

## Historical Lecture

### *Early American Anesthetists*

#### *The Origins of Professionalism in Anesthesia\**

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DIVERSE EXPLANATIONS have been offered to account for the late appearance in America of professionalism in anesthesia—some 60 years after the “discovery,” or first public demonstration. As it is often useful to comprehend the past in anticipation of change, I have attempted to discover the origins of those individuals to whom the credit goes for establishing the specialty in the first decades of this century. I call these people, admiringly, our early American anesthetists. If there has been confusion over the meaning of their long gestational period, possibly the fault lies in the techniques of medical historiography which, in the instance of anesthesia, particularly, have been largely anecdotal—doting on biography and the sensational rather than on the elemental geographic, social, intellectual and philosophic aspects of the era. We have been too prone to invent the excuse that the aura of opportunism, mysticism, and controversy surrounding the demonstration stunted the growth of anesthesia. Likewise, comparison is usually made with the English development, focusing on John Snow and assuming that true professionalism followed his early death. I am not prepared to accept either of these apparent conclusions but contend that, in general, the medicine of those times, as well as anesthesia, had to catch up with science, and that surgery was not prepared to accept the challenge of anesthesia.

In commenting on the historiography of ideas in medicine, Owsei Temkin<sup>17</sup> notes that,

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“sociologists of science have cited in evidence for social causation the multiple appearance of the same discovery—‘multiples’ in the language of Robert Merton.<sup>10</sup> The independent use of anesthesia by Long, Wells and Morton is a well known medical example. Though discoveries are not necessarily ideas, both are spoken of as being ‘in the air’ or ripe for their time.” The discovery of anesthesia was “in the air” because of a mounting series of events perhaps starting with the use of the somniferous sponge in the thirteenth century, advancing slowly with the preparation of ether by Valerius Cordus, strengthened by the experiments of Harvey, and culminating in the pneumatic medicine of the late eighteenth and early nineteenth centuries.

“Research in anesthesia had started in England before 1800 following the chemical discovery of new gases and consequent to the suggestion of inhalation procedures. It came to nothing because Davy and other experimenters were not sufficiently interested in surgery. Further stimulus was provided by a growing humanitarianism which campaigned against all human forms of suffering. Hickman’s work in England during the 1820’s was clearly motivated by this concern. Successful clinical experiments with ether were prompted by this factor, also by the particular need for relief from pain in dentistry.”<sup>14</sup>

Ralph Waters<sup>29</sup> said that progress in England was fortunate in eliciting the interest and enthusiasm of an individual familiar with the scientific literature, clever in laboratory experimentation, and accomplished as a practical anesthetist—John Snow (fig. 1). But Snow was a product of the times in England, where as a consequence of the industrial revolution

increasing attention was being paid to public health and individual medical services, the creation of infirmaries for the aged and poor, enlargement of existing endowed institutions, and formation of special hospitals. Medical education was clinical, with experience on the wards and in operating rooms, the general practitioner a leading figure from whose ranks the hospitals appointed honorary officers, while clerks and dressers gave the anesthetics.<sup>1</sup>

After John Snow's death there was no immediate successor. Benjamin Richardson (fig. 2), Snow's biographer, did not have the endowment to follow in his path. Subsequent progress was scant, in large part, as Waters contends, because of lack of familiarity with other contributions to scientific knowledge. The English seemed to become preoccupied with anesthetic devices and to engage in recurrent harangues over the safety of chloroform. Genuine study or research was not done in anesthesia, which became stagnant and unresponsive to new ideas; the failure to adopt regional anesthesia is a notable example. We may conclude, therefore, that the appearance of professionalism was delayed in England as it was in America. Nevertheless, from the start, anesthesia was recognized as a branch of medicine in England and its development treated as such.

On closer analysis, it is probable that in some respects American medical practice was not unlike that of England and other European countries. Without meaning to disparage John Snow, he was, as were the early figures in American medicine, a member of an elite of urban physicians who, for the most part, treated the wealthy and educated, while less elaborately trained practitioners saw to the health needs of the poor. "Most medical practice was in the hands of informed rural semi-educated practitioners who leave few tracks in archival sands."<sup>12</sup> This could have been the situation with the majority of anesthetics given in both Britain and America. The tendency to accept John Snow as emblematic of professionalism in Britain arises because "the history of medical practice has tended to be the chronicle of a self-conscious and comparatively articulate urban elite. The greater availability of their written records only increases,



FIG. 1. John Snow.

seems almost to make inevitable the predilection of medical historians for the discoverer, for representatives of high medical culture."<sup>12</sup>

It does not seem that surgery had reached the stage of professionalism either. This might be a good time for me to define "professionalism." "Professionalism" is a calling in which one professes to have acquired some special knowledge used by way of instructing, guiding, or advising others or of serving them in some art. In addition to mere specialization, I would add that professionalism in any field entails study with consequent progress, the teaching and recruitment of others, integration with the other branches of medicine, and devotion to the kind of investigation that solves its own problems. The introduction of anesthesia changed surgery very little. It was still external surgery, as the diaries of John Collins Warren indicate: trephining the skull, tapping the chest to remove fluid, relief of strangulated hernia, extraction of stones from the bladder, reduction of fractures, and amputation of extremities. Textbooks of surgery

were largely devoted to these subjects. Articles on surgery appearing in the *Lancet* of that era were mostly lectures or dissertations on anatomy. Edgar states that surgery remained in a deplorable state before the acceptance of Listerism, its scope and usefulness remaining at the point where Ambrose Paré had left it.<sup>5</sup> Likewise, J. C. Trent reveals the sad fact that even though the number of operations increased, the qualifications for practice changed. Manual dexterity and speed ceased to be the prime desiderata in surgeons. "Deliberate and careful techniques took their place and many able men rose to eminence despite their lack of mere mechanical talents." As Lawson Tait remarked of Syme, "He never could have been the surgeon he was without the encouraging influence of an anesthetic."

Furthermore, "the increase of hospitals through charitable donations and consequent rise in admissions created a new spectre of death, 'hospitalism,' which was nothing more than suppuration or bacterial infection—hospital gangrene, pyemia, septicemia, erysipelas, tetanus and puerperal fever. A surgeon's decision to operate was often a death warrant and the name hospital usually struck terror in the hearts of patients. Anesthesia, blessing though it was, effected its own defeat."<sup>5</sup> For example, at the Krankenhaus in Munich, where as in other hospitals, amputations comprised the major part of practice—resorted to for all compound fractures—80 per cent of the amputees became afflicted with gangrene. At one time at the Massachusetts General Hospital, among 692 amputees there were 180 deaths, a 26 per cent mortality rate. Military surgery, as witnessed by events in the American Civil and Crimean Wars, was in a worse plight. Of hip amputations performed during the Civil War, 89.3 per cent resulted in fatality, and Listerism was not acclaimed universally until 1879 at an international congress, followed then by the introduction of steam sterilization and asepsis.

However, more cogent than delayed technical improvements in surgery and the failure to conquer infection was the late acceptance of surgery as a form of medical treatment. Sigerist observed that the introduction of an-

esthesia was not the first attempt to render patients insensible. None of the measures tried, however—the decoctions, the inhalations, use of opium and alcohol and local application of cold—was in general acceptance. "Why then did surgery not have its great development before the middle of the 19th Century, coincident with—rather than resulting from—the introduction of anesthesia. Or we may put the question differently: why was general anesthesia not developed before the middle of the 19th Century. In other words, what was the background of Morton's contribution?"<sup>15</sup> Sigerist finds the answer in a study of the development of the concept of disease—"for surgery is only one method of treatment and like any other method is largely determined by the concept of disease prevailing at the time.

"For over 2,000 years disease was considered the result of a disturbed balance of the cardinal humors of the body which enjoyed health when in balance but showed symptoms of disease when upset. Logical treatment consisted in correcting the mode of living, by corrective diet enforced by drugs, purging and blood letting. From the Renaissance on, new therapies appeared, as Vesalius studied the structure of the body, and anatomy became animate with Harvey's use of the experimental method and discovery of the circulation of the blood. Then in the 18th and 19th Centuries with Morgagni describing the results of large numbers of autopsies it was learned that organic lesions were responsible for disease. It seemed, then, that if an organ were abnormal its function would also be abnormal. Symptoms of disease began to be correlated with anatomical findings at autopsy. Consequently, it became the purpose of diagnostics to perceive anatomic changes in the living patient by the use of percussion and auscultation, development of the ophthalmoscope and use of bulbs and mirrors to look into the body cavities. Roentgenography was the ultimate triumph in this direction. Ultimately the attitude toward surgery changed and it gradually assumed a primary position among therapeutic measures. The surgeon by draining an abscess, or excising an ulcer or tumor, was removing the disease and correcting the organ.

But without doubt surgery could not develop freely before the two bonds had been removed that enslaved it—pain and infection.”

Now that I have introduced the thesis that anesthesia was not a retarded child on this continent as well as elsewhere and that it grew with medicine in general, let us turn once more to the America of 1846. We were then at war with Mexico, and both the Smithsonian Institute, our first national scientific body, and the American Medical Association were in process of formation. Introduction of the magnetic telegraph had begun to improve communications. This was a period of expanding frontier medicine when the general practitioner did the bulk of the work—and the Easterners began to loom as leaders in medicine. Emphasis lay on practice as a business. Professors at medical schools were chosen from the ranks of practicing physicians; they had to have lucrative practices to attract students. Medical education was at a low level, with dozens of worthless schools. It is said that groups of physicians literally knocked at the doors of colleges asking to be grafted on as medical faculties. The best doctors trained at Edinburgh and Paris.

Let us look further into research and education. “So far as the professions were concerned, a process going at least as far back as the Renaissance had gradually shifted the emphasis in practice from salaried service or maintenance, to private practice. With conflict between the modern need for income and the medieval idea of service, growth of competitive practice tended to deprive physicians of the time necessary for original studies.”<sup>13</sup> So far as research was concerned, it lacked public support and there was little prestige in doing it. The only medium for scientific publication in America during the first part of the nineteenth century was the *Transactions of the Royal Society*. The Columbian Institute, founded in Washington in 1816, intended to bring statesmen and scientists together in a quest for utilitarian values, survived only until 1838. Similarly short-lived, from 1840 to 1847, was the National Institute for the Promotion of Science. Ultimately, however, the veil was lifted. In 1878, E. S. Minot of the Physiology Department at Harvard was able



FIG. 2. Benjamin Richardson.

to comment on the phenomenon of the development of fatigue in muscle: “This is the first time as far as I am aware that so extended a physiological research requiring the use of physical methods has been carried out in America.” Carl Schmidt notes that only in the first decade of the twentieth century had the Western Hemisphere begun to establish chairs of pharmacology at the major universities and medical schools. As late as 1909, S. J. Meltzer, in his presidential address to the American Society for the Advancement of Clinical Investigation, described the need for a differentiation of clinical medicine into science and practice.

These interdependent developments comprised the geographic, social, educational, and scientific milieu wherein the first professionals developed. Now, at the turn of the century, we begin to see the emergence of individuals clearly identified with anesthesia. Interestingly enough, unless my survey is biased, many of this group were Middle Westerners, with tentacles reaching into Canada. Is there

a peculiar characteristic of the Midwestern physician to account for this phenomenon? Perhaps so. T. N. Bonner, in depicting the social and political attitudes of Midwestern physicians of the times, comments on "their pioneering tradition, their common purpose, devotion to equality and their struggle for success. He was the kind of man who sought to carve out for himself the largest possible stake even while he cooperated with his neighbors. He had in a sense a cultural isolation, a strong feeling of sectionalism and an antipathy toward the East: perhaps self-conscious about the cultural lag, sensitive to criticism and an intense feeling of inferiority with regard to European science (shared by the country as a whole). The Midwesterner denounced the servility to old world ideas and resented the condescension of Eastern societies and their newly formed journals." 2 Some of this

feeling prevails to this day, and it was a major hindrance in attempts to organize anesthesia nationally in the thirties.

At last, we begin to notice in journal announcements and hospital reports the names of anesthetists and their appointment to positions of responsibility. This occurred despite the fact that nurses had appeared on the scene to give anesthetics and get the work done, trained among others by the Mayos in Rochester and G. W. Crile in Cleveland. In 1935, T. S. Buchanan became Professor of Anaesthesia at the Flower School of Medicine in New York. Orville Cunningham was named at the University of Kansas and L. W. Hardy at the University of Iowa. Thomas L. Bennett came from Kansas to New York in 1899, to give anesthetics at the Roosevelt Hospital (fig. 3) and the Hospital for the Ruptured and Crippled, then was placed in charge of anes-



*brought to a degree of exactitude the diagnosis and treatment of acute appendicitis*

#### DR. MCBURNEY OPERATING IN SYMS - 1900

FIG. 3. Thomas L. Bennett giving an anesthetic at the Roosevelt Hospital, 1900.

thesia at Presbyterian Hospital. L. H. Prince, who modified Esmarch's chloroform mask in order to administer open-drop ether, went from the Ochsner Clinic to Chicago, where he was unable to collect his own anesthesia fees for a period of three years. S. O. Golden wrote at length on the difficulties of maintaining an independent practice and collecting fees from the patient. "It seems to have been common practice after 1900, as well as before, for the surgeon to pay the anesthetist after collecting from the patient."<sup>16</sup> In Canada, Howell, Bourne, and Johnston began to make themselves heard. J. A. Heidbrink, a dentist, gave anesthetics in Minneapolis, while Charles Teter, physician and dentist, was chief of anesthesia at St. Luke's Hospital in Cleveland. In addition to these pioneers, many gave their names to pieces of apparatus: Boothby, Cotton, and Connell, all surgeons, and Gwathmey, who with Baskerville wrote the first comprehensive American textbook on anesthesia. We should not overlook Albert Miller of Providence, describer of intercostal paralysis as evidence of deep ether anesthesia, and Albert F. Erdmann of Brooklyn, an early worker in the vineyard. There were many others whom I do not wish to slight by failing to mention their names.

In a reflective mood, Ralph Waters described the development of our specialty in terms of men, publications, and organizations. In my opinion there were three men who merit special notice because of their activities along these lines: F. H. McMechan, E. I. McKesson, and Ralph Waters himself.

Francis Hoeffler McMechan, the organizer, wielded a tremendous beneficial influence on all those who met him (fig. 4). Born the son of a physician in Cincinnati on January 16, 1879, McMechan as a preparatory and college student excelled in oratory, elocution, debating, and dramatics, reputedly writing some 30 plays. "This natural ability and experience subsequently enabled him to dramatize dinners, meetings and international congresses, which he did so well."<sup>20</sup> After working for three years as a reporter for a newspaper, he matriculated at Cincinnati Medical School. There, as was the custom in this country well into the forties, he was asked by chance to



FIG. 4. Francis Hoeffler McMechan.

give anesthetics, also an occasional administration for his father. His interest quickened to the point where he became a devotee, looking into new methods, reading all the anesthetic literature available, and generally being regarded as a cheerful idiot who was wasting his time. During the years 1903-1910 he combined anesthesia with general practice—toward the end of that period marrying Laurette van Varsevold, who was to become his partner in every endeavor. He became afflicted, then, with crippling arthritis, which eventually forced the abandonment of any kind of clinical practice. Undaunted, he entered strenuously upon organizational and editing activities. In 1912, with Bainbridge, a surgeon, Yandell Henderson, a physiologist, and James T. Gwathmey, the anesthetist of New York, he helped to form the American Association of Anesthetists. This move was antedated by the founding of the Long Island Society in 1905. As a result of McMechan's persuasion, the *American Journal of Surgery* began publication, in 1914, of the *Quarterly*

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Fig. 5. Quarterly Supplement of Anesthesia and Analgesia, American Journal of Surgery, 1914

*Supplement of Anesthesia and Analgesia*, which survived until 1926 (fig. 5). Likewise, in 1916, also under the editorship of McMechan, the first of a series of *American Yearbooks of Anesthesia and Analgesia* appeared, while from 1919 to 1923 he was Editor of the *Ohio State Journal of Medicine*, an estimable publication of the times. Not the least of his endeavors was the founding, with W. H. Long and E. I. McKesson (of whom more later), in 1915, of the Interstate Association, then the National Anesthesia Research Society, with manufacturers of anesthesia apparatus as co-members. This developed into the Interna-

tional Anesthesia Research Society and the publication, in 1922, of *Current Researches in Anesthesia and Analgesia*, the first periodical devoted solely to anesthesia. All this was done as McMechan became totally disabled by ankylosing arthritis, a trial of the man's strength relieved only by his death in 1939.

Waters said of McMechan that, "he was emotional and brilliant, true blue and steadfast with a moral determination to stand for what he believed right—utterly incapable of shilly-shallying or compromise. The recognition and advancement of anesthesia were very dear to his heart."<sup>20</sup> There was little

doubt in Waters' mind that the contributions toward the abolition of pain in the world made by the McMechans from 1912 to 1930 were unequaled.

My second nominee for recognition, whom I shall call innovator, teacher and promoter, is Elmer I. McKesson (fig. 6), born in 1881 in Walkerton, Indiana. A graduate of Northwestern and the University of Chicago, he was for several years principal of a high school before entering Rush Medical College. Following internship at the Toledo Hospital, he founded the University of Toledo, where he acted as Associate Professor of Physiology and Physiological Chemistry. Moreover, an interest in anesthesia he had developed as an intern led in 1910 to the devising of anesthesia apparatus and the founding of the Toledo Technical Appliance Company. Invention after invention followed: several types of gas-oxygen apparatus, suction pumps, metabolism-recording apparatus, intermittent-flow valves, oxygen tents, and associated therapeutic devices. His Nargraf machine incorporated intermittent gas flows, fractional rebreathing, and a respiratory charting device. All the while, McKesson functioned as anesthetist to St. Vincent's and Toledo Hospitals. Though he gave many talks, wrote extensively, and helped in organizations then nascent, his greatest contribution is said to lie in the clinical use of nitrous oxide, incorporating the techniques of primary and secondary saturation. Waters wrote that the physiologic principles which he taught at the time are in the main acceptable up to the present. "He led the life of a multiple personality. Rarely has a physician developed so serious an interest outside the practice of medicine without sacrificing much of his professional standing—capable physician, expert designer and mechanic, business man, civic minded and teacher of neophytes—respected by his confreres in every field."<sup>20</sup>

Finally, we return to the man who influenced generations of anesthetists by his far-seeing vision, combining in no small measure all the sterling attributes of the other early American anesthetists. A quotation from Albert Einstein's autobiographical notes is relevant here: "That which is essential in the life



FIG. 6. Elmer I. McKesson.

of a man of my sort lies in what he thinks and how he thinks—not in what he does or suffers." For Ralph M. Waters (fig. 7) it was both what he thought and what he did. Born in 1883, an only son of pioneer stock in North Bloomfield, Ohio, he entered Adelbert College of Western Reserve University, then its Medical School, serving an internship at the German Hospital in Cleveland. He began the practice of medicine in Sioux City, Iowa, with a main interest in obstetrics, also doing occasional general surgery. While a few of the more or less full-time surgeons employed nurse-anesthetists, the others depended upon each other to give the anesthetics or borrowed the nurse technicians. Waters comments that, "under these circumstances probably three reasons contributed to his early interest and specialization in anesthesia: first, the results of anesthesia which he observed were variable and offered something of a challenge; second, extracurricular experience in the administration of anesthesia while a student in Cleveland, together with occasional oppor-



tunities to observe the use of nitrous oxide by an extremely skillful dentist, Charles K. Teter, had developed in me an unusual interest in the subject; and lastly, one of the more 'surgical' surgeons returned from an Eastern trip in 1913 with a nitrous oxide apparatus (the first in Sioux City), the use of which was offered me in other cases if I would anesthetize his patients.

"A desire to study was a natural outcome of this enforced special interest but I did not know of Hewitt's or any other textbook, nor had I seen a special journal dealing with the subject. [The first edition of Hewitt's English textbook had appeared in 1893; the *Proceedings of the Royal Society* instituted a section of anesthetics in 1908; Gwathmey and Baskerville's American textbook was issued in 1914.] It was with considerable joy therefore that I discovered the introductory number of the *Quarterly Supplement of Anesthesia and Analgesia* which appeared in the October 1914 issue of the *American Journal of Surgery*." Waters became aware of the writings of McKesson and paid a visit to Toledo, learning much and founding an enduring friendship. His first paper, probably inspired by conversations with McMechan, was entitled, "Why the Professional Anesthetist." Total devotion to anesthesia and the scientific observations that accrued from experimentation led to Waters' appointment as Assistant Professor of Surgery in charge of Anesthesia at the Medical School in Madison, Wisconsin. The intellectual environment there was fed by such luminaries as E. R. Schmidt, Bardeen, Meek, Casser, Erlanger, William Snow Miller, and later, Loevenhart, Chauncey Leake, Tatum, and SeEVERS, in the several basic science and clinical divisions.

Waters believed that the ideal background for anesthesia lay in a prolonged apprenticeship in general practice. The residency program instituted at Madison comprised three years, with a trial of six months to ascertain suitability of the novitiate for the specialty. Record keeping, statistical evaluation of practice and results, journal clubs, didactic lectures, and instruction of medical students comprised the core of the program. Papers (many of them "firsts") written by the depart-

ment and usually representing collaborative endeavors with basic sciences numbered into the hundreds, on such diverse subjects as carbon dioxide absorption, use of cyclopropane, avertin fluid, evipal and thiopental, trichloroethylene, a re-evaluation of the actions of chloroform, and many technical innovations, including the cuffed tracheal tube, pharyngeal airways, and laryngoscope blade. The Department of Anesthesia at Wisconsin, under Waters' direction, lays claim to the initial training of more than 27 department heads, the world over.

Noel Gillespie, biographer of Waters, concluded his brief account with a quotation attributed to Geoffrey Kaye of Melbourne, who when asked to write his impressions of the department found that he was writing less about the department than of a man. "I should be a bad Moslem, I fear, for I demand not one but many Meccas. Of my Meccas of anesthesia, however, Madison will ever remain among the most rewarding and the most revered."

Thus I approach the close of this analysis of the absorbing combination of ideas, events, and influences that helped to establish professionalism in America, as well as abroad. It is essential now, perhaps more than ever before, to try to profit from the lessons of history—to survey the past, examine the present, and peer into the future. Anesthesia has never had a surplus of recruits—not enough of a continuum of John Snows, McMechans, McKessons or Waterses. This may be attributed to the fact that the basis of our specialism lies not in the prevention or cure of disease; the main body of our work is not therapeutic in context. Rather, clinical pharmacology and toxicology have formed the basis of our concern for patients, our teaching and research. Many of us are encouraged now as we espy more than a few changes in this narrow sphere of professionalism—some for the good—others leading toward unknown destinations. But our major problem is still recruitment, and my subsequent remarks are devoted to that aspect alone.

We are being impelled to diminish the quality of preparation for anesthetic practice by abolition of the rotating internship, and we

are shortening the period of training before Board approval. These are practical solutions to current problems of medicine as a whole, but they do not fit Waters' concept of the training and wisdom needed to become a physician in the practice of anesthesia. Furthermore, although beneficial for the patient and in accumulation of new knowledge, we witness further specialism in our heretofore-small arena: devotion solely to neurosurgery or cardiac surgery—perhaps pediatrics, ophthalmology, or obstetrics—none of which should be apart from the mainstream of thought and practice. Some of this is, of course, dictated by the persistence of specialty hospitals and continued separation of the surgical specialties in the larger institutions. Rightfully, we have recognized the major contribution to patient care of nurses trained in anesthesia, and we move toward the training of paramedical personnel to strengthen our thin ranks.

I wonder what will remain of anesthesia to attract neophytes when predictive monitoring of vital signs is combined with the expected arrival of the nontoxic, selective, centrally acting intravenous anesthetic or some physical means of achieving anesthesia, such as electronarcosis or acupuncture. I raise these questions because there is undoubtedly a life and death—or metamorphosis—going on in all of the medical specialties.<sup>6</sup> Iago Galdston sagely pointed out that “diseases have been conquered not by the clinical or surgical specialties but by ecological and physiological medicine.” A specialist is one who does not practice comprehensive medicine; he exercises his skills only in some subdivision or in some partial function within the larger framework of medicine. Specialization is not concomitant with, nor is it in itself a gauge of, the advancement of medicine. Many specialists in particular diseases or organs have been eliminated by the development of new drugs—the phthisiologist and syphilologist, for example. The dermatologist, one of the earliest of the specialists, has lost more terrain than any of the others as the broad class of skin diseases has literally evaporated under the physiologic illuminations of nutrition and endocrinology. Otolaryngologists lost considerable ground with



FIG. 7. Ralph M. Waters.

the introduction of antibiotics, retreating almost to the middle ear, while surgeons have begun to lose hold of endocrine disease and treatment of malignancy, as chemotherapy and radiotherapy become more effective. Let us try to imagine how all the medical specialties will be affected by genetic counseling and preventive medicine as it relates to infection, degenerative diseases, and immunologic disorders.

Obviously, and I say this wistfully, the forces that spawned our early American anesthetists are not the same today. However, just as they were, so are we driven by the tide. Reflection a generation from now, as most of you, but probably not I, will be able to indulge in, may reveal little that is recognizable as anesthesia now—in the drugs and methods used and those who administer them.

In conclusion, I would say that the time has come for us to desist from calling ourselves a young specialty or the newest of the specialties in order to account for our problems and deficiencies. We are no longer the youngest—

or newest—but at least 70 years old according to my calculations.

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### Blood Transfusion

**FILTERS AND BLOOD TRANSFUSION** Two types of cardiopulmonary bypass filters were evaluated for their effectiveness as blood filters. Samples from nine units of 21-23-day-old ACD bank blood were forced at a constant flow rate through a fixed area of a nickel mesh screen (20- $\mu$  pore size) before and after passage through the filters. The amount of debris retained was determined by weighing. The screen entrapped 0.90 to 3.20 mg/ml (mean 1.54 mg/ml) of debris from unfiltered blood, 0.50 to 0.89 mg/ml (mean 0.69 mg/ml) after passage through a polyester filter, and 0.01 to 0.03 mg/ml (mean 0.02 mg/ml) after passage through a Dacron wool filter. (McNamara, J. J., Burran, E. L., and Suehiro, G.: *Effective Filtration of Banked Blood, Surgery* 71: 594-597, 1972.) **ABSTRACTER'S COMMENT:** Both Pall (polyester) and Swank (Dacron wool) filters are now available in models appropriate for use during blood transfusion. Although it is now possible to remove a substantial amount of detritus, we need more information on allowable levels that will not alter function in the lung, the *in-vivo* filter commonly used.