Before the first World War the number of true specialists in anaesthesia among doctors of the U.S.A. could be almost counted on the fingers of one's two hands. In March of 1918, one of these (Leslie Burwell of New Rochelle, New York) reported for duty at the Medical Headquarters of an American unit at Vittel in the Vosges, France. Upon his insistence that he wished to be assigned to work for which he was particularly fitted, the medical officer in command said, "You will have to see Guedel. He runs the Anaesthesia in this region. He blows in here every day or two, like a wild Indian, on a motorcycle. Wait for him." Sure enough, the next afternoon, with a roar and a put-put the motorcycle arrived in a cloud of dust.

Burwell's curiosity, as to how an anaesthetist could function on a motor-bike, was soon satisfied. The several hospitals in the neighbourhood could be visited frequently only by such means. The scarcity of anaesthetically minded medical officers had made it necessary to assign non-professional, inexperienced persons to duty as anaesthetists. The manner of teaching and directing such personnel under these circumstances is an illustration of the amazing versatility and resourcefulness of Arthur Guedel. He was forced to devise not only simple methods of teaching these willing though inexperienced people but also quick and reliable ways of checking the accuracy and safety of the dosage of ether which they were able, as a result of his teaching, to maintain in the operating rooms of the several
Arthur E. Guedel

hospitals. The difficulties which Guedel surmounted during the first World War were of immense benefit to military surgeons and soldier-patients, it is true, but of what greater value were his experiences there to all the rest of us—teachers and pupils alike—all over the world! He insisted that during ether anaesthesia movement of the patient’s eyeball was a sign which could be checked quickly and which the enlisted-man technician could observe readily and reliably. How often since, have we older teachers found the observation valuable, and even essential, in trying to help medical students and young physicians safely to administer anaesthetics. Guedel’s chart of physical signs of ether anaesthesia was born in the military hospitals and while riding army motor bikes over the rough roads between them. I presume we might even say that the book, later published by Macmillan, as *Inhalation Anesthesia, A Fundamental Guide*, had its foundation built in Guedel’s mind in the military hospitals and along the shell-shattered roads of France, during the first war.

Arthur Guedel is a Hoosier in origin and a genius by natural endowment. “Hoosier” is a nickname, in America, for many of our distinguished citizens who come from the state of Indiana. He was born in 1883 and graduated from the Medical School of the University of Indiana in 1908. The versatility of his interests and the originality of his thoughts were evident in the first years of his medical practice. But none of his valuable medical contributions, nor all of them together, can illustrate his protean capabilities.

In his younger days, his 15 stone of bone and muscle was perfectly co-ordinated for action. An athlete of the first order, he swam with endurance and was adept in the manly art of self-defence, yet no physician I have ever known had the delicate artistic co-ordination of the smaller
muscles that was his. He played the organ and piano with the skill of a natural artist. Many of the pieces of anesthetic apparatus which have come from his hands bear witness to this delicacy of touch. How rarely do we find in the same individual such command of execution combined with originality, imagination, and critical thought. Not only could Guedel bring music from the keyboard but he could compose the music which fitted the occasion. One of his strongest assets, in writing, in lecturing, and in conversation, was his use of the pertinent story—of the perfectly illustrative case. Like every anæsthetist with original thoughts and a desire to learn, Guedel has made mistakes. But, unlike so many of us, he has used mistakes, unusual and unexpected happenings, as food for thought, as a basis for personal and professional advancement and to the benefit of his pupils and associates. His lectures and conversation were much more likely to be sprinkled with the stories of the case that nearly died than of the one that paid the large fee, and always a lesson was taught or material left in one's mind for future consideration and discussion.

It was my misfortune not to have enjoyed Guedel's friendship until after the first World War. Although we were of the same age, he graduated from medical school four years before I did and had developed one of his most important contributions to anæsthesia to the point of practical application before I had acquired a medical degree. The first volume of the American Year Book of Anesthesia and Analgesia, edited by F. H. McMechan, was published in 1916. To it Guedel contributed a resumé of his work on analgesia up to that time. The first of his papers referred to in the review was "Nitrous Oxide-Air Anesthesia Self Administered in Obstetrics," published in The Indiana Medical Journal for October 1911. Since he was ever excessively conservative regarding premature publication,
this meant that considerable work had been done with analgesia at least during 1910 or earlier. This article in the *Yearbook* is a classic. Unfortunately, it has received too little notice even to the present. Not only does it contain the basic principles of mixing nitrous oxide with air or with oxygen to produce analgesia and the advantages of self-administration of such mixtures, but included is an early example of the author's superb command of the methods which he has always used so effectively, of classification and diagrammatic representation as a means of clarification in writing and teaching. Nine charts are included which analyse, for the first time so far as I know, the variations in type of uterine contractions that occur in different women during labour. Superimposed upon these simple diagrams are representations of the necessary concentrations of gas and the time factors which he had found important in relieving pain during parturition.

Many of us who have done some teaching and writing find that, as time passes, we often regret what we have said—have to “eat our words,” as the saying goes. In 1938, in response to an inquiry from Madison, Guedel wrote as follows regarding nitrous oxide in labour:

Self administration of nitrous oxide in labor is O.K. I told you that twenty some years ago. However, I do not like the idea of strapping a mask on the patient's face. There is too much danger of aspiration of vomitus. And even of asphyxia if the gas mixture goes wrong. Before I stopped doing obstetric anesthesia I had gone to the old McKesson machine because we had one at the hospital. I later developed a spring release mask for the Heidbrink but did not like it as well.

For a number of years I spent a lot of time telling the patient just what to do and how to do it. Later I got tired of telling and there developed for me the best technique that I found. I would push the gas machine up to the patient, set the oxygen for twenty to thirty per cent and tell the patient to take as much as she wanted whenever she wanted it. For the first twenty minutes or half hour they would be taking it for most of the time whether they needed it or not. But they would do that anyway under the
"Telling" system so it did not matter. After they had become sedated by the $N_2O$—after twenty minutes or half an hour—they would sleep between pains, awakening at the beginning of the pain. They would then put the mask to their face and breathe like the devil for a few breaths—six to twelve—and go to sleep until the next pain. I would let this go on for hours, in some cases up to the point of actual delivery, when I would take it over. They would take care of their own anesthesia better and more safely than I could do it for them. After it was all over—the next day—they would invariably report that they were in labor but a short time. The hours were not noticed and they were happy. Keep the oxygen up. Don't strap the mask to their face. I used to strap it to their hand with adhesive tape so that they could find it easily when they wanted it. And don't pay too much attention to them.

This quotation illustrates very well two traits characteristic of Guedel. The first is that his early observations and opinions are apt to be checked carefully before expressing them, so that they need not be withdrawn later. The second is that his tendency, as time goes on, is towards practical simplification rather than towards more complication of methods and concepts. I doubt that anyone has added much of fundamental significance to the subject of the relief of pain in labour by inhalation, since Guedel's article in the 1915 *Yearbook*. It is to be regretted that it is not universally available in modern libraries.

From the end of the war until I moved to the University of Wisconsin in 1927, I met Guedel occasionally at anaesthetists' meetings and we exchanged infrequent letters. Our first discussions were concerned with his plans to include in his chart the physical signs of ether anaesthesia, the observation of Albert Miller of the progressive paralysis of respiration that takes place as anaesthesia becomes more profound; first the intercostal musculature and finally the diaphragm.

Later our common interests in the techniques of carbon dioxide absorption and of endotracheal intubation served to increase the frequency of letters passing between us.
After I joined the faculty at Wisconsin, our correspondence became active, our friendship real, and visits between us frequent. From 1925 to 1945, there was an average of several long letters a month. For my own part, they were all letters dictated to the secretary. While Guedel was officially connected with the Medical School in Indianapolis until he moved to California in the summer of 1928 and again with one of the medical schools in Los Angeles soon after going West, he depended upon private practice of anaesthesia in both places for his income and acted always as his own typist. As I re-read those letters now, I am impressed with the mere mechanical labour that was involved for him to keep up such a correspondence, writing often late at night after tiring hours in the operating room, in contrast to the help and convenience I enjoyed of a secretary available at all times.

During my recent re-examination of these letters, it is brought home to me more emphatically than ever how much, not only the Department of Anesthesia at Wisconsin, but American anaesthesia in general, owe to Arthur Guedel. The fact that he was the first outside the British Isles to receive the Hickman Medal (1941) testifies to such appreciation outside the U.S.A. To me, he has been a wise adviser and a true personal friend. To both the department at Wisconsin and me he was, during 20 years, a valuable critic, and a master of argumentation and of unmerciful and inconsiderate frankness, when he believed we needed that treatment. But throughout all a wonderful and loyal friend at the times when loyalty and friendship really counted. The arguments about methods of teaching, or conducting research, of publication, and regarding experiences with new drugs and new techniques, were all subjects of hot debate throughout the twenty years; and every publication from the Department of Anesthesia
at Wisconsin was better for the critical comments of Guedel.

For many years his motto was, "Maintain Flying Speed," taken from the pilot of the time whose altitude began to fail as his forward progress diminished. But the letters I have just re-read come to a point where speed seems not so important. Here is one illustrative quotation, "There is a mighty small line between contentment and laziness and tonight I am a bit over-contented at least." A little later he quotes a friend, "What the hell are you working for? A good obituary?"; and may I add one more quotation from these wonderful Guedel letters I have been reading? "It hurts a fellow some to see himself being slipped to the outside—but I am feeling more and more that, if he has good sense, he will slip himself clear out of it and pass the time doing something else—something entirely different." Aimed directly at me? I think so. We are now both retired and no longer write the heated, argumentative, contentious, and sometimes "scurrilous" letters regarding anaesthesia that pleased us for so many years. I believe we are no less happy because of retirement.

It has been said "If a man loves dogs he will love mankind." It is true of Guedel. The first dog that was subjected to closed endotracheal anaesthesia under water in his laboratory at Indiana was named "Airway" and shipped to my children in Madison because the Guedel family was already blessed with two dogs and "he is such a lovable mut." A sensitive man of intense personal likes and dislikes, with a "quick temper" and prompt expression of it; his intimate friendships have sometimes begun with a brief quarrel. He has been quick to admit his own fault and sincere in efforts to undo a real or fancied wrong. To friends, students, and family alike, kindness and generosity
Arthur E. Guedel

have characterized his attitudes, often to his own dis-
advantage.

An appreciation of the humour of situations and an
inimitable manner of expressing it, has stayed with him
through happiness and adversity. No physician's family
I have ever known enjoys a happier relation with father
and husband.

The Guedel residence in Los Angeles has for years been
a shrine visited by anaesthetists from far and near. Whether
they are well or ill, whether in mood for visitors or in black
despair—good will, hospitality and helpfulness shine forth
from the home of Florence and Arthur Guedel.