colloquoy which followed, in the course of which the young beginner quizzed the celebrated surgeon, he invited me to come to the Mayo Clinic to organize a section devoted to anesthesia. We had discussed the new

anesthetic gas, ethylene, and my use of it. I accepted his invitation and went to the Mayo Clinic in March of 1924. There I remained for 35½ years. I remember that Dr. Mayo told me that I should take the realm of all pain to be my province, and that my principal enclave should be anesthesia. Forty-two years later I am still trying to do what he asked me to do. When I retired in 1959, I spent 3½ years in Chicago and renewed acquaintances there. I returned to Seattle in June, 1964, in order to finish my years in comfort amidst the scenes of my first years as a young graduate in medicine.

Now, in current circumstances, I can administer anesthetic agents personally, and I have found places in which to practice my specialty that are satisfactory for what I prefer my way of life to be. I wish to recommend a technique of general anesthesia which I have developed at the Nelems Memorial Hospital of Snoqualmie, Washington. Using a standard Heidbrink gas machine with a Vernitrol regulator for Fluothane (halothane) and an ether vaporizer for Penthrane (methoxyflurane), I have found that the answer to my search involves a return to my first experience in anesthesia in North Dakota, as previously mentioned. I also find that I achieve even better results than I did in those far-away days when I use the A.C.E. mixture of one part alcohol, two parts of chloroform and three parts of ether, mixed in a bottle.

Now that I have a gas machine for the administration of nitrous oxide and oxygen with soda-lime absorption for economy, and since both Fluothane and Penthrane are available for use either separately or together, I can produce at will the conditions needed by the surgeon, obstetrician or dentist, without danger of fire or explosion. Short or long induction of anesthesia and recovery from it are easily accomplished, as desired. The use of Pentothal sodium (thiopental sodium) for induction is not contraindicated. The preliminary administration of 1 mg of Phenergan hydrochloride (promethazine hydrochloride) per 10 pounds of body weight, with the maximal dose 25 mg is helpful because it reduces the dose required, and the cost, of the Fluothane and Penthrane. I still use atropine preoperatively in most cases, and often I add Prinadol (phenazocine) to it in doses of 1 or 2 mg to reduce further the dose of the anesthetic agent. However, the fact that such powerful agents as Fluothane and Penthrane are available makes me independent of the drugs sometimes thought essential as preliminary medication years ago.

In obstetrical general anesthesia it is possible to restrict the contractions of the uterus with Fluothane when such an action is indicated, but for the most part it is better to use Penthrane for this purpose, because Penthrane does not depress the respirations of either mother or child.

For these same reasons it is possible to use Fluothane to reduce the respiratory function in surgical cases if reduction of respiration will help the surgeon, but generally surgeons can be made to understand that some degree of breathing by the patient not only is imperative but generally is advantageous to the patient's circulation, so that cardiac arrest thereby can be avoided. The use of muscle-paralyzing agents has been greatly overdone; fortunately, the tendency now is to eschew paralysis of the respiratory muscles in favor of relaxation of the abdominal wall.

In 1927 I felt the need of a more intensive knowledge of human anatomy than either I or my graduate students in anesthesiology then possessed, and with the help of the late Dr. Harold E. Robertson, head of the Section of Pathologic Anatomy of the Mayo Clinic, I was able to arrange with a firm of undertakers in Rochester for a laboratory in their building. There Dr. Harris, of London,England, visited me, and I consulted others, and soon I had four anatomy tables and was even able to install compressed-air lines for embalming and dissecting. I operated this laboratory from 1927 to 1947, mostly without help from others excepting the undertakers in question. Many fellows of the Mayo Graduate School of Medicine extended their knowledge of anatomy in this laboratory, especially those who planned to undergo

examinations by certifying boards. Dr. H. L. Williams, of the Section of Otolaryngology and Rhinology, spent much time there developing his technique for the fenestration operation for deafness. Throughout the period I have mentioned I did not have sufficient time in the laboratory to learn as much as I wished to know about anatomy in relation to local, regional and spinal anesthesia, but I did learn enough for it to be of great help to my work in the operating rooms of the five hospitals in which I was responsible for the anesthesia.

In 1928 I began to use Amytal (amobarbital) intravenously, in 1930 Nembutal (pentobarbital) and in 1934 Pentothal sodium (thiopental sodium). In 1930 Sir Ivan W. Magill came to Winnipeg, Manitoba, to give a paper at a joint meeting of the Canadian Medical Association and the British Medical Association. After the meeting he visited us in Rochester, and gave me his method of endotracheal anesthesia. In exchange I gave him my technique of producing anesthesia with Nembutal. He spread the technique of Nembutal anesthesia throughout the British Empire, and I helped bring the Magill type of endotracheal anesthesia into favor in the United States. I formed the name "Nembutal" from the structural chemical formula of the drug: I took N from Na for sodium, E from ethyl, M from methyl, and BUT from butyl.

The terminal, AL, was used because compounds of barbituric derivations are commonly given this suffix. Thus, the acronym, Nembutal, puts one in mind of the chemical constituents of this agent. I had used the Abbott Laboratories symbol, No. 844, for some time to designate the agent, until I decided that this drug should have a name easily remembered and at the same time descriptive.

Throughout my years at the Mayo Clinic I carried out a number of experiments in the animal laboratories. One project in particular, done in 1931, concerned spinal anesthesia in dogs; it is reported in a volume which I wrote, with the help of my colleagues, in 1942, entitled Clinical Anesthesia. Then, in 1957, I began to work on the sciatic nerve of white rats, applying 1 milliampere of direct current for 400 seconds or a reduced amount of each factor or of both, to ascertain what I could do to reduce the functional activity of this nerve temporarily. Now I work with dogs, trying to see if I can produce a rheostatic effect on nerves which will reduce function for varying periods. If such a result could be achieved, it might evolve into a useful means for the treatment of chronic pain, addiction to various agents, the pain of cancer, and perhaps in spastic conditions. At the moment there is some faint promise of ultimate success.

I have also caused to be made a rubber mouthpiece, or bite, for use during the production of anesthesia in people who have no teeth in either jaw, or teeth in only

one jaw. The rationale for this device arises from the fact that anesthesia masks will not fit the faces of edentulous patients satisfactorily, and so the face is altered prosthetically so that it will fit the mask. I am also altering the Guedel airway in ways which should allow it to be used concurrently with this bite, or mouthpiece: after an oral airway has been established, the arrangement allows an inhalation anesthetic agent to be inhaled properly. This, of course, is part of what we accomplish by the use of an endotracheal tube. Another of my current studies has to do with victims of dyspnea. Such patients seem to feel better when they are taking tablets of Lorfan/(levallorphan tartrate) to relieve shortness of breath, although whatever relief is obtained therefrom very likely is purely subjective. Still, it is not commonly possible to make these people feel better, even subjectively, by any other means known to me.

In 1937 I started the practice of holding weekly meetings of members of the Section of Anesthesiology of the Mayo Clinic. We each read papers on anesthesia as we found them in the current medical literature, prepared abstracts of the papers and discussed the papers within the group. Later, by means of an arrangement with the Burgess Publishing Company of Minneapolis, a publication named Anesthesia Abstracts was made available. But meetings of this group did not

persist very long, and when they were abandoned, Miss Florence A. McQuillen, C.R.N.A., carried on the work in abstracting so as to make it possible to continue the publication, Anesthesia Abstracts. Very likely she is now the best-read person on the literature of anesthesia. Her contribution to the development of the literature on anesthesia is not excelled and probably will not be. Continuation of her effort in this respect is very important to the field of anesthesia; I hope that on the day she relinquishes her salient labors another person imbued with her dedication to anesthesia will be on hand to carry on the task of preparing the material for more issues of Anesthesia Abstracts.

I attended many medical meetingsduring my tenure at the Mayo Clinic. A meeting which came to be a favorite of mine was that of the Anesthetists' Travel Club. This organization came into existence in December, 1929, when, with the approval of the Mayo Clinic, I invited a dozen men to visit the institution. In the operating rooms I made special arrangements so that no one would encroach upon the visual field of another. There I demonstrated the technique of sacral block anesthesia to the visitors, and the procedure thus began to be used throughout Canada and the United States. My notion of the raison d'être of this organization was that the members would meet annually to exchange knowledge and then go home and disseminate that knowledge locally. But the

latter action was carried out only once, in Boston, by Dr. Philip D. Woodbridge. I wish more members had done like wise. In a letter to me a few years ago, Dr. John Adriani gave much credit for the development of modern anesthesia to the Anesthetists' Travel Club. In 1952 this club became the present Academy of Anesthesiology. I personally hope that the meetings will remain small and intimate, for in such congenial intimacy veterans in the field and longtime friends would be able to see each other under happy circumstances as the period of their active practice begins to narrow.

In 1933 Dr. Charles H. Mayo decided that I should begin the transfusion of blood to children, and by the end of that year I was asked to do the same for adult persons. In 1935 I began to refrigerate citrated blood in the cooler of Dr. W. C. MacCarty's laboratory in St. Marys Hospital; this action preceded by one year the installation of the blood bank in the Cook County Hospital in Chicago. Dr. A. Hustin, of Brussels, Belgium, who originated the citrate-glucose method of transfusion in April, 1914, has credited Dr. Bruce Robertson, of Toronto, Canada, as being the first to refrigerate citrated blood for use as needed. This is said to have been done in 1918, while Dr. Robertson was serving in the Royal Army Medical Corps. For years the Section of Anesthesiology, and especially Dr. T. H. Seldon, operated the blood bank at

the Mayo Clinic and was in charge of the transfusion service. These functions are now performed by the Section of Clinical Pathology.

On March 17, 1942, I opened an unused part of St. Marys Hospital in Rochester as a place in which I could keep newly operated-upon patients near me until I was satisfied that they were in sufficiently good condition to be taken to their own bedrooms, and would require a minimum of care on the part of the floor nurses. There was a minor disadvantage in this plan, in the fact that a patient's relatives might begin to worry about the outcome if their relative did not return to his room reasonably soon after he had been operated upon. To allay anxiety on the part of relatives of operative patients, I called this room the "Post Anesthesia Observation Room," so that the floor nurse, when asked where a patient was postoperatively, with a single phrase could indicate not only the place but also what was being done there. Later the connotation of watchful care was lost when the name of this facility was changed to "Recovery Room," a term which, in the mind of the lay person, creates no impression that anyone is attending the patient in this room.

In 1940, after many years of argumentation at the headquarters of the American Medical Association whenever I was in Chicago, which was often, I finally persuaded the late

Dr. Olin West, longtime secretary of that association, to help me establish a Section on Anesthesiology within the American Medical Association. The arrangement was that I was to remain secretary of the section in question until it was in a strong and autonomous condition. I continued as secretary of the section for 17 years, and was chairman for one year. I still consider the establishment of that section one of the most imminently necessary measures for the ensuring of a voice and a vote to the specialty of anesthesiology in the strongest organization in medicine. Now I think that there should be such a section within any state medical association which has several members specializing in anesthesiology.

After much urging, I persuaded Dr. Ralph M. Waters to serve as the first chairman of the Section on Anesthesiology of the American Medical Association at the annual meeting in of Atlanta, Georgia, 1941, and Dr. Thomas J. Collier to serve as chairman at the second meeting of the section in 1942. The latter year was the centenary of the application of ether to anesthesia by Dr. C. W. Long, of Georgia.

In 1940 I persuaded the Section of Dentistry and Oral Surgery of the Mayo Clinic to assign Dr. George A. Morgan, now of Toronto, Canada, as the first fellow in dentistry and oral surgery of the Mayo Graduate School of Medicine to be trained in anesthesiology for three months.

Finally I arranged for the course to be lengthened to six months. Dr. John Austin, of St. Paul, was the first dental graduate student to take the lengthened course, and I believe it has contributed to his success in the specialty of oral surgery. Special training in anesthesiology gradually has become a part of graduate dental education in many other dental and medical centers.

In 1946 I agreed to serve as president of the American Society of Anesthesiologists. That year marked the centenary of the first public demonstration of ether anesthesia by Dr. William T. G. Morton. I also undertook the reorganization of the society in response to the importunities of many members who said they wished the organization to become more nearly democratic. I saw to it that they got what they wanted, although I knew that it would be an uphill struggle to success.

It is recounted that the great Greek scholar, Benjamin Jowett, master of Balliol College at Oxford, once remarked in an access of sublime arrogance: "What I don't know isn't knowledge." What I know I have learned from a lifetime of intensive devotion, often as a sedulous drudge when an objective warranted it, to a specialty of medicine which has become such as late as within the span of my own years in the field. I am still learning, still seeking the unknown and still confident that infinitely greater accretions to knowledge will come after me than those which I have been able to give to my colleagues.