

Arthur E. Guedel Memorial Anesthesia Center

Impact of Published Manuscripts

By Merlin D. Larson, M.D.

The first issue of *Current Researches in Anesthesia and Analgesia* was published in 1922, with Arthur Guedel as a member of the “Research Committee” of the new journal. In the second volume of the same journal, he had been promoted to second vice president and was in a prominent position to influence editorial policy. The editor of the journal was Francis McMechan, who at the time was not a practicing anesthesiologist. Guedel always had been in private practice and had published several articles in the surgical journals.

Guedel also was on the editorial board when the first issue of *Anesthesiology* was published in June of 1940. In that year, he wrote an article on cyclopropane that was published in *Anesthesiology*, but he did not use that journal for any further communications.

It may be a surprise to learn that none of Guedel’s publications would be found acceptable for publication in any of today’s prominent anesthesia journals. Take as an example his 1927 article on the reclassification of the surgical planes of anesthesia (*Current Researches in Anesthesia and Analgesia*: August, 1927, pages 157-162). In that article there are very few numbers, no consents, no statistical analysis, no standard deviations, no control group, and no institutional approval. Similarly, in the 1927 journal of *Current Researches in Anesthesia and Analgesia*, in which he and Ralph Waters described the cuffed endotracheal tube, the absence of any measurements of any kind is noteworthy.

As we look back on the material that Guedel and Waters published, we can recognize that the material was rudimentary science by our standards, but it also was valid, highly relevant, and had a significant impact on the direction of the specialty. It also is apparent that their keen insights might have been totally lost if more rigorous editorial policies had been in place. The authors’ instructions for the 1922 issue of *Current Researches in Anesthesia and Analgesia* consisted of one sentence: “Manuscripts should be typewritten double spaced and accompanied with photos or drawings to illustrate them.”

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Today the authors' instructions for *Anesthesia and Analgesia* consist of 15 pages. If we take the word count for authors' instructions for 1922, 1977, 1990, and 2009, a rough chart can be constructed to show the exponential rise in the requirements that must be met prior to having an article reviewed (Figure 1). If we extrapolate this chart for another 50 years (to 2060, Figure 2)), the authors' instructions would produce a small book that would be required reading before submitting a manuscript.

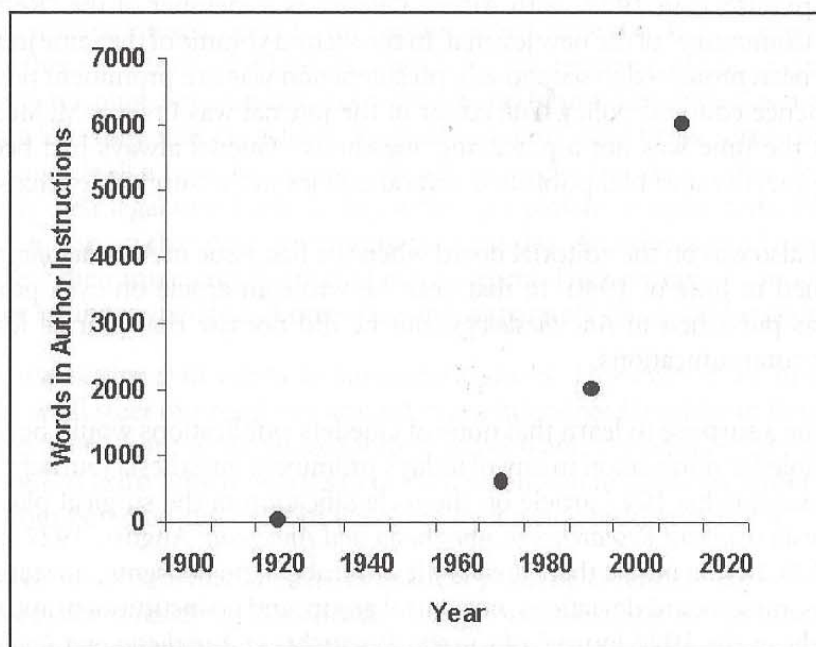


Figure 1. Words in Author's Instructions for *Anesthesia and Analgesia* for 1922, 1974, 1992, and 2009 show an exponential rise over this period of time.

These comments are simply an observation, not a criticism. All of the scientific journals have strengthened their requirements that must be met prior to the review of a manuscript. This is partly due to submission of material that is marginally unethical and also because some individuals have learned to "work the system" by publishing false data. But these stringent requirements make it almost impossible for the busy private practitioner (who usually has no secretarial help and no office) to publish ideas about how anesthesia should be delivered, or who might have encountered interesting cases that have instructional merit.

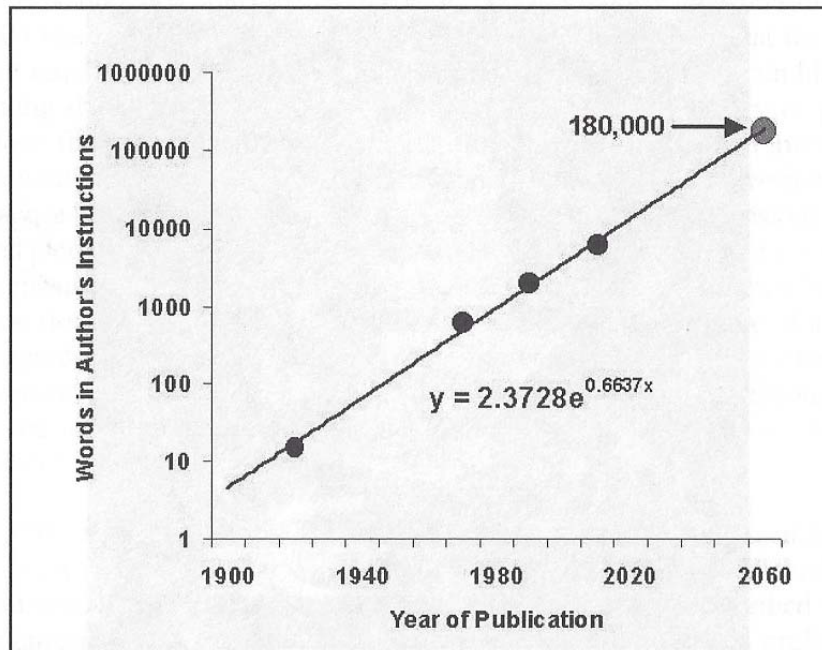


Figure 2. The first four data points in Figure 1 were used to calculate a formula (shown on the graph) and then projected to the year 2060 (50 years from now). If the author's instructions continue to rise at these historical levels, then the entire written journal would be filled with author's instructions.

If one looks back on the origins of the scientific journal, then it is apparent that the journals were never intended to be limited to members of “academia.” Furthermore, the actual written article was never taken as the final word on any subject. Instead, these early scientists took pains to actually demonstrate their findings to an interested audience.

The scientific journal wherein written communications could be disseminated to a wider community began in the 17th century. The first English journal was the *Philosophical Transactions of the Royal Society of London* and the publication was edited by Henry Oldenburg, the Secretary of the Society. He accepted letters and manuscripts from diverse sources (there was no “Guide to Authors,” so this would be the zero in the graph), but he was careful to not publish all communications that were sent to him. Oldenburg spoke several languages, had traveled widely in Europe, and was acquainted with a large number of scientific friends—and he used these friends to evaluate his manuscripts. Peer review thus started with Henry Oldenburg.



Figure 3. Henry Oldenburg, circa 1665. Portrait attributed to John Van Cleef. Public Domain Document. Oldenburg was the first editor of *Philosophical Transactions of the Royal Society of London*, the longest surviving scientific journal that still is published today.

Through Oldenburg's guidance, the *Transactions* published a wealth of valid scientific ideas and observations. For example, Isaac Newton, Rene Descartes, Benedict de Spinoza, Gottfried Leibniz, Marcello Malpighi, Christopher Wren, and Robert Boyle are among the list of correspondents. However, many of the papers that were published at that time have been shown to be mere speculation and fantasy. There are many communications that describe observations of mermaids, perpetual clocks, and the transformation of metals into gold.

In addition to the *Transactions*, the Royal Society held regular meetings, but these events were not at all similar to our Annual Meetings. Their meetings were often filled with demonstrations given by authors to support their written claims.

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The correspondence of Robert Hooke is of special interest to anesthesiologists. In 1665 Hooke wrote to Oldenburg about experiments proving that the lungs did not require intermittent inflation and deflation in order to sustain life. The prevailing thought at the time was that ventilation was necessary to propel the blood through the pulmonary circulation. Hooke performed an interesting experiment to prove that by simply delivering a constant flow of fresh air into the trachea he could sustain the life of a dog. Hooke made small incisions in the parietal pleural and through the thoracic wall to provide an escape for a constant (not intermittent) source of fresh air that was provided through a bellows into the dog's trachea. This dog survived until the constant source of air was interrupted, showing that the movement of the lungs was not a necessary requirement for life, but life did depend upon the flow of pure air through the lungs. In addition to describing this experiment in the *Transactions*, he also demonstrated it at the Royal Society meeting on October 24, 1667.

Even after communications were published in these early *Transactions*, the Royal Society was skeptical of some of the letters that were published. The communication by Antonie van Leeuwenhoek in which he described single cell organisms was a case in point. Leeuwenhoek was a draper by profession, but he had a unique interest in making lenses that revealed tiny creatures in rainwater. The idea of animals with only one cell was completely at odds with the prevailing understanding at the time. The Royal Society was so skeptical of this letter from van Leeuwenhoek that they sent a delegation to Delft, Holland, to review his data. This committee returned to England convinced that these "animalcules" did, in fact, exist.

Arthur Guedel apparently realized early in his career that a scientific publication has very little influence unless the idea that it represents is valid enough to be demonstrated and promoted. He promoted his ideas by traveling to meetings and showing how an anesthetized dog could be submerged in a water tank and could survive intact through the use of a cuffed endotracheal tube. In only a few decades, cuffed endotracheal tubes, endotracheal intubation, positive pressure ventilation and muscle relaxation had become the standard of care. Cuffed endotracheal tubes had been described before, but Guedel was not an "academic" and had not searched the literature to know that the idea of cuffed tubes had "fallen off the cliff" when it was first introduced by Dorrance in 1910, 17 years prior to Guedel's publication.

Our entire specialty might benefit from reading the thoughts of those who, like Guedel and Waters, administer anesthetics every day. These individuals develop unique skills that are nearly impossible to disseminate. Perhaps

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there should be a new journal entitled: "*Journal of the California Anesthesia Practitioner.*" It could be either a printed journal or an "e-journal" and would be edited and reviewed entirely by anesthesiologists who deliver anesthesia on a daily basis. The requirements would be: *Manuscripts should be typewritten double spaced and accompanied with photos or drawings to illustrate them.* Human research would require institutional approval. Some good and some bad material would be published. But, as we are all friends and live in close proximity, we could say to one another: "*I don't believe you; show me. I will come visit you!*" The beauty of science is that it makes little difference what any one person publishes about how nature works. If it cannot be repeated, if it is mostly true but irrelevant, if it is outright false, or if it cannot be promoted by actual demonstration, then it will languish forever in the dusty corridors of the library basement ... or somewhere in cyberspace as a dormant electronic file.

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