PROCEEDINGS-THE RALPH M. WATERS INTERNATIONAL SYMPOSIUM ON PROFESSIONALISM IN ANESTHESIOLOGY

# RALPH MILTON WATERS, M.D.

## MENTOR TO A PROFESSION

LUCIEN E. MORRIS, M.D., EDITOR MARK E. SCHROEDER, M.D., CO-EDITOR MARY ELLEN WARNER, M.D., Assistant Editor



## **RALPH MILTON WATERS, M.D.**

Mentor to a Profession



UNIVERSITY OF WISCONSIN-MADISON ARCHIVES

Ralph Milton Waters was born on October 9, 1883, and died at age 96 in 1979. In 1927 Dr. Waters was appointed to the Faculty of Medicine, Department of Surgery (Anesthesia), University of Wisconsin and thus became the first full-time, salaried professorial appointment in Anesthesia anywhere in the world.



## **RALPH MILTON WATERS, M.D.**

Mentor to a Profession

Proceedings the Ralph M. Waters Symposium On Professionalism in Anesthesiology Madison, Wisconsin 2002

Lucien E. Morris, M.D., EDITOR Mark E. Schroeder, M.D., CO-EDITOR Mary Ellen Warner, M.D.

Assistant Editor

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In 1982 at Eramus University in Rotterdam, a meeting "The History of Modern Anaesthesia" attracted a large international audience. During this meeting a casual suggestion, "we ought to organize," by Jacob Mainzer of Albuquerque, New Mexico prompted Selma H. Calmes and Rod K. Calverley to do just that! The first official meeting of The Anesthesia History Association (AHA) was held in Atlanta during the ASA annual meeting in 1983. Dr. Calverley was elected President and Dr. Calmes became Editor of the Newsletter.

In 1992 the AHA sponsored the 3rd International Symposium on History of Anesthesia held in Atlanta under the auspices of Professor John Steinhaus of Emory University.

In England, the History of Anaesthesia Society (HAS) held its initial meeting at Reading in June, 1986, arranged by Thomas B. Boulton. J. Alfred Lee became President; Ian McLellan, Honorary Secretary; and Adrian Padfield, Honorary Treasurer. The HAS was a sponsor of the 2nd International Symposium on History of Anaesthesia (ISHA) held in London in 1987 at the Royal College of Surgeons and will sponsor the 6th ISHA to be held at Cambridge, UK in mid-September in 2005.

#### FOREWORD

No American physician deserves greater commendation than Ralph Milton Waters for elevating anesthesiology from a technical exercise to a medical specialty. Therefore, in June 2002, anesthesiologists and historians from all over the globe convened in Madison, Wisconsin to celebrate the seventy-fifth anniversary of the appointment of Dr. Ralph Waters to the medical faculty of the University of Wisconsin at Madison, an event that heralded the founding of academic anesthesiology in the United States. This convocation, scheduled as a joint meeting of the Anesthesia History Association and the History of Anaesthesia Society, was the brainchild of Dr. Lucien Morris and resulted from proposals by Dr. Morris to the Anesthesia History Association, the Wood Library-Museum of Anesthesiology, and Dr. Susan L. Goelzer, Chair of the Department of Anesthesiology, University of Wisconsin in Madison. Dr. Goelzer's Department graciously hosted the event and wisely assigned the indefatigable Dr. Mark Schroeder to the organizing committee, bestowing on him the responsibility for local arrangements. The Wood Library-Museum was honored to provide both financial and moral support.

Dr. Waters received his M.D. degree from Cleveland's Western Reserve University in 1912 and moved to Sioux City, Iowa in 1913 to start a general practice. "By gradual degrees," however, Ralph Milton Waters began the transition from general practitioner with an interest in obstetrics to anesthesiologist. By 1915 the transition was almost complete, with Waters' decision shortly thereafter to specialize in anesthesia and to explore the fascinating area of carbon dioxide absorption.

When Waters commenced his clinical career the state of anesthesiology was crude at best. No cascade of negatives would suffice to describe the intellectually bare and barren framework of practice then extant. The typical scenario involved surgeons hiring nurses to administer ether in the morning at hospitals and then to function as office nurses in the afternoon. Most of the few important advances in the field had emanated from surgeons, dentists, or obstetricians, rather than anesthetists. Moreover, there were virtually no anesthesia textbooks, journals, or professional societies to establish standards, disseminate pivotal information, and stimulate research. By realizing how vital these elements are to professional identity, Ralph Waters was to transmogrify these pathetic predicaments.

Dr. Waters was both a bold pioneer and an astute visionary. He had an enviable talent for extracting the wheat from the chaff and for networking with like-minded individuals to accomplish his objectives. It is instructive, for example, to reflect that Dr. Waters' first published paper dealt with the issue of non-physician anesthesia providers, his second with ambulatory anesthesia. Moreover, Waters had the political genius to network with Francis McMechan, founder of the first American anesthesia journal, the equipment expert Elmer "Ira" McKesson, the basic scientist Chauncey Leake, and the educators Arthur Guedel and Emery Rovenstine to more effectively accomplish his goal of elevating anesthesiology to the status of a medical specialty and its practitioners to the rank of esteemed professionals.

The arrival of Ralph Milton Waters at the University of Wisconsin in 1927 as an assistant professor of surgery in charge of anesthesia at the new State Hospital heralded a watershed event in the history of our specialty. Waters conducted the affairs of his new position in the fashion of a "benevolent autocracy." He instituted weekly clinical conferences where …"all solecisms, colloquialisms, or unparliamentary terms observed in the discourses of the participants" were called to account as "…an efficient corrective to the use of medical jargon." Academic anesthesiology began to develop and then flourish in Madison under the brilliant leadership of Dr. Waters. He pioneered in the early use of such drugs as tribromethyl alcohol, avertin, cyclopropane, and pentothal.

Moreover, he advanced our knowledge of the pharmacology of cyclopropane, the toxicology of chloroform, and the prevention and treatment of procaine toxicity. With Guedel he helped to advance the endotracheal technique of anesthetic administration.

Nonetheless. Waters was adamant in his conviction that particular agents and techniques are of considerably less importance than the skill with which they are administered. And, of course, he cast a wide net. Countries represented among the panoply of Waters' residents included Argentina, Brazil, Britain, China, Finland, India, Mexico, Peru, Sweden, and Uruguay. Madison became a Mecca of anesthesia, and Waters was to train (or influence) many of the major luminaries of twentieth century anesthesiology. Among the cohesive cadre of "Aqualumni" are such distinguished physicians as M. Digby Leigh, Emery Rovenstine, Virginia Apgar, Torsten Gordh, Lucien Morris, Perry Volpitto, and Carlos Parsloe.

If history is the account of things said and done in the past, then history can serve us in many ways. It can inspire us with stories of exemplary lives or caution us with tales of human folly. History can inform and educate us by providing the context and perspective that enable us to make intelligent and reflective decisions about the future. And history can delight and enrich us by giving depth to the perception of our profession and illustrating the remarkable accomplishments that can be attained with insight, dedication, and common sense.

All of the illustrious contributors to this volume are historians united in their commitment to honor the memory of a unique genius, Ralph Milton Waters, M.D., who gave direction and purpose to our specialty. Our professional debt to him is incalculable and unmistakable. The legacy of Ralph Milton Waters is both great and crescive. We thank Lucien Morris and his colleagues for their distinguished contributions contained herein that no doubt will foster appreciation of the great strides made since the humble beginnings of our profession. In honoring Ralph Milton Waters this compendium makes an invaluable contribution to the annals, as well as the future, of anesthesiology, and of medical education.

---Kathryn E. McGoldrick, M.D. President, Board of Trustees Wood Library-Museum of Anesthesiology Professor and Chairman Department of Anesthesiology New York Medical College

#### REFERENCES

- 1. Waters RM. Why the professional anesthetist? Lancet xxxix: 32-37, January 15, 1919.
- 2. Waters RM. The down-town anesthesia clinic. Am J Surg (Anesthesia Supplement) 33(7): 71-73, 1919.

#### PREFACE

Ralph Waters had a deep interest in history. It is probable that this appreciation was stimulated as an undergraduate liberal arts student at Western Reserve University. Later, he developed a particular interest in the history of anesthesia and of those early physician anesthetists who, like himself, had made the decision to focus their attention on the principles and practice of anesthesia. Waters greatly admired and professed a debt to the English physician anesthetist. John Snow. whom he viewed as foremost among these historical figures. Further, Dr. Waters was an active participant in the evening medical history seminars organized by William Snow Miller, the University of Wisconsin Professor of Anatomy.

Ralph Waters' last public oration was the opening address in 1964 to the Third World Congress of Anesthesiology in São Paulo, Brazil. Waters envisioned himself a ghost in the presence of ghostly greats from the history of Anesthesia. This is the perfect autobiographical image for the pioneering educator, researcher, leader and mentor of a generation of leaders in anesthesia, who was yet humble and surprised at the acknowledgment of his accomplishments and fame.

This *Proceedings* results from those who gathered to celebrate Ralph M. Waters' 1927 appointment to the faculty of the University of Wisconsin Medical School. That conference, *"Ralph M. Waters, M.D. and Professionalism in Anesthesiology a Celebration of 75 years"* was a combined meeting of the Anesthesia History Association and the History of Anaesthesia Society. It was held in Madison, Wisconsin in June 2002. The prestigious national and international attendees who came to America's pastoral Midwest to describe the continuing influence of Dr. Waters may have caught the sense they were returning to their professional roots. It was largely from Madison in the twenty-two years of Ralph Waters' tenure that the form of modern academic and professional Anesthesiology that we know today received its impetus.

By its nature history is dependent on perspective. Some of those who knew and were taught by Ralph Waters give personal accounts that enliven this book. It is plain to see that the techniques of anesthesia administration were but one small component of what Waters' students, who called themselves "Aqualumni," learned. Other contributors add to a description of influence that encompasses Europe, the Americas and Austral-Asia with histories of Anesthesia departments founded, research performed, textbooks written, professionalism in anesthesia advanced, and patients safely and painlessly escorted through the warm nocturnal mists of anesthesia. Look closely enough and you will see the image of a man with a pipe in each of these accounts.

Our goal in preparing this *Proceedings* has been to allow the voice of each author to be heard and to avoid enforced uniformity. We have taken a certain delight in preserving the rich international variations of English. We have been careful to strive for historical accuracy and to make a volume that will be useful to future researchers and particularly to students in the professional lineage of Waters.

Many individuals, groups, and organizations have been helpful in bringing this volume and the meeting from which it arose to fruition. We thank Professor Susan Goelzer, who holds the Ralph M. Waters Distinguished Chair of Anesthesiology for recognizing the impor-

tance of Dr. Waters' history at the University of Wisconsin. Through her leadership and support the University of Wisconsin Department of Anesthesiology hosted the meeting and provided a significant contribution toward the publication of this volume. The late Betty Bamforth, Aqualumna, Rovenstine Lecturer and former acting Chair at the University of Wisconsin Department of Anesthesia nurtured the memory of Dr. Waters and never failed to remind the Wisconsin Anesthesia residents of their proud history. She enthusiastically supported plans to honor Dr. Waters, but passed away before those plans became a reality. Tehra Meyer provided capable and creative secretarial assistance in planning the meeting. Cathy Means of the University of Wisconsin Office of Continuing Medical Education was an invaluable meeting planner and attended to all of the details for a successful event.

We are proud and grateful for the recognition of the American Society of Anesthesiologists with the approval of Resolution No. 2 in October 2001 proclaiming 2002 as the year of the Ralph M. Waters, M.D. Jubilee. John F. Kreul, M.D., the District Director from Wisconsin and University of Wisconsin Professor of Anesthesiology, crafted the resolution. The Ohio Delegation led by Thomas B. Bralliar, M.D. spoke in support of the proclamation honoring their native son.

Grants in support of the meeting and this *Proceedings* were given by Abbott Laboratories, Datex-Ohmeda, King Systems Corporation, Merck and Company, Pharmacia and other generous anonymous donors.

We thank the Members of Council of the Anesthesia History Association and the leadership of the History of Anaesthesia Society for their support and active interest in planning the meeting and their patience as they awaited this book. We also thank the Wood Library-Museum of Anesthesiology for financial support of this *Proceedings*, and Patrick Sim, Librarian, for his ever willing and thoughtful advice, many times at a moment's notice.

We are indebted to the plenary speakers and indeed to all of the authors who willingly put their words to paper to allow us to make a useful record accessible to all. We are grateful for the support of the Waters family, their willingness to share memories and their attendance at the meeting.

A special thanks to Sarah Broderick whose knowledge of writing, attention to detail, willingness to read and check the authors' submissions and preparation of the typescripts was invaluable. And finally, we owe a tremendous debt of gratitude to Roz Pape. Her enthusiasm was a constant source of encouragement and her knowledge of book design and publishing and its creative application was pivotal to the completion of this project. Thank you.

> ---Mark E. Schroeder, M.D. Associate Professor of Anesthesiology University of Wisconsin Medical School Madison, Wisconsin



## THE AQUALUMNI TREE

For the first seventy-five years following the demonstration by Morton of inhalation anesthesia with ether for surgical procedures, anesthesia remained a neglected area of medical education and in the United States was rejected by organized medicine. Anesthesia was viewed as a technical exercise, unworthy of serious medical interest, and generally not included in the curriculum for medical students. The subsequent changes in attitude and perception during the latter half of the twentieth century were stimulated by and largely due to the vision, leadership, persistence, and personal dynamics of Ralph M. Waters, M.D.

A most enduring part of the legacy of Dr. Waters resulted from his initiation and development of an academic anesthesia center at the University of Wisconsin with a program for education of both medical students and post-graduate physicians. For the latter, it was Dr. Waters' intent to teach doctors who would go out and teach other doctors the scientific basis for safe clinical practice of anesthesiology. In that goal, Waters was remarkably successful in that twothirds of his trainees actually did go on to teach anesthesiology in medical centers, and of these, twenty actually established and developed new academic centers for anesthesiology in other medical schools and universities.

By using the names of Waters trainees, their students, and students of their students it was possible to construct the Waters Professional Lineage as depicted by limbs, branches, twigs, and leaves of the Aqualumni Tree. It needs to be reiterated, that the only names on the Aqualumni Tree are those of chairpersons or heads of academic anesthesia centers. There are, of course, potentially hundreds of other anesthesiologists with faculty appointments, and literally thousands of physicians in private practice, all of whom are equally entitled to claim themselves to be of the Waters Professional Lineage.

Copies of this professional lineage, as originally portrayed by Professor and Mrs. Lucien Morris at an exhibit during the ASA meeting in 1984, were available as a handout, courtesy of the Wood Library-Museum, to all registered attendees at the Waters' Jubilee Meeting in Madison, Wisconsin, 6-8 June 2002.



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t has been argued that formal medical history began in the nineteenth century as Hippocrates began to be replaced by the nascent biological sciences as an authority to test new ideas of diseases and their treatments.<sup>1</sup> Surgery—which had been a craft—had new approaches with the introduction of anesthesia and then antisepsis—asepsis.

### Robert J. T. Joy

## THE HISTORY OF THE DEVELOPMENT OF THE HISTORY OF MEDICINE AND ITS TEACHING IN THE UNITED STATES

Diagnostic capabilities changed with roentgenology and the slowly increasing use of laboratory tests. Therapy changed as pharmacology began to replace herbs with drugs and "germ theory" entered medicine.<sup>2</sup>

History was becoming a profession, markedly influenced in the same period by Leopold von Ranke in Germany who urged historians to "see the past as it essentially was," by describing the past from primary sources and recording "objective" observations rather than "subjective" interpretations.<sup>3</sup>

These developments in medicine and history led to "modern" medical history in Germany, when Karl Sudhoff in Leipzig founded an Institute of the History of Medicine in 1905, begun to train graduate students, to found a journal and publish new research. It is fair to say that he, his institute, his disciples, and his journal publications founded the present discipline of medical history.<sup>4</sup>

In the United States there had been episodic medical history lectures at some medical schools, but no development of programs, literature, or courses of study.<sup>5</sup> Oddly enough, the U.S. Army Medical Department established medical history in the U.S. In 1865 Surgeon General Joseph Barnes directed the writing of the *Medical and Surgical History of the War* of the Rebellion, the first such extensive mili-

tary medical history.<sup>6</sup> It was written over 20 years by medical officers at the Army Medical Museum (now the Armed Forces Institute of Pathology). To support their work, Barnes assigned Major John Shaw Billings to purchase for the Surgeon General's library the books and journals the authors needed. He was the first of a series of medical officers to direct the library until 1960 and began the growth and development of the Army Medical Library, since 1956 the National Library of Medicine.7 Billings became internationally famous as a hygienist, bibliographer, librarian, producer of the Index Catalogue of the library (and the *Index Medicus*),<sup>8</sup> designer of hospitals (like Johns Hopkins), and as an historian.<sup>9</sup> His *Index* and the library not only made the current literature available, but increasingly the printed and manuscript record of medicine from earliest times. Colonel Fielding Garrison succeeded Billings at the Army Medical Library and produced the first American synoptic text of medical history in 1913. It had four editions and several reprintings, the last in 1966.10

Medical history at the new Johns Hopkins School of Medicine (1893) began with lectures by Billings, but it was the enthusiasm of William Osler, William Welch, and Howard Kelly that really established history with a history club, book collecting, teaching and publishing.<sup>11</sup> In 1912 Abraham Flexner published his famous study of the 115 U.S. medical schools and proclaimed Hopkins as the model.<sup>12</sup> The Hopkins "model" included a slowly increasing interest in medical history.

At the University of Wisconsin, Hopkins graduate, William Snow Miller, Professor of Anatomy began in 1909 to hold an evening medical history seminar for medical students and faculty. There was some focus on the "great books," but the required papers for discussion ranged widely. For example, Ralph Waters presented "Historical aspects of artificial respiration" in 1936 and "Protoxide of Azote" in 1941.<sup>13</sup>

After World War I, medical education began to improve as the Flexner-Hopkins model spread. Medical history began to become a discipline when Edward Krumbhaar, Professor of Pathology at the University of Pennsylvania established the American Association of the History of Medicine in 1927.14 In 1929 William Welch at Hopkins established a Chair and Department of the History of Medicine in a new library building.<sup>15</sup> At the inauguration ceremonies famed neurosurgeon. Harvey Cushing, deplored the increasing separation of the basic and clinical science faculties, interests, and teaching. In reference to the history of medicine, he asked of the new chair and department:

Will this mean still another group of specialists having their own societies, organs of publication, separate places of meetings, separate congress...and who will also incline to hold aloof from the army of Doctors made and in the making?<sup>16</sup>

Medical history began to flourish in new journals.<sup>17</sup> In 1939 the AAHM began its own journal, *The Bulletin of the History of Medicine*. Nearly all papers were written by physicians and topics were medically oriented. The AAHM always met concurrently with a

clinical society. The books were written by physicians and fell mostly into categories: The Great Doctors,<sup>18</sup> History of Disease,<sup>19</sup> and celebratory and triumphalist accounts of the technical and scientific progress in medicine.<sup>20</sup>

At Hopkins, Henry Sigerist, M.D., a Sudhoff student and successor at Leipzig, had been appointed the first Welch professor in 1932. His philosophy of medical history fit in well with rising social issues in U.S. medicine—health insurance, government financing, increased specialization, and so on. He declared: "Medicine is a social science. Medicine is a service, bought and sold. Physicians may be great scientists, but if classes of society cannot purchase their services, medicine will fail."<sup>21</sup>

Sigerist made an impact! He began to move the discipline away from its celebratory, clinical, and scientific orientation and toward cultural, social, and economic approaches to medical history. He was on the cover of *Time* in 1936, when he went to Russia and was impressed with socialized medicine. He published widely, raised a number of disciples—especially those interested in public health—influenced the teaching of medical history in medical schools, and dominated the AAHM. His papers and books were influential in shaping medical history before World War II.<sup>22</sup>

The medical world changed again after WWII. Biological science had an increasing impact on patient care, led by the exponential growth of the National Institutes of Health. Medical education emphasized the laboratory and basic sciences. In medical history the older journals had closed during the war. The *Bulletin* slowly became increasingly social history oriented and Ph.D.s began to migrate from the other specialties of history to the study of the history of medicine, and the AAHM now met as a separate group, away from clinical societies.

At Wisconsin, Dean William Middleton returned from the war and reestablished the Miller seminar as a faculty dinner meeting. In 1947 he established a medical history chair and brought Erwin Ackerknecht from Hopkins, who, from 1947 to 1956, rebuilt the student club and installed a course for medical students, which in 1950 achieved department status as the second one in the U.S.<sup>23</sup> He produced a classic study of malaria in the Midwest and a series of useful texts.<sup>24</sup> In general, medical history was not faring well in medical schools: a wide-ranging study of 1950 noted that "most schools give short didactic courses in the first year," but all schools consistently reported "a crowded curriculum," "curricular crush," or "overcrowded curricula" as the increase in new scientific data had to be taught.25

The appointment of Richard H. Shryock, Ph.D. in 1949 to succeed Sigerist may

In general, medical history was not faring well in medical schools: a wide-ranging study of 1950 noted that "most schools give short didactic courses in the first year," but all schools consistently reported "a crowded curriculum," "curricular crush," or "overcrowded curricula" as the increase in new scientific data had to be taught.

have marked the beginning of the dominance of pure historians and the fading away of the importance of the M.D. historian. He was an American social historian and his books and papers now defined the field and inspired young historians to take up the history of medicine.<sup>26</sup>

Medical historians were becoming concerned about the future of their disci-

pline. The physician-historian saw the Ph.D. pure historians taking over, and many papers by M.D.s on the "clinical utility," the "humanizing aspects," and so on of medical history began to appear with common themes of "the place" in medical education, and assertions

Table 1* Medical History Courses Percent of Schools						
Year	# Schools	Have Course	Required Course	Elected Course		
1937	74	62	60	39		
1952	79	47	54	46		
1967-68	95	41	36	64		

about the "well-rounded physician."<sup>27</sup> These arguments were not new <sup>28</sup> and were increasingly ignored by medical school curriculum committees. Table 1 documents the steady increase in the number of medical schools, the steady decline of courses in medical history and the increase in transformation from required courses to elective ones.

Believing that medical educators did not understand how medical history should be taught and where and why it should be placed in the medical school curriculum, medical historians undertook to argue their case.<sup>29</sup> The most recent collection of such studies includes gloomy and somewhat despairing opinions about the future of the history of medicine in medical schools, and its enfolding by bioethics and "medical humanities" programs.<sup>30</sup>

In 1958 the National Institute of Mental Health, (psychiatry being the most socially and culturally oriented medical specialty), began to offer research grants and training fellowships in the history of psychiatry.<sup>31</sup> In 1964 the NLM took over the program and historians began to be more prominent in selecting grants and fellows.<sup>7</sup> The discipline moved increasingly toward Sigerist and Shryock's point of view.

John Shaw Billings' final legacy to the NLM was his 1882 concept of electromechanical data sorting (his guidance of Herman Hollerith led to such a machine in 1890, which in 1911 became the foundation of IBM). Colonel

Table 2**							
	AAHM Programs: Presenter Degrees						
Year	<b>Total Presenters</b>	% MD	% PhD	% Other	MD/PhD		
1980	63	44	44	11	1.00		
1985	79	27	56	17	0.48		
1990	104	28	55	17	0.51		
1995	109	17	53	29	0.31		
2000	136	18	62	20	0.30		

Frank B. Rogers (who oversaw the transfer of the AML to the NIH/NLM) introduced punch cards and later computers to library science and bibliographic indexing, thus making clinical, scientific, and history of medicine sources available through MEDLINE.<sup>9</sup>

It is clear that physicians no longer dominate the discipline. From being 75% of an AAHM membership of about 504 in 1956, they are now 44% of about 1170 members.<sup>32</sup> From parity with Ph.D.s as presenters and presiders in 1980, M.D.s are now only 30% of the total (table 2). There has been an increasing number of medical history organizations as part of a specialty organization; the Anesthesia History Association is an example. There are at least seven such groups. The teaching of the history of medicine in medical schools is increasingly either a part of a general course in medical humanities or an elective (table 3). Historians now dominate the teaching and writing of the history of medicine. They have brought useful new approaches to the analysis of medicine and health as social and cultural issues, while leaving patient care and medical practice history to physician-historians, who mostly publish in clinical journals. There is not room to discuss the topics of historian's present interests. Women in medicine, race, class, age, and economic issues are examples, with an emphasis on society and policy rather than physicians, patients, and disease.<sup>33</sup> While a distinguished British historian has argued that "very much of the social history of

Table 3*** History of Medicine: 1997-1998 126 Schools: Number of Courses					
Part of Required Course	Separate Required Course	Elective Course	No History Offered		
47	6	63	29		

medicine leaves out the practice and theory of medicine,"<sup>34</sup> there is no indication that historians as such will (or can) do medical history in the way that the clinically trained M.D. can do it. But that M.D. must now be held to the historiographic standards of the Ph.D. historian.<sup>35</sup>

What may we conclude from this brief overview of the history of our history? The history as such is solidly in the hands of trained historians and they do an excellent job of writing about health care as an institution of society. They do the most of the formal teaching of medical history in the few medical schools that have a specific course, but they seldom can bring a clinical orientation to their teaching. Physicians have carved out separate domains, largely by specialty, to publish the history of patient care and the study of disease and trauma. The historians who study the history of medicine and the physicians who study medical history have little in common, do not much communicate and have limited interest in each other's work. And nearly everyone appears to be happy.

And Harvey Cushing has been shown to be a true prophet.

#### References

This paper is an abbreviated version of a 50-minute, 160 slide illustrated lecture presented at the opening session of the celebration. The references have been selected and grouped to provide, in part, a miniature bibliography for those who may wish to investigate the subject.

- Henry E. Sigerist, *Primitive and Archaic Medicine* (New York: Oxford, 1951): 3; Gert Brieger, "History of Medicine," in *A Guide to the Culture of Science, Technology and Medicine*, ed. Paul T. Durbin (New York: Free Press, 1980): 124-125.
- 2. Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity* (New York: Norton, 1997).
- 3. Peter Novick, *That Noble Dream. The "Objectivity Question" and the American Historical Profession* (Chicago: Cambridge University Press, 1998): 28.
- 4. Karl Sudhoff, *Essays in the History of Medicine*, ed. Fielding H. Garrison (New York: Medical Life, 1926): 3-41.
- 5. Genevieve Miller, "Medical history" in *The Education of American Physicians*, ed. Roland Numbers (Berkeley, CA: University of California, 1980): 290-307.
- 6. *Medical and Surgical History of the War of the Rebellion*, 2 vols., prepared under the direction of Surgeon General Joseph K. Barnes (Washington, DC: USGPO, 1870-1888).
- 7. Wyndham D. Miles, A History of the National Library of Medicine (Washington, DC: USPHS/ NIH, 1982).
- Index Catalogue of the Library of the Surgeon General's Office, U.S. Army, 5 series (Washington, DC: USGPO, 1890-1966). The card catalogues had not been developed. The monthly *Index Medicus* (1879) gave access to the current literature, which the *Index Catalogue* did not, since it was published yearly by subsets of the alphabet.
- 9. Fielding H. Garrison, John Shaw Billings (New York: Putnam, 1915); Carleton B. Chapman, Order Out of Chaos. John Shaw Billing's and America's Coming of Age (Boston: Boston Medical Library, 1994): 239-243.
- 10. Fielding H. Garrison, *An Introduction to the History of Medicine* (1913; reprint, Philadelphia: W.B. Saunders, 1966).
- William Osler, "A note on the teaching of the history of medicine," *Brit Med J* 93 (July 12, 1902); Michael Bliss, *William Osler. A Life in Medicine* (Oxford: Oxford University Press, 1999): 294-297.
- 12. Abraham Flexner, *Medical Education in the United States and Canada* (Washington, DC: Carnegie Institution, 1912).
- 13. William S. Middleton, "The way of the medical historian," Bull Hist Med 50 (1976): 122-127.
- 14. Genevieve Miller, "The missing seal or highlights of the first half of the century of the AAHM," *Bull Hist Med* 50 (1976): 93-121.
- 15. Simon Flexner and James T. Flexner, *William Henry Welch and the Heroic Age of American Medicine* (New York: Viking, 1941): 416-443.
- 16. Harvey Cushing, "The binding influence of a library on a subdividing profession," in *The Medical Career* (Boston: Little, Brown, 1940): 153-171.
- 17. These are the most significant U.S. history of medicine journals. The editors follow the titles and the dates of publication. Bulletin of the Institute of the History of Medicine, 1933-1938, Henry Sigerist; Annals of Medical History, 1917-1942, Francis Packard; Medical Classics, 1936-1941, Emerson C. Kelly; Medical Life, 1920-1938, Victor Robinson; and Clio Medica, 1913-1942, Edward Krumbhaar. Various editors: Ciba\_Symposia, 1939-1951; Bulletin of the History of Medicine, 1922
  - 1939-present; Journal of the History of Medicine and Allied Sciences, 1947-present.

- Representative "Great Doctor" books are: Paul DeKruif. Microbe Hunters. New York: Harcourt, 1926; Logan Clendening. Behind the Doctor. London: Heinemann, 1933; Henry Sigerist. The Great Doctors. New York: Norton, 1933; Sherwin B. Nuland. Doctors. The Biography of Medicine. New York: Knopf, 1988.
- Examples of histories of disease are: Ralph H. Major. *Classic Descriptions of Disease*. 3<sup>rd</sup> ed. Springfield, IL: C.C. Thomas, 1948; Henry Sigerist. *Civilization and Disease*. Ithaca, NY: Cornell University, 1943; William H. McNeil. *Plagues and Peoples*. New York: Doubleday, 1976; Robert P. Hudson. *Disease and Its Control*. Westport, CT: Greenwood, 1983.
- 20. Histories of medicine in order of decreasing triumphalism: Logan Clendenning. Source Book of Medical History. New York: Hoeber, 1942; Cecelia C. Mettler. History of Medicine: A Corrective Text According to Subjects. Philadelphia: Blakiston, 1947; Ralph H. Major. A History of Medicine. 2 vols. Springfield, IL: C.C. Thomas, 1954; Erwin H. Ackerknecht. A Short History of Medicine. New York: Ronald Press, 1955. Revised Johns Hopkins University, 1968 and 1982; Jacalyn Duffin, History of Medicine. A Scandalously Short Introduction. Toronto: University of Toronto, 1999.
- 21. Henry E. Sigerist, "The history of medicine and the history of science," *Bull Inst Hist Med.* 4 (1936): 1-13.
- 22. Some of Henry E. Sigerist's major works: Man and medicine: An Introduction to Medical Knowledge. New York: Norton, 1937; idem. Medicine and Health in the Soviet Union. New York: Citadel, 1947; idem. Landmarks in the History of Hygiene. London: Oxford University, 1956; idem. On the Sociology of Medicine. Ed. Milton I. Roemer. New York: MD Publications, 1960.
- 23. Gunter B. Rissé, "An account of the Wisconsin chair in medical history," *Bull Hist Med* 50 (1976): 133-137.
- 24. Erwin H. Ackerknecht. "Malaria in the Upper Mississippi River Valley, 1760-1900." In Bull Hist Med Supplement No. 4. Baltimore: Johns Hopkins Press, 1945; Idem. Medicine at the Paris Hospital, 1794-1848. Baltimore: John Hopkins Press, 1967; Idem. A Short History of Psychiatry. New York: Hafner, 1968; among others.
- 25. John E. Dietrick and Robert C. Berson, *Medical Schools in the United States at Mid-Century* (New York, McGraw-Hill, 1953): 254. See also: Raymond B. Allen, *Medical Education and the Changing Order*. New York: Commonwealth Fund, 1946.
- 26. Richard H. Shryock. *The Development of Modern Medicine*, New York, Knopf, 1936; Idem. *American Medical Research Past and Present*, New York: Commonwealth Fund, 1947; Idem. *Medicine and Society in America, 1660-1860*, New York, 1960; are representative.
- 27. For example: Oswei Temkin. "An essay on the usefulness of medical history for medicine," Bull Hist Med 19 (1946): 9-47; Erwin H. Ackerknecht. "The role of medical history in medical education," Bull Hist Med 21 (1947): 135-145; Robert Hudson. "Medical history-another irrelevance?" Ann Int Med 72 (1970): 956-957; Gunther B. Rissé. "The role of medical history in the education of the 'humanist' physician: A re-evaluation." J Med Educ 50 (1974): 458-465; Idem. "Whither healing? The place of medical history in shaping the future role of medicine." MD (February, 1979): 9-11.
- 28. Eugene F. Cordell, "The importance of the study of the history of medicine," *Med Lib Hist J* 2 (1904): 268-282; Berthold Laufer, "A plea for the study of the history of medicine and natural sciences," *Science* n.s. 25 (1907): 889-895.
- 29. For representative papers see: George Rosen. "The place of history in medical education." Bull Hist Med 22 (1948): 594-627; Ilza Veith. "The function and place of the history of medicine in medical education," J Med Educ 31 (1956): 303-309; John B. Blake, ed. Education in the History of Medicine, Report of a Macy Conference. New York: Hafner, 1966. (A collection of opinions and data by several teachers); George Rosen. "People, disease, and emotion: Some newer prob-

lems for research in medical history." *Bull Hist Med* 41 (1967): 5-23; Chester R. Burns. "History in medical education: The development of current trends in the United States." *Bull NY Acad Med* 51 (1975): 851-869; Lester King, ed. "Viewpoints in the Teaching of Medical History." *Clio Medica* 10 (1975): 205-308. (A collection of papers by physicians-historians, all of whom teach.)

- 30. Jerome J. Bylebyl, *Teaching the History of Medicine at a Medical Center* (Baltimore: Johns Hopkins University, 1982). A collection of papers by PhD's and MD's, all of whom teach.
- 31. Philip Sapir and Jeanne Brand, "The National Institutes of Health Research grants program and the history and socioculture aspects of medicine," *Bull Hist Med* 33 (1959): 67-74.
- 34. List of members, American Association of the History of Medicine, *Bull Hist Med* 30 (1956): 252-274; AAHM *Membership Directory 2001*, Canton, MA: Academic Services, 2001.
- 35. See for example: Michael Foucault. The Birth of the Clinic. An Archeology of Medical Perception. New York: Pantheon, 1973; Ronald L. Numbers. Almost Persuaded. American Physicians and Compulsory Health Insurance. Baltimore, MD: Johns Hopkins University, 1978; Todd Savitt. Medicine and Slavery: The Diseases and Healthcare of Blacks in Antebellum Virginia. Urbana, IL: University of Illinois, 1978; Paul Starr. The Social Transformation of American Medicine. New York: Basil, 1982; Judith W. Leavitt. Women and Health in America. Madison: University of Wisconsin, 1984; Regina Morantz-Sanchez. Sympathy and Science. Women Physicians in American Medicine. New York: Oxford University, 1985; Kenneth Ludmerer. Learning to Heal. The Development of American Medical Education. New York: Basic Books, 1985; Kenneth Ludmerer. Time to Heal, American Medical Education from the Turn of the Century to the Era of Managed Care. Oxford: Oxford University, 1999. (Excellent studies by a historically trained professor of internal medicine).
- 36. Andrew Wear, review of *The Common Lot*, by Margaret Pelling, *J Soc Social Hist Med* 13 (2000): 327-328.
- 37. Robert J. T. Joy and Dale C. Smith, "On writing medical history," Ann Diag Path 1 (1997): 130-137.

#### Tables

- \* Table 1. Sources: Henry E. Sigerist, "Medical history in medical schools in the United States," *Bull Hist Med* 7 (1939): 627-662; David A. Tucker, "Committees to survey the teaching of the history of medicine in American and Canadian medical schools," *Bull Hist Med* 26 (1952): 562-578; Ibib. 28 (1954): 354-358; Ibid. 29 (1955): 535; Ibid. 30 (1956): 365-369; Ibid. 31 (1957): 358. Genevieve Miller, "The teaching of medical history in the United States and Canada," *Bull Hist Med* 43 (1969): 259-267; Ibib. 43 (1969): 344-375; Ibid. 43 (1969): 444-472; Ibid. 43 (1969): 555-586.
- \*\* Table 2. Sources: Programs of annual meetings of the American Association for the History of Medicine for the above dates.
- \*\*\* Table 3. Source: Kimberly S. Varner, ed., AAMC Curriculum Directory, 1997-1998, Washington DC, AAMC, 1998.

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#### Theodore C. Smith

## THE WORLD, THE NATION AND WISCONSIN IN 1927

celebration was moved from February to June. But in fact that is not what was happening in February of 1927. A massive Pacific storm had battered the West Coast with death and destruction, and was beating itself out across the plains. Madison had a February thaw. So what was it really like in the world, the nation and the University, that provided the environment in which Ralph M. Waters planted the seeds of education, research, and professionalism for Anesthesia?

The world was full of contrasts and tumult. Europe was slowly recovering from the devastation of a four-year war and the world was recovering from the decimation of a global influenza pandemic. Adolph Hitler was jailed in 1924 for an aborted coup (during which he wrote Mein Kampf). By 1927 he was in charge of an efficient if small private army and a nascent if illegal airforce, consolidating power based on a fascist ideology. Joseph Stalin, following Lenin's death in 1924, was perfecting a triangle offense, (ally with two other powerful figures, discredit and dispose of them, repeat ad infinitum) consolidating power in a communist ideology. Sun Yat Sen had managed to ally Chiang Kai-Shek and his nationalists with Mao Tse Tung's communists in an attempt to overcome royalist warlords of Peking supported by European colonizers. They wanted the foreign devils out of China, even though they couldn't agree on an ideology. They were accomplishing it by 1927. Down in the great subcontinent of India, a spare British trained barrister, Mohandas Gandhi, was demonstrating passive, nonviolent, civil disobedience, weaving homespun cotton and making sea salt—such was his disobedience, as textiles and table salt were British monopoly practices. The world professed to be sick of war and was demonstrating it by building little armies into great ones.

America took little notice of these events. It was recovering from its hesitant involvement in a World War, but had been enriched by the inflow of money and immigrants fleeing war, business failures, and political strife in Europe and its colonies. It professed to be sick of war. America was frightened of the specter of anarchy although the last such event was a smallish explosion in Wall Street in 1920. But anarchy as a farce still had scare value into 1927. Bertolomeo Vanzetti and Nicola Sacco were sentenced and executed for anarchism. An Ivy League Professor wrote, "although not actually guilty, nonetheless morally culpable."

Calvin Coolidge called on the world to reduce naval armadas. But first France, then quickly Britain, Italy, and Japan denounced military reductions. The U.S. Congress appropriated \$450,000 for three heavy cruisers. The U.S. Navy invaded Nicaragua with 1,800 Marines and 10 airplanes. Kurt Vonegut wrote in *Palm Sunday*, 50 years later: "It's hard to believe how sick of war we used to be. We used to boast of how small our army and navy were and how little influence generals and admirals had in Washington. We used to call armament manufacturers 'merchants of death.' Can you imagine that?"

Under Coolidge, America indulged in easy credit, unchecked speculation and high living. "Silent Cal" as he was known, (to a dinner companion who had a sizable bet that she could get him to speak three words, he said "you lose"), practiced a four-hour work day punctuated with naps and interrupted by trips to trout streams. His lasting contribution? He proclaimed the third Sunday in June as Fathers Day.

America had contrasts of its own. It was a time of Bible thumping and Prohibition, the latter widely viewed as better than no liquor at all. It had its own royalty: King Oliver, Duke Ellington, and that infamous Queen of the burlesque show. Oliver composed "West End Blues" (named for a Lake Pontchartrain venue) in 1927 and Louis Armstrong recorded it, serving notice according to critic Gunter Schuller, "... jazz has the potential to compete with the highest order of previously known expression." In contrast, a Princeton professor wrote, "... the fault lies not in syncopation, for that is a legitimate device when sparingly used. But jazz is an unmitigated cacophony, a willful ugliness, and a deliberate vulgarity." In spite of such mixed reviews, jazz spread rapidly into clubs and speakeasies from New Orleans, up river to Kansas City and Chicago, thence to New York and Europe. And soon it went to Hollywood where radio and the talking movies brought the sound of the Charleston, the Blues, and other jazz forms to all America and then the entire world.

New in 1927: the first Oscar for *Wings* as best production, the beginning of the George Washington Bridge, the full opening of Route 66 from Chicago to Los Angeles, Hostess Cupcakes, Wonder Bread, Borden's homogenized milk, and the Model A Ford, fig. 1.



Figure 1. The model A Ford was introduced in 1927. It featured a gearshift replacing the gear pedals of the Model T. Various styles of coachwork offered included convertibles, and a rumble seat instead of a trunk. Photograph by THE AUTHOR

Heisenberg wrote "About the Quantum and Theoretical Reintegration of Kinematic and Mechanical Relationships," which, despite the uncertainty of the title, certainly established the uncertainty principle. In 1927 Miriam Noel pursued Olgivanna Ivanova and Frank Lloyd Wright to California to collect maintenance. A second fire at Taliesin added to Wright's troubles. In February of 1927 Babe Ruth threatened to quit baseball, then hit 60 home runs by the end of the 154 game season. Jack Dempsey failed to move to a neutral corner for five seconds. The ensuing "Long Count" enabled Gene Tunney to recover and win a decision. Dempsey died in 1983 at age 87, outliving Waters. Our vocabulary expanded to include these: all wet, belly laugh, upchuck, whoopee, gin mill, jalopy, keen, lousy, neck, pet, copasetic, and to frame. Born in 1927 were Caesar Chavez, Gina Lollabrigida, and Daniel Patrick Moynahan. Dying in 1927 were Lizzy Borden, Isadora Duncan, and Willem Einthoven of a different triangular fame. Charlie Chaplin, Buster Keaton, and Harold Lloyd were uplifting standards for cinematic genius and wholesome comedy. Clara Bow (The "IT" Girl) in Hollywood and Mae West in New

York were uplifted in another way. Mae West was arrested for indecent behavior after opening a Broadway play, *Sex.* The nation was in the midst of a decade of doubling of its wealth and a 60 percent increase in its manufacturing. But, in 1927, a few rural banks began failing. The Farm Price Index was only 131, having been above 200 earlier in the 1920's. Black Tuesday, the 29th of October 1929, was two years and eight months in the future.

America embraced new technology and anti-intellectual views equally. Enthusiasm for flight was taking over the country with barnstorming and wing walking. General Billy Mitchell had demonstrated the ability of air power by sinking the German dreadnaught Ostfriesland in 1921, but that was unappreciated by the traditionalist generals and admirals. He was court-martialed on ridiculous grounds and quietly retired. But the American population was energized by heavier than air flight when Charles "Lucky" Lindbergh completed a transatlantic flight in May of 1927. He had earned the nickname for his success at bailing out of four different airplanes while flying the new airmail service. Lindbergh spent February of 1927 in California preparing his Spirit of St. Louis and waiting for better weather, much like

this conference's planners. Will Rogers was gaining recognition by sending daily cables from Europe, reports of only one paragraph because he personally had to pay for the cable fee. Other national news included Mississippi and California joining Arkansas in banning the teaching of evolution, the Nebraska Legislature contemplating a tax on 21-to-25 year olds who remained unmarried, and Kansas banning cigarette smoking and mince meat pie. both on health grounds. The Klu Klux Klan, which was founded in Tennessee in 1865 as a social club for ex-soldiers, was being reborn in the 1920s, practicing racism and scandal when Edward Y. Clark and Elizabeth Tyler (his mistress) shifted the center of activity to northern Indiana, just 200 miles from Madison.

The two newspapers in Madison, Wisconsin, the Wisconsin State Journal, which leaned toward the center from the far right, and The Capital Times, (fig. 2)were both firmly in hands of the La Follette family and had little world news, considerable national news and a lot of dull local news. They looked very much like current newspapers with front page, sports sections, society pages, local advertising for food, clothing, automobiles, and a comic page much like today's, with a different



Figure 2. Front page of a typical Madison newspaper, The Capital Times, for Wednesday, 16 February 1927. Local and state news predominates. In world news, the fall of Shanghai to the Chinese Nationalists is imminent, but the story did not reach large-type headlines until reports of 90 who were beheaded in celebratory revenge five days later. PHOTO FROM WISCONSIN HISTORICAL SOCIETY MICROFICHE.

cast of kids, young people and parents getting into silly troubles. Fanny Flapper was popular, saying things like, "People have no business kissing-that's a pleasure." Four themes repeatedly appeared in the paper:

- The moralism of Prohibition and its breakdown in the big cities.
- The isolation of America from Europe and the big Red scare.
- The rise of racism and the Klu Klux Klan to control the Negro.
- The literal fundamentalism of Protestant churches.

Madison was located geographically, politically, and socially between big city, beer drinking, urban Milwaukee and small town, cheese-eating, fundamentalist Lacrosse. But small towns in Wisconsin did support a court decision in February of 1927 declaring the manufacturer of wort quite legal. Wort, a mixture of water, yeast, and malted barley had only one use, the fermentation of an illegal beverage. The annual prom at the University was reported in detail starting days earlier with descriptions of the gowns chosen by many dozens of young ladies. Men mostly appeared in white tie and tails but a few new tuxedos were noted. Only one bottle was found by police officers at the event, which was dimmed not in the least by the drizzling rain. Madison was basically a small town with a big university and a big state government. Mes Mezzrow described a typical suburbia in this way: "All the days were Sabbath. A sleepy-time neighborhood big as a yawn and just about as lively. Loaded with shade trees, clipped lawns, and a groggy-eyed population that never came out of its coma except to turn over." Much of Madison was like that but not, I believe, either the state government nor the state university.

Both Gov. Phillips' Stalwart Party and the La Follette's Progressive Party were fiercely isolationist, agreed on very little else, and took a lot of time and newspaper space to declare it. At the University in February, Rachmaninoff appeared in concert playing Schubert, List, Brahms, and Chopin. The Dane County Medical Society announced a program on Upper Respiratory Infection and a Demonstration of Bronchoscopy. Jens Jensen lectured on landscaping. A farmer from Blue Mounds visited Madison and his itinerary was reported in detail. There was no mention of the arrival of Ralph M. Waters in the newspapers,

perhaps because he came alone, not bringing his family to Madison until the summer. He, too, may have been skeptical of the weather in Wisconsin.

The university was a very interesting place at an interesting time. Founded in 1849 with a class of seventeen poorly prepared male scholars, it had grown to 5000 by World War I, housed in classrooms Teaching loads were onerous at oneand-a-half to two times the intended level. The University urgently needed new faculty as there were over 100 vacancies, new classrooms, laboratories, equipment and an expansion of its twoyear medical school to four years plus graduate training.

designed for 3,500, with a library fit for perhaps half of that. No new classrooms were added for a decade, but the student body exploded to nearly 8,000 by the mid 1920s. Teaching loads were onerous at one-and-a-half to two times the intended level. The University urgently needed new faculty as there were over 100 vacancies (and simply filling them would have been inadequate), new classrooms, laboratories and equipment, new library resources including books, space, librarians and services, and an expansion of its two-year medical school to four years plus graduate training. This history is well recorded with interesting detail by E. David Cronon and John W. Jenkins in Volume 3, 1925-1945, of the official The University of Wisconsin: A History.

Edward A. Birge was in his fifth year as University President in 1924 and had seen himself as a short term, interim one. But he had excelled. He consolidated state legislative support, assuring future funding, and appointed many scholars who would achieve the renown, including two who would earn Nobel laureates (J. Erlanger and H. Gasser), as well as the Dean of the medical school, C. R. Bardeen (who smoked a pipe). He founded and built the Wisconsin General Hospital after solving a town and gown problem with an innovative limited private practice plan for the faculty. President Birge also founded the Wisconsin Alumni Research Foundation (i.e.WARF) to promote and commercialize faculty inventions: first vitamin D enrichment of milk to protect dairy interests from oleomargarine, and later Coumadin for rat poison and human therapy, better known as Warfarin. Now after his 50 years of service to the people of the state and the University Birge wanted out, urging the regents to select a younger more energetic leader to grapple with post war problems.

Political infighting blossomed in the Board of Regents and the state legislature as various names surfaced. Alexander Meiklejohn was an educator at Amherst College, fired for tangled finances and radical educational ideas. But he was just too radical to be in charge. Oddly enough Meiklejohn ended up at the University of Wisconsin a few years later to start a new college based on his reform ideas. Roscoe Pound, Dean of the Harvard School of Law, was strongly considered, as was the choice of the La Follette family, Robert Morss Lovett. The latter got into a tizzy about Pound's nomination and he talked himself out of the job. Pound then removed his name from consideration, based on the flurry of political pressure attempts. By late 1924, one name kept emerging, the name of Glenn Frank.

Frank was born in Missouri in 1887. As a teenager he rode the Methodist circuit, accompanying preacher Billy Sunday. He was a graduate of Northwestern University where he excelled despite a conditional admission. He was active in many extracurricular activities and voted both the senior who did the most for the school and the best looking. After his baccalaureate degree he organized Northwestern University alumni clubs, became the editor of the alumni magazine and raised endowment funds for the university. This was as far as he got academically. He became the intellectual consultant of merchandiser E. A. Filene (before his basements were common) who introduced Frank to national business and political figures. This led to Frank's appointment as editor of the progressive Century Magazine and his publication of ideas on international problems and enlightened capitalism. Based on these credentials he was appointed President of the University of Wisconsin and arrived in Madison with his childhood sweetheart wife in September of 1925. He threw himself into the job and solidified legislative support for the large budget increases that were needed, including the demands of the clinical faculty at the Medical School who were teaching third, then next year fourth year classes.

The faculty now included internist William S. Middleton, surgeon Erwin R. Schmidt, anatomist William Snow Miller, and a wonderful group of pharmacologists including A. Tatum, C. Leake and M. Seevers. The Dean of the Medical School continued a flood of clinical faculty appointments, fleshing out the departments of medicine, pediatrics, dermatology, radiology, orthopedic surgery, plastic surgery, chemosurgery, ophthalmology, obstetrics and gynecology, and of course anesthesiology. Dean Bardeen, (fig. 3) helped push legislative support by designating the Wisconsin General Hospital as a World War Memorial. What legislator could vote against that?

Certainly the strong pharmacology group was attractive to Ralph M. Waters. His interest in research, previously pursued during the time of a busy private practice, would bloom in such



Figure 3. Dean C. R. Bardeen as characterized by Max Otto. The coat and hat would have been appropriate for February 1927. That may be a Model A coupe in the background. FROM THE UNIVERSITY OF WISCONSIN: A HISTORY-VOLUME 3

an environment. Waters was no stranger to the campus. His sister married a Professor Hastings of the Department of Agricultural Bacteriology. Waters paid them a number of visits. Erwin R. Schmidt was also said to be receptive, even eager to recruit a full-time anesthesiologist. Oddly, Noel Gillespie's brief biography of Ralph Waters contains no mention of Schmidt in an early typescript found in the library, but in its published form says, "...received a warm welcome from Dr. E. R. Schmidt, a professor of surgery." Gillespie and the surgeons were never warm and close friends. But Waters and Schmidt were. Their names appear together on publications. During the Second World War they worked long hours together in the Operating Room while many of the Surgical and Anesthesia Faculty were serving in the Armed Forces hospitals elsewhere. And it must have been with Schmidt's approval that Waters moved up through the academic ranks. Waters' official faculty portrait contains this list:

- 1927 to 1928 Assistant Professor of Surgery (Anesthesia)
- 1928 to 1932 Associate Professor of Surgery (Anesthesia)
- 1933 to 1952 Professor of Anesthesiology

The official history, The University of Wisconsin Medical School: A Chronicle, a book of little scholarly value, records the names of early basic and clinical faculty who continued to drive the school's growth for the next several decades. Fortunately, many of the participants are among those contributing to this and other publications. The University has continued to excel. In the year 2002 the Madison campus was cited as among the top twelve American Universities for innovation and economic development in a National Science Foundation-supported report of the Southern Growth Policies Board: "...a story of an extraordinarily successful research university that has also nurtured a long-standing mission of service to its state, while at the same time creating a very entrepreneurial culture and some novel approaches to technology transfer."

This was certainly the environment that Ralph M. Waters met and capitalized upon in the winter of 1927. An acorn can't grow into an oak without the proper soil. The Waters Tree certainly had the right genes in its acorn, and was planted in just the right milieu. n the late nineteenth-century, American anesthesia practice began a slow and difficult transition from its status as a stepchild of surgery to an independent medical specialty. The early decades of this change paralleled the growing professionalism of clinical medicine and medical education in the United States after the Civil War.

## A. J. Wright

# APPEALS FOR PHYSICIAN ANESTHESIA IN THE UNITED STATES BETWEEN 1880 AND 1920

In 1869 the first academically affiliated hospital opened at the University of Michigan. During the 1870s Harvard University President, Charles Eliot, brought reforms to the medical school there. Johns Hopkins opened its medical school in 1893 with its model of serious basic science instruction and extensive clinical experience. The American Medical Association set up a Council on Medical Education in 1904. Yet these and other positive developments could not prevent Abraham Flexner's devastating 1910 report on the generally sorry state of American medical education.<sup>1</sup>

The Flexner report's effects on American medical education were profound. In 1910 some 148 medical schools operated in the United States; by 1919 that number had fallen to 85. Many of the marginal proprietary schools Flexner criticized so harshly did not survive his report. A similar reduction in medical students also took place, from 21,526 in 1910 to 12,930 in 1919. Greene has argued that medical education standards that were developed after Flexner's report did not allow easy access by new disciplines such as anesthesia. Since physician anesthesia in America was so rare in 1910, decades would pass before the specialty could establish itself.<sup>1</sup>

Early in the twentieth century a profession of anesthesiology did begin to slowly emerge in the United States. In 1905 G. A. F. Erdmann and three other physicians founded the first anesthesia organization, the Long Island Society of Anesthetists. Six years later the Society combined with a group from Manhattan to form the New York Society of Anesthetists. An anesthesia supplement to the American Journal of Surgery began publication in 1914 and continued until 1926. Edited by F. H. McMechan, this supplement was the first regularly published item devoted to the specialty. McMechan and J. T. Gwathmey founded the American Association of Anesthetists in 1919. McMechan also began the world's first anesthesia journal, Current Researches in Anesthesia and Analgesia, in August 1922. These and other developments served as prelude to the arrival of Ralph Waters in Madison, Wisconsin in 1927 and the creation of the first academic department of anesthesiology in the United States.

The poor quality of much anesthesia administration had been noticed before the American Civil War and less than two decades after Morton's public demonstration in Boston. In 1859, one physician noted, "In some cases Dr. M. had seen chloroform administered by young gentlemen, rather in a careless manner...In fact, he believed that most of the fatal cases can be traced to a careless administration of the remedy."<sup>2</sup> Many anecdotes can be found in the medical literature that illustrates the stepchild nature of anesthesia administration in the U.S. after the Civil War. In April 1875, Dr. W. A. Bradfield of East Pascagoula, Mississippi, was attending a pregnant patient.

Everything seemed to be perfectly natural, and nothing wanting but a few good pains. I had scarcely finished my examination when she was seized with another violent convulsion, which seemed to cause every muscle in her body to become perfectly rigid. I then chloroformed her, and instructed the midwife how to keep her in that condition until I could go to my office and get my instruments and more chloroform.<sup>3</sup>

This kind of on-the-spot training of any person available seems to have been the norm in both hospital and home settings in the second half of the nineteenth century. Midwives, first-year medical students, husbands, chauffeurs, and inexperienced general practitioners were all pressed into service to administer anesthesia.

However, by the early 1880s some physicians were committing to print their concerns about anesthesia practice. These observations generally fall into three broad areas: 1. anesthesia is complex, often risky to the patient, and poorly administered; 2. trained specialists should administer anesthesia; and 3. anesthesia training should be part of the medical school curricula. One of the earliest physicians to make the case against the anesthesia status quo was New Yorker F. D. Weisse. "Had I the power to make and enforce law, I would make a law forbidding the administration of any anaesthetic, except by or in the presence of a regular graduated doctor of medicine or dental surgeon. The majority of those who are today giving nitrous oxide are mere amateurs...who understand but little of the practice and less of the theory of anaesthesia."4

By the early 1890s concerns about anesthesia appeared regularly in the medical literature. "There is a decided tendency among the older members of the profession," W. L. Coplin observed in 1892, "to have a medical student administer the anaesthetic...For my own part, were I to undergo an operation of any gravity... I should prefer that the student do the operation and that the surgeon administer the anaesthetic."5 Coplin, a surgeon by training, spoke from experience. He had spent more than five years administering anesthesia at the Jefferson Medical College Hospital in Philadelphia and to the private patients of various surgeons and gynecologists in that city.<sup>5</sup> Sometimes this careless attitude toward anesthesia was tied to specific events. A medical editorial writer in Denver in 1894 asserted that several recent operative deaths were due to the "bungling and improper way" in which the anesthetics had been administered. He further noted.

"A certain doctor in Denver, a well-known and reputable physician doing a large practice, said to the writer not long since when discussing the remuneration of a physician who had given an anesthetic, 'Oh, five dollars is enough for him, too much, in fact, for anyone can give ether.""<sup>6</sup>

In 1898 the *Journal of the American Medical Association* editorialized about the "indifferent" anesthetist:

> When the patient is under, the anesthetist, who has given ether two or three times, wishes to demonstrate to the assembled students and spectators his entire familiarity with etherization by indifferently gazing around the room or at the field of operation, or he exchanges jokes with a bystander. This is essentially wrong and it is a wrong to be corrected by the operator himself. No operator should permit any man to administer his anesthetics unless he is competent to do so and willing to direct his undivided attention to the patient.<sup>7</sup>

Poor payment for anesthesia services concerned some commentators. "For the operator to charge \$100 or \$200 for performing a simple uncomplicated operation and give the anesthetizer \$5 for conducting a difficult and complicated anesthesia...is an injustice which is not calculated to increase the number or efficiency of anesthetizers," complained Galloway of Chicago in 1899. Yet poor pay was not the only problem; contempt by some surgeons for anesthesia administration seems to have also been common. "A patient ... " wrote Galloway, "requested that the most experienced anesthetizer available be obtained. The surgeon informed the patient that that would cost \$25 additional, and the patient said he would gladly pay it. The surgeon employed a student to give the anesthetic, collected \$225, gave the student \$5..."8

After 1900, criticism of the quality of American anesthesia practice intensified. Heinick warned in 1901, "Never should the surgeon administer chloroform or ether, and operate at the same time. It is false economy. There is no scarcity of physicians. It is unsafe. Deaths have been caused by this practice."9 Apparently that practice was still common enough in 1901 to provoke comment. Seven years later Roberts published an article with the alarming title "The Anaesthesia Peril in American Hospitals."<sup>10</sup> In that article, he noted, "During a recent visit in a metropolitan medical centre I was shocked at the reckless manner in which general anaesthetics were given. Observations during my surgical life in some ten or more hospitals...has convinced me that a protest against the methods... is urgently needed." In the same year, Baldy stated flatly, "The general administration of anaesthetics as performed to-day is the shame of modern surgery, is a disgrace to a learned profession, and if the full, unvarnished truth concerning it were known to the laity at large it would be but a short while before it were interfered with by legislative means..."11

In 1910 two other critics continued these themes. "Yet the majority of doctors treat anaesthetics lightly," wrote Porter, "and some delegate the giving of chloroform in obstetrics to the husband or the nurse while they use forceps in the delivery. Is there anything in the practice of medicine where we are as careless as in this one of anaesthesia?"<sup>12</sup> In that same year Barnesby published a book with the alarming title, Medical Chaos and Crime, which contained such chapters as "The Surgical Novice" and "The Amateur Anaesthetist." In that latter chapter, he wrote, "and though [America is] the birthplace of modern anaesthesia, the discovery of which has brought relief to countless thousands, we permit the administration of anaesthetics by any Tom, Dick or Harry who can be pressed into service." Barnesby further noted, "were a public investigation called for at the present time, the employment of trained anaesthetists, or the adoption of adequate measures for the safety of the patient, would be found to be the exception rather than the rule."<sup>13</sup> Complaints about anesthesia administration by the inexperienced continued into the 1920s. In 1922 Flagg noted in the third edition of his textbook The Art of Anesthesia, "We must realize that this business is a most serious one; that its frequent execution by the youngest and most inexperienced interne [sic] is a most unjust thing."<sup>14</sup> Despite the passage of almost three decades, the situation was little improved from Weisse's conclusions in 1882.

By 1900 numerous nurse anesthetists worked in the United States; many of them were nuns in Catholic hospitals. Also by that date a few physicians were making anesthesia a significant if not complete part of their practices. Thomas D. Buchanan<sup>15</sup> and Thomas L. Bennett began practice in New York City in 1899; S. Ormand Goldan began practice in that city the following year.<sup>16</sup> Just three years earlier the *Medical Record* of that city had declared, "So far as we are informed in the
matter, there exists in this great city no physician who makes a specialty of administering anaesthetics. There would seem, however, to exist a demand in that direction."<sup>17</sup>

As early as 1891 the American Medical Association's journal had editorialized about physicians and anesthesia administration. "That the administration of an anaesthetic by a physician for any purpose whatever, except in obstetrics and cases of emergency, without the presence of another physician, when such can be procured, is to be condemned," the editorial stated. "In a large city like Indianapolis, where the services of an expert in anaesthesia can always be procured, the physician who does not avail himself of such services should be held to a strict accountability for any disastrous results that may occur."<sup>18</sup>

Even in the small town of Selma in the poor, rural state of Alabama, some physicians were extolling the value of a specialty of anesthesia by the mid-1890s.

> The administration of anaesthetics should be considered a specialty. The anaesthetist should be an anaesthetic specialist, both in theory and in practice. The time has fully come when we should abandon forever the too common practice of inviting men with neither special knowledge of anaesthetics, nor the proper methods of their administration, to steer our patients through so dangerous a voyage.<sup>19</sup>

A decade and a half later, in Birmingham, the largest city of the same state, a surgeon named Edmund Prince expressed similar sentiments. "The first essential is to have an anesthetist of ability and one who has given much time and thought to this subject. He should be employed to give every anesthetic, so that his experience in this work would enable him to become more efficient," wrote Prince, "and he should be paid as every other specialist is paid; no attempt should be made to secure the services of a high-class physician at the price of a workman."<sup>20</sup>

For several years Prince employed a fellow Birmingham physician, James R. Dawson, to administer nitrous oxide-oxygen anesthesia for thousands of his cases. Prince often complimented Dawson's work in his published papers, and apparently Dawson was his model physician anesthetist.<sup>21</sup> Two years earlier Prince had expressed another sentiment common to many critics of American anesthesia practice at that time: "The anesthetic should be given by one who is thoroughly qualified to do this work. The day for selecting a man to give the anesthetic because he is the possessor of the least quantity of gray matter has passed, and the people are beginning to demand that they be protected in this respect as in others."22

Some physicians expressed the need for professional anesthesia services and noted the drawbacks at the same time. "An excellent solution of the problem, and what ought to be the desideratum of every surgeon, would be the professional anaesthetist," wrote Simon in 1898. "It is doubtful, however, whether one taking the work up as a specialty could make a living at it alone; and especially is this true in the smaller cities."23 J. Montgomery Baldy of Philadelphia echoed this argument eleven years later. He argued that physician anesthetists were "a perfect solution" but went on to note the lack of such medical men due to "the disadvantages of the scientific narrowness and lack of opportunity for distinction and income to hold a sufficient number of men of this type."24 Baldy used this conclusion to argue for nurse anesthetists as the best practical solution to the need for specialty anesthesia training.

Not all commentators on anesthesia practice had a pessimistic outlook. In his 1910 address to the North Carolina State Medical Society, C. O. Abernethy observed that the status of anesthetic practice was improving. Realizing that this branch of the profession was so very important, the medical schools of the country began to establish departments for its teaching. Their attention being thus drawn to it, the profession began to demand that anesthetists make themselves proficient, so young men began to specialize on this subject until today nearly every large hospital, all cities and most surgeons have their special anesthetists, who devote practically their whole time to the administration of anesthetics.<sup>25</sup>

In the same year his colleague Eugene Metzenbaum, anesthetist at Mt. Sinai Hospital in Cleveland, Ohio, expressed a bit more negative outlook.

> The professional anesthetist has thus far not been able to establish in the minds of the laity or the profession generally the true value of his services. This is due to the fact that the importance of the anesthetic is not known to the patient and its direct bearing upon the success of the operation fully appreciated by the many who perform occasional surgery.<sup>26</sup>

Perhaps personal experience led each of these men to such different conclusions.

Critics of anesthesia practice at this time noted the complexity of anesthesia and the importance of the anesthetist to the condition of the patient. "The position of the anaesthetist is not an easy one. Upon him depends not so much the success of the operation (for every operation is successful and beautiful even though the patient die), but the recovery of the patient," Simon noted.<sup>23</sup> More than twenty years later the great surgeon Frank Lahey made the same argument for professional anesthetists. "[I]n our opinion, there exists no more forceful argument in favor of the regular employment of a trained anesthetist than the fact that once the operation is under way, the responsibility as to whether the patient is going to be able to endure the complete procedure is almost entirely in the hands of the anesthetist."<sup>27</sup> Lahey supported physician anesthesia and over the years hired Drs. Lincoln Sise and Philip D. Woodbridge to administer anesthesia for his clinic.

In 1912 a Committee on Anesthesia made its report to the American Medical Association's House of Delegates. Chaired by Dr. Yandell Henderson of Connecticut, the five member committee stated forcefully, "Anesthesia should cease to be regarded as merely an adjunct of surgery...It should be in charge of those whose principal aim is, not to see as much of the operation as possible, but to administer anesthesia in such a manner as to bring the patient through with the least possible loss of vitality."28 Coming just two vears after Flexner, this report had little effect on anesthesia practice, but it did put the AMA on record as supporting improvement in anesthesia practice.\*

Some early writers declared the need for better education in anesthesia. "As the success and progress of surgery depend in a large measure upon the safety of anesthesia, it is evident that too much study can not be given to this subject," Heinick wrote in the 1901 edition of his textbook. "An operation may be practically devoid of danger, while an anesthetic is never administered without imperiling the life of the patient."<sup>29</sup> Eight years later Peterson was even

#### **Editorial Comment**

\*In spite of this favorable committee report, the AMA in that same year, 1912, rejected a request for a separate anesthesia section for presentations at the AMA annual meetings—a recognition by organized medicine of anesthesia as a specialty, which was not attained until 1940, twenty-eight years later!

more explicit. "For some years past I have felt that we were not doing our duty toward the undergraduate in sending him forth upon his life's work with little or no experience in the practical administration of anaesthetics," he wrote.

> [I]t is only by such a systematic course of instruction in the theory and practice of administering anaesthetics that we can ever hope to deal with the problem we have under consideration. The faculty of the department of medicine and surgery of the University of Michigan have only this spring placed themselves on record in favor of such a course.<sup>30</sup>

As we have noted, a number of physicians lodged serious complaints about the quality of anesthesia administration in the United States in the forty years between about 1880 and

	1920. These physician-
"It is evident	authors also declared
that too much	the need for specialists
study can not	trained in anesthesia-
be given to this	especially physician
subject," Heinick	anesthetists. By 1920
wrote in the	little had changed;
1901 edition of	the same complaints
his textbook. "An	echoed across the
operation may be	decades. Some physi-
practically devoid	cian anesthetists were
of danger, while	practicing, and societ-
an anesthetic is	ies and journals were
never adminis-	beginning to meet and
tered without im-	publish. Even at this
periling the life	early date, observers of
of the patient."	the situation had a posi-
	tive vision of things to

come. "A word as to the future of anesthetization, instead of the haphazard methods of administering anesthetics they will be properly taught by those competent to teach," wrote S. O. Goldan, the New York City physician anesthetist, in 1901. "The anesthetist will not be considered a mere satellite of the surgeon, but recognized as one of a distinct class. There will be an incentive to men to give their best energies to the perfection of anesthesia."<sup>16</sup> Goldan himself was an enthusiastic promoter of physician anesthesia; he had published seven articles on aspects of anesthesia in just the previous year! Goldan, an early pioneer in regional anesthesia, only practiced the specialty for seven years and stopped publishing as well when he abandoned anesthesia.<sup>31/33</sup>

In 1919, early in his career, Ralph Waters published an article that expressed his similar positive vision for the future of anesthesia. "No more is the occasional necessity for a layman or a nurse to administer an anesthetic, an argument that we physicians should not fit ourselves to do the best work that can be done in that line and help to develop the science, to make it better," he wrote. "I wish especially to appeal to the physicians...in every town who occasionally give anesthetics, to wake up, get busy, and make anesthesia a part or all of your business. Do it the best you know how every time you officiate at the head of the table. Learn all there is to find out about it, and help the rest of us to do it better by adding to the developments already made."32

Eight years later Waters was invited to Madison, Wisconsin by Chief of Surgery, Erwin Schmidt, to establish an academic anesthesia program at the medical school. The program he started, and the programs started by many of his trainees, finally provided a mechanism to address some of the problems with anesthesia practice so many physicians had noted for so long.

#### A.J. WRIGHT

#### References

- 1. NM Greene, Anesthesiology and the University (Philadelphia: Lippincott. 1975): 28-32.
- 2. "Medical societies," Hosp Pract 3:14 (December 31,1859): 305.
- 3. WA Bradfield, "Puerperal eclampsia: chloroform—forceps—puerperal mania," *Trans Med Assoc State Alabama* (1875): 138-140.
- 4. FD Weisse, "The obligations and responsibility of an administrator of an anaesthetic," *Medico-Le*gal Soc NY, 2nd series (New York: W.F. Vanden Houten, 1882): 144-160.
- 5. WM Coplin, "Anaesthesia. Some practical suggestions for the guidance of those who administer anaesthetics, and for those who have anaesthetics administered," *Therap Gaz* 16 (1892): 370-375.
- 6. "Death from anaesthetics in Colorado," Denver Med Times 14 (1894): 219.
- 7. Editorial, "The indifferent anesthetist," JAMA 31 (1898): 613.
- 8. DH Galloway, "The anaesthetizer as a specialist," Phila Med J 3 (May 27, 1899): 1173-1175.
- 9. AP Heinick, General and Local Anesthesia, 2nd ed. (Chicago: G.P. Engelhard, 1901): 10.
- 10. JB Roberts, "The Anaesthesia Peril in Ameican Hospitals," Therap Gaz (February 1908).
- 11. JM Baldy, "The general administration of anesthetics," Trans Am Gynecol Soc 30 (1908): 3-10.
- 12. M Porter, "The trained anaesthetist," Lancet 103 (1910): 641-644.
- 13. N Barnesby, Medical Chaos and Crime (London and New York: M. Kennerley, 1910): 176, 181.
- 14. PJ Flagg, The Art of Anaesthesia, 3rd ed. (Philadelphia: Lippincott, 1922): 72.
- 15. FM Dearborn, "Thomas Drysdale Buchanan (1876-1940)," Anesthesia History Association Newsletter 9:1 (Jan. 1991): 6.
- 16. SO Goldan, "Anesthetization as a specialty: its present and future. A consideration of the subject based upon an extensive experience in the administration of anesthetics," *Am Med* 2 (1901): 101-104.
- 17. "The professional anaesthetizer," Medical Record (NYC) 51 (1897): 522.
- 18. Editorial, "Another death from chloroform," JAMA 16 (1891): 347.
- 19. G King, "Surgical shock," Trans Med Assoc State Ala (1895): 335-338.
- 20. EM Prince, "Gas-oxygen anesthesia. Observation in 2,000 cases," JAMA 58 (1912): 1342-1344.
- 21. AJ Wright, "Three early physician-anesthetists in Alabama," Anesthesiology 89 (1998): A91.
- 22. EM Prince, "Caesarean section, report of seven cases without loss of mother or child," *Alabama Med J* 23 (1910): 685-694.
- 23. S Simon, "The relation of the operator to the anaesthetist," *Medical Record* 52 (February 12, 1898): 230-231.
- 24. JM Baldy, "The nurse as anaesthetist," Surg Gynecol Obstet 8 (1909): 545.
- 25. CO Abernethy, "The anesthetist: a specialist," South Med J 3 (1910): 489-491.
- 26. E Metzenbaum, "The professional anesthetist," Ohio State Med J 6 (1910): 124-127.
- 27. F Lahey, "Relations of the surgeon and the anesthetist," Am J Surg 35 (1921): 108.
- 28. "Committee on Anesthesia report to AMA House of Delegates," JAMA (June, 1912).
- 29. AP Heinick, General and Local Anesthesia, 2nd ed. (Chicago: G.P. Engelhard, 1901): 8.
- 30. R Peterson, "The advisability of making the practical administration of anesthesia a required part of the medical course," *Surg Gynecol Obstet* 7 (1909): 525-527.
- 31. SO Goldan, "Anesthetization as a specialty: its present and future. A consideration of the subject based upon an extensive experience in the administration of anesthetics," *Am Med* 2 (1901): 101-104.
- 32. BR Fink, "Leaves and needles: the introduction of surgical local anesthesia," *Anesthesiology* 63 (1985): 77-83.
- 33. RM Waters, "Why the professional anesthetist?" Lancet 39 (1919): 32-34.

**P**rofessionalism and Ralph M. Waters, M.D., go hand in glove. From its very beginnings, anesthesia practice and education sprouted from the example set by Ralph Waters. He was a prime example of an individual who understood professionalism. In establishing the first university-based graduate medical education

## Alan Jay Schwartz

# **PROFESSIONALISM: A DEFINITION**

program designed specifically for anesthesiology, Dr. Waters set a tone that he wrote about and demonstrated by example. In, "The Requirements of an Anesthesia Service," Waters described what he termed, a "fictitious" anesthesiologist. This ideal anesthesiologist would display the following traits. She/he must "be an excellent practitioner of medicine," and "must have sympathy and forbearance with... fellow practitioners whose patients come under his care...[and] have respect for their help and advice."<sup>1</sup>

It was the conceptualization, articulation, and real life demonstration of these traits that set Dr. Waters apart from others and placed him ahead of his time. He recognized that physicians, in general, and anesthesiologists, in particular, must be professionals in the broadest sense of the word. He believed that professionalism must be taught by example and as a subject matter. He recognized that professionalism is the basis of medicine's contract with society.

What is professionalism? The new physician's charter defines it well.<sup>2,3</sup> A modern day "oath" for physicians, the new physician's charter lists three fundamental principles and nine professional responsibilities that define professionalism.<sup>2,3</sup> The fundamental principles include: The *Principle of primacy of patients' welfare*, ie, the dedication to serving the interest of the patient first.

The *Principle of patients' autonomy*, i.e., physicians must be honest with their patients and empower them to make informed decisions about their health care. Patients' decisions about their care must be paramount as long as they are ethical and don't lead to demands for inappropriate care. Remember that it is the physician who is the guest in the patient's world.

The *Principle of social justice*, i.e., medical professionals must promote fair distribution of health care resources and eliminate all forms of discrimination in the delivery of health care.

To achieve these fundamental principles, physicians must assume responsibilities that model professionalism.<sup>2,3</sup> The responsibilities that model professionalism include:

*Commitment to professional competence*, i.e., lifelong learning and processes for continuous quality improvement.

*Commitment to honesty with patients,* i.e., to ensure that patients are completely and honestly informed.

*Commitment to patients' confidentiality*, i.e., especially in this age of electronic information.

*Commitment to maintaining appropriate relationships with patients*, i.e., to recognize and respect their vulnerability and dependency.

*Commitment to improving quality of care*, i.e., continuous quality improvement activities and maintaining clinical competence.

*Commitment to improving access to care*, i.e., to eliminate barriers to access based on education, laws, finances, geography and social discrimination.

*Commitment to a just distribution of finite resources*, i.e., balance between needs of individual patients and cost effective management of limited clinical resources for society's benefit.

*Commitment to scientific knowledge,* i.e., based on the integrity and appropriate use of scientific knowledge and technology.

Commitment to maintaining trust by managing conflicts of interest, i.e., an obligation to recognize, disclose to the public and deal with conflicts of interest.

*Commitment to professional responsibilities*, i.e., professionals work together to maximize patients' care, be respectful of each other, and participate in the process of self-regulation including remediation and discipline of peers who have failed to meet professional standards.

Realization of these responsibilities will occur most effectively in the context of an educational process.

Ralph Waters was a visionary with respect to a high standard of values in the practice of

medicine. Today, however, a problem exists when it comes to Professionalism. "The Two Cultures and the Health Care Revolution. Commerce and Professionalism in Medical Care" is a recent paper highlighting this problem. The authors' premise is that there are two cultures in medicine—professionalism and commerce—and both have much to offer in strengthening medical care and reducing costs. The authors point out, however, that the two cultures are currently at odds with each other as commerce has invaded medical care. Medical care, once the exclusive purview of physicians has changed with the result that professionalism has suffered greatly.<sup>4</sup>

In professional medical care, the physician assumes responsibility for the patient's welfare. This is the anesthesiologist's "unwritten contract" with her/his patient, "assured by a few words, a handshake, eye contact denoting mutual understanding or acknowledgment by the physician to the patient that, 'We will take care of you.'"<sup>4</sup> You see it don't you? The Marcus Welbys of the medical world! These are the professional practitioners who value the patient's welfare above their own, who provide patient care even at financial loss and despite physical discomfort or inconvenience.

This is in stark contrast to commercial medical care. "The fundamental objective of commerce in providing medical care is achieving an excess of revenue over costs while caring for the sick...[The primary goal is not to ensure care for the sick, which does happen, but rather to ensure] profit for corporate providers, investors or insurers."<sup>4</sup> A central feature when enhancing net income over expense in the commercial model and competitive market, is to reduce volume or perhaps the quality of services, to reduce the costs, at the same time prices to the patient/purchaser are maintained or increased.<sup>4</sup>

Do you recognize this picture? Do you think there is a problem here? Do you think professionalism is at risk in this setting? It's In professional medical care, the physician assumes responsibility for the patient's welfare. This is the anesthesiologist's "unwritten contract" with her/his patient, "assured by a few words, a handshake, eye contact denoting mutual understanding or acknowledgment by the physician to the patients that, "We will take care of you."

amazing that professionalism really doesn't have to be explicitly defined as we all recognize what it is and isn't. The same statement used by our judicial system to talk about pornography, "It's hard to define but you know it when you see it," can be used when talking about professionalism.

The essence of the conflict between profes-

sionalism and commerce is that when a corporation employing physicians seeks profit by selling their services, the physician-employees cease to act as professionals.<sup>4</sup> They "cease to act as free agents."4 Professional commitment to patient care may be or in many instances is subordinated to the new rules of practice that assure the profitability of the corporation or the insurance company first, and the care of the patient second. It is important to recognize that this applies to all settings including voluntary nonprofit models of health care delivery, particularly prepaid health plans and teaching hospitals, as well as fee for service arrangements. Physicians, the professionals, "[find] themselves increasingly burdened by clinical constraints intended to insure the survival of the hospital, the plan or the insurance carrier in a fiercely competitive market."<sup>4</sup> It is interesting and quite curious that what is being assured is survival of the hospital, the plan, or the insurance carrier first, and not the survival of the patient!

The editorial that accompanied the paper by McArthur and Moore insightfully points out that while people say that medicine and business are incompatible, they aren't, and, in fact, have to be made compatible for the benefit of both patients and society.<sup>5</sup> The potential for monetary motives to undermine medical care is real. Professionalism, Linda Emanuel says, must be the strong protector of patients and health care. She makes it very clear when she states, "unless investors in medical business can be held accountable for promoting medical professional standards, managers will always have an imbalanced motive to give priority to investment returns."<sup>5</sup>

What would Ralph Waters have done to address a dilemma like the one presented to today's physicians as commercialism butts heads with professionalism? How would he have fostered the professionalism that is so necessary for the healing of body and soul? It's probable that Ralph Waters would have subscribed to a process that educates physicians about professionalism.

In our modern era, the American Board of Internal Medicine (ABIM) did just that. In 1990 the ABIM launched its Project Professionalism.<sup>6,7</sup> In many ways this has become the standard for educating physicians on Professionalism.<sup>6,7</sup> Project Professionalism set out to, "Define Professionalism, Raise the concept of Professionalism in the consciousness of all within internal medicine. Provide a means for inculcating the concepts of Professionalism within...[resident physician education] and Develop strategies for assessing Professionalism of residents and subspecialty fellows [during their education]."6.7 The ABIM started this initiative because it was worried about the same types of problems already cited, some examples: ethical dilemmas posed by a pharmaceutical industry influencing medical decision making, fraud in medical research, conflict of interest exemplified by self-referral and physician impairment.6

The ABIM defined Professionalism as those attitudes and behaviors that serve to maintain patient interest above physician self-interest.<sup>67</sup>

Much like the new physician's charter, these include:

*Altruism*: The essence of Professionalism, i.e., keeping the best interest of patients above self-interest.

Accountability: To patients, to fulfill the patient/physician contract; to society, to address health care needs of the public and to our profession, to adhere to "med-icine's time honored ethical precepts."

*Excellence*: Life-long learning and a "conscientious effort to exceed ordinary expectations."

*Duty*: Commitment to service for patients—24/7/365—regardless of ability to pay.

*Honor and integrity*: "Refusal to violate one's personal and professional codes" and avoidance of conflict of interest.

*Respect for others*: "Patients, their families, other physicians, professional colleagues... nurses, medical students, residents, and subspecialty fellows...[this] is the essence of humanism...[that] is...central to professionalism and fundamental to enhancing collegiality among physicians."

Ralph Waters no doubt would have agreed with the statement by the ABIM that, "A major responsibility of those...[who are educating] residents and subspecialty fellows is to emphasize the importance of Professionalism." <sup>6,7</sup> Not only would he have agreed, he would have role modeled it in patient/anesthesiologist and anesthesiologist/other health care provider relationships. Anesthesiologists are quite good and very methodical at teaching knowledge and psychomotor skills. An important question to ponder is: are anesthesiologists as good at teaching attitudes and values, in other words, at teaching Professionalism?

Other medical specialties are at varying stages of development of professionalism curricula. Some, like the American Board of Pediatrics (ABP), have developed a specific educational program for its graduate medical trainees. Pediatrics has mandated Professionalism education and assessment of residents. Where does anesthesiology stand in this? The American Society of Anesthesiologists (ASA) has made a great effort to address the issue of the impaired physician, one specific aspect of Professionalism. A model curriculum for substance abuse education has been developed by the ASA. The American Board of Anesthesiology (ABA), however, has not yet fully developed this type of educational focus for its graduate medical trainees. Were Ralph Waters alive today, undoubtedly he would be a leader in developing this educational focus in anesthesiology.

ABIM's Project Professionalism set the stage for a much broader application of the concepts of Professionalism and their being linked to education of physicians. The Accreditation Council for Graduate Medical Education (ACGME) recently introduced its Outcome Project.8 This is intended to be a method for enhancing residency education through outcome assessment. At its February 1999 meeting, the ACGME identified six general competencies that must be incorporated into residency education. Knowledge, skills, and attitudes must be defined so that educational experiences can be provided and residents evaluated with respect to their having achieved competence in these areas upon graduation and assuming the role of new practitioner.8 The six competencies include patient care, medical knowledge, practicebased learning and improvement, interpersonal and communication skills, Professionalism, and systems-based practice.8 How does the ACGME define Professionalism?<sup>8</sup>

Residents must demonstrate a commitment to carrying out professional responsibilities,

adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:

> Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development.

> Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices.

> Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities"

As one reads the details of what the AC-GME expects graduate medical trainees to be able to do, a consistent theme that we have already heard in the new physician charter and the ABIM's Project Professionalism emerges. The ABA is in the initial discussion phase about Professionalism education. In the next few years the ABA will have to act in a fashion similar to the ABIM and the ABP and incorporate a specific educational curriculum about and assessment of competence in Professionalism in its requirements. This will have to evolve, as this is a priority of the ACGME, the organization that accredits the educational programs that produce the candidates that the Boards certify. As this process evolves, the public trust that a sage anesthesiologist such as Ralph Waters exemplified and taught to others will be preserved.

There are modern day physicians that mimic what Ralph Waters exemplified. A very good example of such an individual is Donald M. Berwick, MD, MPP. Dr. Berwick is a pediatrician. As a physician and also as the President and CEO of the Institute for Healthcare Improvement, Dr. Berwick has, like Ralph Waters, taught and role modeled Professionalism.<sup>9</sup> The mission statement for his organization: "The Institute for Healthcare Improvement (IHI) is a not-for-profit organization driving the improvement of health by advancing the quality and value of health care." It speaks loud and clear about the goal expressed in the editorial, "Bringing market medicine to professional account."<sup>9</sup> Berwick's message, like Waters' own, is one for the need to place Professionalism very high on the list of physician values. Berwick can be heard giving this message in his 1999 keynote address at the IHI annual conference.<sup>10</sup>

Celebrating the 75th anniversary of the arrival of Ralph M. Waters in Madison, Wisconsin, provides a great opportunity to remember what Professionalism meant to this giant in Anesthesiology, and to consider its place in modern day medicine.

#### Alan Jay Schwartz

#### References

- 1. RM Waters, "The requirements of an anesthesia service," Anesth & Analg 11 (1932): 219-223.
- 2. Medical Professionalism Project, "Medical professionalism in the new millennium: a physicians' charter," *Lancet* 359 (2002): 520-522.
- 3. Medical Professionalism Project, "Medical professionalism in the new millennium: a physicians' charter," *Ann Inter Med* 136 (2002): 243-246.
- 4. JH McArthur and FD Moore, "The two cultures and the health care revolution. Commerce and professionalism in medical care," *JAMA* 277 (1997): 985-989.
- 5. L Emanuel, "Bringing market medicine to professional account," JAMA 277 (1997): 1004-1005.
- 6. American Board of Internal Medicine Committee on Evaluation of Clinical Competence, and the IBIM Clinical Competence and Communication Project, *Project Professionalism* (Philadelphia, PA: IBIM, 1995).
- 7. www.IHI.org
- 8. www.ACGME.org/Outcome/
- 9. www.IHI.org
- 10. www.IHI.org/resources/videos/

e are celebrating the 75th anniversary of the arrival of Ralph Waters in Madison, Wisconsin. In those seventy-five years, a legend has grown up around Dr. Waters. Who was Ralph Waters, and what did he accomplish? Why have his contributions remained at the forefront of anesthesia and anesthesia history, while

### Douglas R. Bacon

# WHY CELEBRATE RALPH MILTON WATERS?

those of many of his contemporaries have slipped from the collective conscience? And, how has Waters' work in Madison translated to the world of anesthesiology both contemporaneously and historically?

#### The Beginning

Ralph Waters was born in North Bloomfield, Ohio, on October 9, 1883. He was the only son, with two sisters to complete his nuclear family. At the age of seven, Ralph had many chores, some of which included herding sheep and cows from horseback. He was also to deliver milk to the neighbors for which he designed a cart with a lamb as the power plant! In 1891, the family moved to Austinburg, Ohio because his mother, a schoolteacher, felt that the educational opportunities were better in a larger community. Ralph attended and eventually graduated from the Grand River Institute at Austinburg in 1901.<sup>1</sup>

In 1903 Waters enrolled in the Adelbert College of Western Reserve University. Four years later he graduated with a degree in Liberal Arts. It is most likely that he studied history there, which would become a life-long interest with historical publications scattered in amongst his more "scientific" work. He began his medical studies shortly after graduation, enrolling in Western Reserve Medical School in 1907. Waters interned at the German Hospital in Cleveland in 1911 and was awarded his medical degree in 1912.<sup>1</sup> It was during his medical school years that Waters most likely gave his first anesthetics. Charles Teter, a dentist and skilled anesthetist, especially with nitrous oxide, was one anesthetist Waters would have observed. As an intern Waters undoubtedly gave anesthetics.<sup>1</sup>

#### **Private Practice**

Waters' early career was an interesting one. After graduation he established a thriving private practice in Sioux City, Iowa, and later in Kansas City. In January of 1913, Sioux City had about 65,000 people and 100 physicians, of which 95 operated. Waters began practicing obstetrics and giving anesthetics. However, a surgeon returned from a trip East with a nitrous oxide apparatus. In exchange for Waters' exclusive anesthetics, Waters could have the machine.

In the spring of 1913 Ralph Waters returned to Ohio and married Louise Diehl. They returned to Sioux City and settled into professional and domestic life together. In 1916 Waters joined the Iowa National Guard and was ordered to duty during World War I as a lieutenant in the medical corps. Waters was stationed in Texas. Around this time Waters' discovered the *Quarterly Supplement* to the *American Journal of Surgery*, and over the next several years began attending meetings of physician anesthetists.<sup>1</sup> Waters began to work on some of the problems of anesthesia. His first two papers were published in 1919. In the first, entitled, "Why the Professional Anesthetist?" Waters argued forcefully for the creation of a medical specialty of anesthesia from within the ranks of physicians. Thus, he foreshadowed his own career, emphasizing teaching and the need for medical schools to include anesthesia in the curriculum.<sup>2</sup> His second paper dealt with an ambulatory anesthesia clinic within an outpatient surgical center Waters had established to help meet the needs of both patients and surgeons given limited operating room available in Sioux City.<sup>3</sup>

In 1924 Waters left Sioux City for the larger metropolis of Kansas City. His family had grown; now he had four children, two sons and two daughters. In Kansas City the ambulatory anesthesia clinic was even more popular, thus adding to his professional reputation.<sup>1</sup> Waters continued his interest in scientific and clinical problems in anesthesia. He researched and wrote on carbon dioxide absorbance<sup>4</sup> and developed a cuffed endotracheal tube<sup>5</sup> with his friend Arthur Guedel, whom he had met at meetings of physician anesthetists. Another colleague he met this way was John Lundy.

#### **The Mayo Influence**

In 1924 John Lundy had left his practice of anesthesia in Seattle, Washington, and ventured to the Mayo Clinic in Rochester, Minnesota. Lundy at first was responsible solely for regional anesthesia at the clinic, taking over the work begun initially by Gaston Labat. Within two years, Lundy was responsible for all the anesthetics given at the clinic.<sup>6</sup> Lundy had a keen interest in the work Waters was doing with carbon dioxide absorbance, and Waters was curious about the regional anesthesia Lundy was doing.<sup>7</sup>

Waters soon believed that an opportunity existed for him to increase his regional anesthetic skills. Lundy urged that he come to Rochester soon, because "as time goes on there is more and more opportunity to observe and less and less of an opportunity to get actual experience. You can do well to come as soon as you can."<sup>8</sup> With four children and a wife to support, taking time from practice was difficult. The two arranged for Waters to arrive in time to start his regional anesthesia training for the quarter of the academic year beginning July 1, 1926.<sup>9</sup> Lundy sent Waters a Mayo Foundation application to insure that all the paperwork was done correctly. Waters was to become a voluntary resident in regional anesthesia.<sup>10</sup>

Waters arrived and began his work at the Mayo Clinic on July 5, 1926, leaving on September 15th. He worked in the section on regional anesthesia, most likely performing and observing blocks for surgery. The University of Minnesota and the Mayo Foundation graded him as a voluntary resident for Education and Research as all residents were at the time.<sup>11</sup> This time served to cement the relationship between Lundy and Waters, who would work together for the benefit of anesthesia for almost a quarter century. However, Waters' time at Mayo, half the time Robert D. Dripps, an acknowledged Waters' alumnus, spent in Madison, begs the question: is Waters really a Mayo Alumnus? Until the creation of the American Board of Medical Specialties in 1934 and the beginnings of standardization in postgraduate education, residency training was variable. Many physicians have claimed to be residents of programs in which they trained for less than a year, and many programs have also acknowledged residents as alumni who pursued graduate education with that program for less than a year. For example, Virginia Apgar is considered to be a Waters' alumna, yet she spent only six months in Madison. Likewise, Robert Dripps spent nine months training with Waters and is considered an Aqualumnus. Therefore, by logical extension, can the work of Waters be credited as a derivation of the Mayo Clinic anesthesia department, just as the work of Waters' alumni have been credited to University of Wisconsin program?

#### The University of Wisconsin

Shortly after leaving the Mayo Clinic, Waters reinjured his back. His sacroiliac was manipulated, and he was placed at bedrest in a cast.<sup>12</sup> While he was recovering, the University of Wisconsin offered him a position in charge of anesthesia.<sup>13</sup> Thus, Waters desire for a less strenuous practice with a guaranteed salary was before him. The move was also attractive for personal reasons. Waters' youngest sister lived in Madison; she was married to a professor in the Department of Agricultural Bacteriology. Also, Ralph knew the city well, having spent summers while in college helping to build one of the large office buildings near the capitol.<sup>1</sup>

The University of Wisconsin afforded him both a different type of practice and an opportunity to, "work toward bringing back of anesthesia into the medical profession where it originally was and where it undoubtedly belongs. The only way I could see of really basically helping this movement was through the educational institutions."<sup>14</sup> The challenge Waters accepted in 1927 was to design and implement a residency training program in anesthesia. Waters chose to make the training three years after the internship, with the first and third clinical and the second laboratory based research. Waters preferred residents that had already been in general practice for a few years, as these candidates were more mature.15

Waters' reception at the University was warm. Chauncey Leake, of Pharmacology and Toxicology wrote a letter to Waters on February 2, 1927. "I want to express to you my great pleasure at the opportunity of cooperating with you....We should be very happy to have you talk to our students at the 11:00 a.m. lecture, Thursday March 8, on the general subject of practical anesthesia..."<sup>16</sup> The anesthesia community at large was also very receptive to what Waters was doing in Madison. Francis Hoef-

fer McMechan, the leader of organized anesthesia at the time and a recognized international figure, was addressing anesthesia meetings and, Leake states, "talked most enthusiastically of the work you are doing in Madison. He described in considerable detail the organization you have worked out and the plans you have for the future. He also laid great stress on the

Waters' reception at the university was warm. Chauncey Leake, of Pharmacology and Toxicology wrote a letter to Waters on February 2, 1927. "I want to express to you my great pleasure at the opportunity of cooperating with you....We should be very happy to have you talk to our students at the 11:00 a.m. lecture, Thursday March 8, on the general subject of practical anesthesia..."

actual achievement you have made and in general held up your work as an example for the whole country to follow."<sup>17</sup>

Once established, Waters' next greatest challenge was to transplant the residency training program to another site while keeping his program alive. Waters wrote,

> My ambition is for the men who spend some time with me here to get eventually in teaching positions in other universities because I think that that is the only way we can hope to improve the specialty in the future. It has therefore been a disappointment to me each time that one of my boys has gone to private practice.<sup>18</sup>

A unique opportunity arose in 1934. Waters most experienced resident, who had remained on the faculty after completing his training, Emery Rovenstine, accepted the position as Director of Anesthesia at Bellevue Hospital, beginning in 1935. While Rovenstine had a difficult time changing surgical practice in the first few months, his results spoke for themselves. Mortality on the surgical service plummeted. Rovenstine then developed his own training program, molded after Waters' own. Soon the two were sharing residents and looking for universities that wanted to develop an academic program in the specialty, in which to place their graduates.<sup>6</sup>

Had establishing an academic department in anesthesia been Waters' only contribution to the field, his career would still be worthy of study. Yet, he was much more involved. In the years before arriving at Madison, he had become enmeshed with the new professional anesthesia societies and had become a close personal friend of Francis Hoeffer McMechan. Waters presented numerous papers and published the results of his work long before he became associated with the scientists at the University of Wisconsin. Once he became established in Madison, however, McMechan relied on Waters to have papers for meetings and to keep a steady flow of young physicians interested in anesthesia coming to the meetings.19

#### Politics

Waters remains best known as an educator. He carefully focused his energies in that field, yet he also worked toward the recognition of anesthesia as a medical specialty. When Mc-Mechan proposed certification for specialists in anesthesia in the early 1930s, Waters supported the initial proposal. Yet, when Waters learned that physician anesthetists who worked with nurses were to be excluded,<sup>20</sup> Waters broke with McMechan, straining their twenty-year friendship<sup>21</sup> and suffered verbal attacks by McMechan's close associates.<sup>22</sup>

In many ways it was Waters who added the imprimatur of academic excellence to the founding of the American Board of Anesthesiology.<sup>23</sup> Waters also played a key role in the difficult mending of the relationship between organized anesthesia and the American Medical Association (AMA). Waters and his department developed exhibits at the AMA annual meeting that displayed for the professional medical community the importance of physician anesthesia.<sup>24</sup> Perhaps, even more importantly, Waters' close relationship with the Chairman of Surgery at Wisconsin, Erwin Schmidt, allowed a proposal for the American Board of Anesthesiology to be certified as a sub-board of the American Board of Surgery to come forward and provide certification for specialists in anesthesia starting in 1938.<sup>23</sup>

#### Conclusion

Why celebrate Ralph Waters' arrival in Madison, Wisconsin? It has been suggested that Henry K. Beecher was responsible, more than any other, for introducing anesthesia into the university.<sup>25</sup> Yet Beecher was appointed in 1936 as anesthetist in chief at the Massachusetts General Hospital (MGH), nine years after Waters' appointment and a year after Rovenstine's appointment at Bellevue. Waters was considered a candidate for the Dorr Chair at Harvard. Waters proposed that he would be the departmental chairman and that there would be a "first assistant" at the various hospitals, with Beecher being designated at the MGH. Finances and the Chair of Surgery, Edward Churchill, prohibited such an arrangement, and Waters declined the position. If Beecher, the great basic scientist, and Waters, the leading educator and clinical investigator, had pooled their talents in Boston, where would anesthesia be today?26

In historical writing today, the careers of outstanding individuals have been de-emphasized. Many authors argue that these individuals are no more than the product of their times and circumstances. Yet, there is a fallacy in that argument, for it negates the influence of the individual in changing his (or her) own destiny. Waters was an active clinical investigator before ever considering his move to the university center. When the right opportunity arose, Waters grabbed it. Did Waters want to do more for the specialty than simply being a sound practitioner? Did Waters have a vision of postgraduate medical education in anesthesiology? Whatever his reasons, Waters' move to Madison was at some personal financial cost. Waters wrote, "I persuaded my wife to forego the possibility of having anything in the way of finances other than bare living for the rest of my days in order that I might spend the rest of my life, if possible, in attempting to further the interest of anesthesia and to do my little bit to help to make the future anesthesia professional anesthesia."<sup>14</sup>

From 1927 until 1949, a span of twentytwo years, Waters was able to revolutionize the practice of anesthesiology. Remembered most often for starting the first university based residency training program, Waters' contributions are more extensive than that, and often his work has remained unknown. In a time when anesthesiology was newly being defined as a medical specialty, Waters worked to insure that it was set on an equal footing within the university, with surgery, internal medicine, and pediatrics, as well as the traditional hospital based specialties of radiology and pathology.

It is his example of personal integrity, and his desire to give back to the specialty that allowed him a living, that makes Waters such a compelling figure. Waters did many things well and was often among the first to do them, including establishing residency training in a form well recognized today, integrating basic science and clinical research, working in administration in both the department and national arenas, and helping to establish specialty certification for physicians that is still recognized around the world.

Waters was, without doubt, a product of his time, yet his career teaches us that being involved and chasing a vision for the specialty can, and ought to be, done.

#### References

- 1. NA Gilespie, "Ralph Waters: a brief biography," Br J Anesth 21 (1949): 197-214.
- 2. RM Waters, "Why the Professional Anesthetist," Lancet 39 (1919): 32-37.
- 3. RM Waters, "The downtown anesthesia clinic," Am J Surgery Anesthesia (Q) Supplement 33 (1919): 71.
- 4. RM Waters, "Clinical scope and utility of carbon dioxide filtration in inhalation anesthesia," *Current Researches Anesth Analg* 3 (1924): 20-22.
- 5. AE Guedel and RM Waters, "A new endotracheal catheter," *Current Researches Anesth Analg* 7 (1928): 238-239.
- 6. J Eckman, "John Silas Lundy," in *The Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield, IL: C.C. Thomas, 1982): 35-48.
- 7. Letters between John S. Lundy and Ralph M. Waters, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.
- 8. Carbon copy of a letter from John Lundy to Ralph Waters, December, 28, 1925, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.
- 9. Ralph Waters, letter to John Lundy, January 7, 1926, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.
- 10. Carbon copy of a letter from John Lundy to Ralph Waters, March 27, 1926, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.
- 11. Record of training Ralph M. Waters, MD, Mayo Foundation Clinic, Rochester, MN.
- 12. Ralph Waters, letter to John Lundy, October 29, 1926, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.

- 13. Ralph Waters, letter to John Lundy, January 3, 1927, John Silas Lundy Collection, Mayo Foundation Archives, Rochester, MN.
- 14. Ralph Waters, letter to Frederick W. Clement, MD, February 3, 1933, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 15. DR Bacon and R Ament, "Ralph Waters and the beginning of academic anesthesiology in the United States: the Wisconsin template," *J Clin Anesth* 7 (1995): 534-543.
- 16. Chauncey Leake, letter to Ralph Waters, February 2, 1927, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 17. Chauncey Leake, letter to Ralph Waters, May 23, 1929, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 18. Carbon Copy of a letter from Ralph Waters to Lincoln Sise, May 5, 1933, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 19. Letters between Ralph Waters and Francis Hoeffer McMechan, The Waters Collection, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 20. "The anesthetist who trains or works with technicians is on a par with the physician who allows his name to be associated with any type of quackery. It is bad enough for surgeons to advocate nurse 'anesthetist' for economic reasons, but I believe that an anesthetist who does so should not be permitted to be a member of the anesthetic society and should not be regarded as a qualified anesthetists whatever his attainments may be." Francis Hoeffer McMechan, letter to Ralph Waters, December 12, 1932, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 21. "I can only say that I should feel very badly to have you class me as an advocate of nursing anesthesia or as one whose ethical attitude toward the practice of anesthesia was seriously different from your own. I do probably differ decidedly from you as to methods of bringing about what we both consider ideals for the future." Carbon copy of a letter from Ralph Waters to Francis Hoeffer McMechan, April 22, 1933, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 22. "I can see your point in reference to the controversy between you and Frank McMechan...as Frank is no more, I hope that you will hold no animosity against the organization or any of its members." Charles Wells, letter to Ralph Waters, July 4, 1940, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 23. DR Bacon and MJ Lema, "To define a speciality: a brief history of the American Board of Anesthesiology's first written examination," *J Clin Anesth* 4 (1992): 489-497.
- 24. Exhibit on Anesthesia 138, 1939. The Collected Papers of Paul M. Wood, MD, The Wood Library-Museum Archive Collection, Park Ridge, IL.
- 25. JS Gravenstein, "Henry K. Beecher: the introduction of anesthesia into the university," *Anesthesiology* 88 (1998): 245-253.
- 26. JP Bunker, "Henry K. Beecher," in *The Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield, IL: C.C. Thomas, 1982): 106-109.

hauncey Leake (1896-1978) graduated from Princeton University in 1917 with a triple major in philosophy, chemistry, and biology. He and others of his graduating class were conscripted to Camp McClelland in Anniston, Alabama, and then to a Depot Brigade in Atlanta, Georgia. It was there that he was recruited by

## John W. Severinghaus

# CHAUNCEY LEAKE'S RESEARCH ATTRACTED WATERS TO MADISON



Figure 1. Chauncey Leake at age 30, In Madison.

University of Wisconsin Physiological Chemistry Professor, Harold Bradley, who had been made personnel officer to recruit sciencetrained draftees into the newly set up Chemical Warfare Service at the Medical Defense Division in Madison. There Leake was joined by, among thirty others, my father Elmer L. Severinghaus, a graduate medical student and later a colleague of Harold Bradley. Leake was assigned to work with Samuel Amberger from the Mayo Clinic and Walter Meek, Professor of Physiology at U.W. They studied chlorine, chlorpicrin, mustard gas, and lewisite to determine their effects on blood acid-base balance.

After the armistice and his military discharge, Leake was invited to remain in Madison as Instructor in Physiology and pursue a Ph.D. while studying morphine's effects with Arthur Loevenhart, professor of Pharmacology, who had just returned from a post in Washington D.C. organizing the toxicological service. In 1923, upon receiving a Ph.D., Leake was appointed Assistant Professor of Pharmacology.

In Madison Leake met, and in 1921, married bacteriologist Elizabeth Nancy Wilson, a 1918 UW graduate. Following up on the war gas effects on metabolism, they collaborated on studies of anesthetic agents and morphine, and later on a search for a cure for anemia. When they discovered effects of morphine on blood reaction, i.e. pH and acid base balance, Leake began to study the anesthetics ether, chloroform, ethylene, and nitrous oxide. Leake, in an oral interview at UCSF said,

Our work in connection with the anesthetic agents showed that they all produced an artificial diabetes, in a way; and we showed that their effects were dependent upon the extent to which they would interfere with oxidation in the body. We published this material quite early, along about 1922, 1923 and 1924.

#### Leake continued,

My work in anesthesia had attracted Ralph Waters to come to Wisconsin. The clinical years were being started...you see, the University of Wisconsin only gave the first two years in Medicine. But

**Ralph Waters set** up the first fullclass Department of Anesthesia in this country, training residents. They were all called the "Water babies." Oh, he was a great, marvelous teacher and he set up the whole program for Anesthesia as a specialty. He and I worked together very happily. He came to Wisconsin because he wanted to work with somebody in Pharmacology.

after they built the big State Hospital there on the campus, then they got into the clinical years, around 1927. Ralph Waters... set up the first full-class Department of Anesthesia in this country, training residents. They were all called "Water the babies." Oh, he was a great, marvelous

teacher and he set up the *whole* program for Anesthesia as a specialty. He and I worked together very happily. He came to Wisconsin because he wanted to work with somebody in Pharmacology.

Well, in 1828, Henry Hill Hickman, in England, had reported on the anesthetic

properties of carbon dioxide. Nobody had ever looked at it since that time, so Ralph Waters and I thought, well, we ought to take a look at it, and see if he was right. So a hundred years later, 1928, we did put out a report on carbon dioxide as an anesthetic agent. It is 30% carbon dioxide and seventy percent oxygen, so there is no possibility of asphyxiation; that is anesthetic. One can maintain, as we did, animals, dogs, rabbits, and so on, eight and ten hours in carbon dioxide anesthesia without any difficulty at all. There is always a little trouble when they go over, a little neck jerking and so on. We tried it in humans but decided not to use it because it upset the surgeons, and all; the animals' neck muscles would twitch; but that would be over pretty quickly. We never had guts enough to hold it in humans. This would be fully physiological: I haven't any idea how on earth it works. Nobody knows how anesthetic agents work, as yet; there are all kinds of theories.

Waters and his family arrived in Madison in January 1927. On February 2, Leake wrote him,

> I have been making ineffectual efforts since Saturday to get in contact with you. I want to tell you how very happy we are to have you here with us, and to express my great pleasure at the opportunity of cooperating with you. It will mean a great deal to us all, I know, to have you associated with us, and I hope that you will find Madison an interesting and enjoyable place in which to live.

During the delivery of the Leake's first son in 1927, a "tough delivery," Waters tried out a new anesthetic Leake had developed. Waters had to stop administering the anesthetic because it relaxed the uterine muscles too much. In August 1927, Leake accepted an invitation from UCSF to spend a term in San Francisco teaching pharmacology. On August 30 he wrote Waters from San Francisco,

> I am sorry that we got away without having an opportunity to visit Mrs. Waters and yourself, but we hope to have that chance as soon as we can return in the winter. We are hoping that you are well settled in Madison and that you will continue to enjoy it. Certainly you have made the finest sort of an impression on all your colleagues and they are enthusiastic over your interest and achievements in your work.

On Sept. 12, 1927, Waters wrote Leake,

You are the best old scout in the world and so is your wife. You were both quite instrumental in selling Wisconsin to me. Both Mrs. Waters and myself are quite ashamed that we had to have our nose in a barrel the only time she had an opportunity to meet you...Of course, you know I am praying daily that the climate doesn't agree with you or Mrs. Leake, and that on the whole you receive rather shabby treatment in California, so that we need not worry about the possibility of your leaving...Of course I don't mean that, because you both deserve the world on a platter, but I do hope that you can be made happy here in Madison.

However, the fall UCSF visit resulted in a professorial appointment, and the Leakes moved permanently to San Francisco.

In the much later oral interview, Leake continued,

When I was at Wisconsin I had worked on ether, among other things; also on a new anesthetic agent, namely ethylene. Now ethylene has a double bond in the carbons; ether does not. Ethylene is an excellent anesthetic agent, and is better than nitrous oxide, and has certain advantages over ether. So, I thought: why don't we combine the chemical configuration of the double-bond carbon? Well, there wasn't any such thing at the time. When I came out here I tried to get our chemists over in Berkeley to make it, but they weren't interested. They were all interested in theoretical chemistry. G. N. Lewis was great, he should have had the Nobel Prize for his chemical work on the structure of the atom.

But, anyway, in trying to get divinyl ether then, this particular ether I wanted. I went back to Princeton and got Lauder Jones, who was professor of Organic Chemistry, to undertake it. He turned it over to one of his graduate students, Randolph Major, who made us a series of unsaturated ethers, and sent them out. They were all volatile liquids, inflammable. So we studied them. Later then Randolph Major became Director of Research for Merck, and Merck then put out divinyl ether as Vinethine, after we had shown what it would do and how it would work. Well, it's a good anesthetic, as we had predicted, and it does not have a lot of post-anesthetic complications, and it is easy to administer, and very quick and very powerful, actually. You have to be careful with it: it's as powerful as chloroform. Well, I couldn't get our clinicians here [at UCSF] to use it. They were pretty stuffy, really; some of them were interested.

Waters and Leake suspected that anesthetics worked by decreasing cerebral metabolism and oxygen use. On December 10, 1928, Leake wrote Waters from San Francisco, "We are hoping to start a metabolism study, something along the lines that Marion Stark, Elmer Severinghaus and yourself had underway last year." Leake notes that at Wisconsin in 1921 he started the first course in the country on the History of Science.

When Dr. Loevenhart died in 1929, Leake wrote Wisconsin's Dean, Charles Bardeen,

Dr. McMechan, the secretary of the Anesthetic Society, paid a most glowing tribute to the cooperative work between the Departments of Surgery and Pharmacology at the University of Wisconsin in connection with anesthesia...It was a splendid tribute to Dr. Schmidt, Dr. Waters and Dr. Loevenhart....My wife is very homesick for Madison....I consider my laboratory [at UCSF] merely an extension of the one which Dr. Loevenhart developed at Wisconsin.

Bardeen responded, "It's too bad California took you away."

Waters then tried to persuade Bardeen

and others to offer Loevenhart's chair to Leake. Waters wrote Leake, "Last spring demonstrated very clearly that my ability to influence the way things are done hereabouts is practically nil. It is quite the regret of my life that you are not a member of the faculty here." (May 1929)

The correspondence between Waters and Leake, available in the History Collection at UCSF library, continued for a decade, dealing with studies on amytal and other barbiturates, carbon dioxide inhalation in treating dementia praecox, avertin and rectal tri-brom-alcohol, and other anesthesia related research.

Chauncey Leake's early publications on anesthesia research thus first drew Waters' attention and interest to Madison. Leake then took the lead in persuading Waters to move to Madison, leading to the world's first academic professorial appointment in anesthesia.

#### Sources:

University California San Francisco Medical Library History Section

R alph Waters (1883-1979) and Arthur Guedel (1883-1956) were major leaders in the development of modern American anesthesiology. Their extensive correspondence documents a wonderful collaboration while they worked on the problems of anesthesia of that time. This could be because they shared similar

## Selma Harrison Calmes

# TWO MEN AND THEIR DOG: RALPH WATERS, ARTHUR GUEDEL AND THE DUNKED DOG "AIRWAY"

environments as they grew up and because they grew up at the same time (they were born the same year). Waters was born on a farm in Ohio. Guedel was born in Indianapolis, a city still considered "partly rural" by the U.S. Census Bureau as late as 1970.<sup>1</sup> These locations, only about 250 miles apart, were in the heart of America, the Midwest. The strong values and culture of early twentieth century America were integral parts of their lives. These values were to be important factors as they worked to develop the relatively primitive field of anesthesia into a science-based medical specialty.

In addition to the values and the culture of the time, they also shared a dog, "Airway," at one point in their lives. Pet dogs were then, and still are, an important part of American culture and values, and each of the men had deep affection for dogs (fig. 1). Their correspondence often contained references to their dogs, especially Airway. Originally the Guedel family's pet, Airway was used to illustrate the advantages of anesthesia with a cuffed endotracheal tube in the "dunked dog" experiment. This experiment seems to be well known, no doubt because it was so striking. But, the history behind it has not been well documented. This paper reviews what is known from documentary sources about the

dunked dog experiment and describes the affection both men felt for the dog. It also briefly considers why they might have chosen to use a much-loved pet for this experiment. Sources for this paper were the Guedel-Waters correspondence at the Guedel Center, documents in the Waters' Collection at the Wood Library-Museum, and primary and secondary articles in medical literature.

Airway arrived at the Guedel family, which already had two dogs, by 1928. It is not known how he got to the family. The Guedels were in Indianapolis at the time, where Guedel practiced at St. Vincent's Hospital and taught anesthesia at the University of Indiana Medical School.<sup>2</sup> In 1928 Ralph Waters had been at the University of Wisconsin for a year as chief of a new division of anesthesia. The two met at anesthesia meetings in the Midwest. In 1923, at the fall meeting of the Congress of Anesthetists, Waters had presented a clinical system for CO<sub>2</sub> removal. This improved on Dennis Jackson's liquid-based system, by using solid soda lime in a valveless to-and-fro system.<sup>3</sup> This technique was published in 1924<sup>4</sup> and further refined in a paper in 1926.<sup>5</sup> Although a desirable technique physiologically, the heavy metal container for the soda lime, a very large reservoir bag, and the need to continually hold a mask (endotracheal tubes were only rarely used) made for an awkward clinical situation.<sup>6</sup>

At the same time, Guedel was working on developing cuffed endotracheal tubes. (The earlier use of cuffed tubes was not known to either Guedel or Waters at the time they started working on them.) After his anesthetic experience in WWI, Guedel realized the need for better airway control and began work on this problem. He set up a basement lab in his Indianapolis home and studied the anatomy of the airway, using lamb tracheas that Mrs. Guedel purchased for him at the local butcher shop, and tried to develop various methods to seal off the trachea. He was also trying out Waters'  $CO_2$  absorption technique, using the Foregger "midget" machine.<sup>7</sup>

Endotracheal anesthesia at that time was "insufflation," in which large amounts of gas were delivered to the trachea (a metal, woven silver or rubber catheter—without a cuff or seal-might be placed in the trachea) or nearby (in the case of an ether hook for oral surgery). Patients breathed spontaneously and CO<sub>2</sub> would hopefully be removed in the excess gases leaving the trachea or mouth. It was immediately apparent to Guedel that insufflation would not work with the "midget" apparatus because of the small amount of gases available.7 (Midgets at that time used small A tanks.) Later, midget machines could be mounted on a stand and standard E tanks, with larger gas volumes, could be used.<sup>8</sup> This issue took on even more importance because Guedel was considering moving to California. He knew that he would have to go hospital to hospital there, taking his machine with him. There needed to be a way to conserve anesthetic gases in a "closed" system for the midget machine, as opposed to the usual "open" system, insufflation. In a closed anesthesia system, CO2 would have to be removed, so he needed Waters' absorption technique using the metal Waters to-and-fro canister. Somehow he came to the idea of sealing off the airway with a cuffed tube, keeping all gases within the trachea. This would solve multiple problems of the time: It would avoid the waste of insufflation technique, it would solve the awkwardness of holding a mask and dealing with the heavy Waters canister (it was usually supported on a pillow<sup>6</sup>) and the system could protect the lungs from aspiration of blood, gastric contents, or pus. Guedel was familiar with the risk of aspiration from his wartime work.

Guedel's first cuff was made from fingers of rubber gloves, then a rubber condom whose

ends were cemented around the endotracheal tube. (Note: Guedel gives varying information on this, in one case stating the condom was used first.) The first cuff was between three and four inches long and was designed to lie half above and half below the glottis. Deep anesthesia was required for this cuff to stay

Somehow he came to the idea of sealing off the airway with a cuffed tube, keeping all gases within the trachea. This would solve multiple problems of the time: It would avoid the waste of insufflation technique, it would solve the awkwardness of holding a mask and dealing with the heavy Waters canister.

in place; laryngeal reflexes would have to be obliterated. And, if the patient should cough or swallow, the tube could come out into the oropharynx. Next, Guedel made cuffs from a rubber dental dam. This was 1-1/2 inches long and was designed so the upper edge would be just below the vocal cords. This became known as a "flat" type cuff and is the one pictured in Waters and Guedel's paper on cuffed endotracheal tubes.<sup>7</sup>

By April 1928, Guedel was giving anesthesia with a "cuffed" tube. In fact, he did patients first and dogs afterwards! He reported to Waters filling up an intubated patient's oropharynx with water to demonstrate there were no leaks: You should have been here today. Handed a woman closed intratracheal ethylene with ether adjuvant for laparotomy for hour and a half. Incidentally we filled her mouth and nose full of nice clear water and left it there for fifteen mins or so...you should have seen her there, flat on her back—about eight degrees Trendelenburg—carrying her water brim-full and without a gargle. Now you tell one.<sup>9</sup>

He practiced dunking two intubated dogs in early April 1928, and then had the idea of anesthetizing a dog, intubating with a cuffed tube and putting the dog under water, to illustrate the advantages of cuffed tubes and the CO<sub>2</sub> absorption system to others. He suggested this to Waters in a letter on April 7, 1928.<sup>10</sup> Waters wrote back, "Your suggestion of the dog under water is a good one, but it's not new. [Waters offered no information on who had done this before.] However, done with to-and-fro breathing and no bubbles it would be new and if I can find a student that isn't too busy, we'll show it to you in June."<sup>11</sup> Guedel wanted to embellish the show, writing back, "For the show I would prefer a pink aquarium with goldfish and some nice shells."12

The "dunked dog" experiment actually took place in Indianapolis, not Madison, and was done by Guedel, not Waters. The event was at the Indiana University School of Medicine. The probable date was May 8, 1928. The subject was convenient, the pet dog, Airway. Anesthesia for the dog was morphine followed by ethylene and intubation with a cuffed tube. After an hour of submersion in an aquarium, anesthesia was stopped, and the dog sat up in the tank. After being placed on the floor, he shook himself off and laid down for a nap. Attending the demonstration were Waters (who had not yet seen the closed endotracheal technique) and Guedel, two other physicians and medical students. Guedel and Waters' paper on cuffed tracheal tubes was published in

July-August 1928 and described the "dunked dog" experiment.<sup>13</sup> It was not possible to find any other descriptions of this experiment or a similar one in the medical literature.

Guedel and Waters had discussions about repeating the experiment at anesthesia meetings, to teach others about the new technique of CO<sub>2</sub> absorption and cuffed endotracheal tubes. There was at least one other demonstration, but it is not certain at what event it took place. Waters wrote it was for a Student Day at the University of Wisconsin in June 1928.14 Guedel wrote of a demonstration at the meeting of Anesthetists in June 1928 at the University of Wisconsin, at an American Medical Association meeting.<sup>7</sup> No records exist to clarify this situation. This second event we know was staged by Waters and Guedel together and proceeded, as did the one at the University of Indiana, except this time the dog was under water for four hours. This dog was one used for lab experiments, not a family pet. The dog died the next morning, most likely of pneumonitis.14

Waters took a picture of this second experiment and it was published in a popular book, Man Against Pain: The Epic of Anesthesia, published in 1945.<sup>15,16</sup> A second popular book on the history of anesthesia published about the same time also mentioned the experiment but had no picture.<sup>17</sup> These books could be the sources of common knowledge of the "dunked dog" experiment. The experiment is also mentioned by Chauncey Leake in his introduction to Tom Keys' History of Surgical Anesthesia. Leake credits Waters with the experiment.<sup>18</sup> Leake, professor of Pharmacology at the University of Wisconsin in 1928, had been present at the second experiment and no doubt ignored Guedel and his role, due to Leake's Wisconsin ties.<sup>15</sup> Leake's piece was written well after the event, and it is possible his memories were not correct.

What happened to Airway after the experiment? He was the third dog in the Guedel

family, which was about to move to California. (It is not known what happened to the other two dogs on the move, but Guedel had at least one dog in California, a dog who ate the garden's snails.) Guedel offered him to Waters, describing him fondly: "He has a kind face and silky ears. More ears than face...His kind face and the fact that he took a bone away from a bigger and even dirtier dog, won me over."19 Mrs. Waters agreed to accept another dog into the busy Waters household. Guedel planned at first to drive Airway up to the Waters house, but had to ship the dog by rail due to lack of time. "Dog is being sent by express co...we estimated he was worth a dollar or so. I think he will hunt rabbits and maybe cats....Love and regards to the dog...I am sending him to your labs and if you want to take him from the lab that is your responsibility."<sup>20</sup> Waters wanted Airway as a pet for his sons, Darwin and John.14

When Airway arrived in Madison, Waters wrote: "Airway is a fine scroot. He is, however, just a bit too tony for my family. I think he was brought up in a limousine. He has a private limousine and chauffeur and he would prefer to ride all the time. He was so insistent on going with me Saturday that I had to punish him severely."<sup>21</sup> Subsequent letters between Waters and Guedel often contain information on the

dog. Guedel would inquire about him; it was clear he missed Airway and enjoyed hearing about him. Waters would report the dog's adventures in Madison or Door County where the Waters vacationed. After nearly two years with the Waters family, Airway vanished: "Airway is aus gespielt. I think someone stole him."<sup>21</sup>

What might have led them to anesthetize this loved pet and use it for the "dunked dog" experiment? First, he was easily available. And, research standards of the time were much more casual then. Physicians were often experimenting on themselves, and dogs were often used in labs. Experiments were viewed as low-risk events, even if they were not. Finally, dogs were seen as expendable. So what might be seen as animal abuse today was within the standards of the time.

The "dunked dog" experiment introduced the  $CO_2$  absorption technique and cuffed endotracheal tubes to a large audience, even though only a few physicians attended the actual demonstrations. Waters' papers on  $CO_2$  absorption and Waters and Guedel's paper on cuffed endotracheal tubes were other ways these techniques were popularized. These techniques form the basis of modern anesthesia practice. Guedel, Waters—and Airway—deserve a great deal of credit for their parts in developing and introducing these techniques.

#### SELMA HARRISON CALMES



Figure 1. Dr. Ralph Waters walking with one of his dogs. From the 1942 Aqualumni reunion program, Waters Collection, Wood Library-Museum, Park Ridge, Illinois.



*Figure 2. Airway, the "dunked dog."* Guedel Papers, Guedel Memorial Center, San Francisco, CA.



#### Figure 3.

Visiting anesthesiologists with Dr. Arthur Guedel sitting in bed with his dog in the late 1930s. Guedel Papers, Guedel Memorial Center, San Francisco, CA.

#### SELMA HARRISON CALMES

#### References

- 1. Notes for individual place, *Population of the 100 largest cities and other urban places in the US 1790-1990*, Working paper No. 27, Population Division, U.S. Census Bureau. Available at www.census.gov/population/documentation/twps0027.html.
- 2. No author, typewritten manuscript, "Arthur E. Guedel, Servant of Mankind," no date, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 3. LE Morris, "Closed-system anesthesia: then and now," *Curr Anaes and Crit Care* 9 (1998): 92-98.
- 4. RM Waters, "Clinical scope and utility of carbon dioxide filtration in inhalation anesthesia," *Current Researches Anesth Analg* 3 (1924): 20-23.
- 5. RM Waters, "Advantages and techniques of carbon dioxide filtration with inhalation anesthesia," *Current Researches Anesth Analg* 5 (1926): 2-4.
- 6. Lucien Morris, MD, personal communication.
- 7. No author, most likely AE Guedel, "The episode of the inflatable cuff," no date, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 8. Judith Robbins, Equipment Curator, Wood Library-Museum of Anesthesiology, personal communication; Richard Foregger Co., Inc. Catalogs 1926, 1944. New York.
- 9. Arthur Guedel, letter to Ralph Waters, April 4,1928, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 10. Arthur Guedel, letter to Ralph Waters, April 7,1928, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 11. Ralph Waters, letter to Arthur Guedel, April 11, 1928, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 12. Arthur Guedel, letter to Ralph Waters, April 9, 1928, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 13. AE Guedel and RM Waters, "A new intratracheal catheter," *Current Researches Anesth Analg* 7 (1928): 238-239.
- 14. Hand-written page, no author (Waters'writing), no date, Ralph Waters Papers, Archives Collection, Wood Library-Museum of Anesthesiology, Park Ridge, IL.
- 15. No author, most likely AE Guedel, typewritten manuscript, "The episode of the wrong dog," no date, page 13, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 16. HR Raper, Man against pain, the epic of anesthesia (New York: Prentice-Hall, 1945): 24.
- 17. V Robinson, Victory over pain: A history of anesthesia (New York: Henry Schuman, 1946): 285.
- 18. CD Leake, "Introduction," in *The History of Surgical Anesthesia*, by TH Keys (New York: Schumans, 1945): xxix.
- 19. Arthur Guedel, letter to Ralph Waters, May 1, 1928, Ralph Waters Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 20. Ralph Waters, letter to Arthur Guedel, May 7, 1928, Ralph Waters Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 21. Ralph Waters, letter to Arthur Guedel, July 31, 1928, Arthur Guedel Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 22. Ralph Waters, letter to Arthur Guedel, April 1, 1930, Ralph Waters Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.

fter graduating from Medical School in Rio de Janeiro, Brazil, in 1943, I went to Chicago with a fellowship from the United States Public Health Service—in cooperation with the Pan American Sanitary Bureau—for an Internship at the Illinois Masonic Hospital, starting on January 1945. Soon I began looking for a

## **Carlos P. Parsloe**

# MY FIRST ENCOUNTER WITH RALPH WATERS, MADISON 1946



Carlos P. Parsloe, M.D. Aqualumnus

residency in anesthesia and found three good possibilities: two in Chicago, with William Cassels at the University of Illinois Research and Educational Hospital and with Allen Conroy at Presbyterian Hospital, and the third one at University Hospital in Madison, Wisconsin. I interviewed in Chicago and could have been accepted in both places. Nevertheless, I decided to look into Madison. Interestingly, only later I would learn that both Drs. Cassels and Conroy had been Waters residents.

I must admit that up to that time I had never heard about Ralph Waters, ignorant that he was the first and foremost University Professor of Anesthesiology in the world and that Madison was considered the Mecca of Anesthesiology. (I learned recently from Douglas Bacon that Dr. Thomas Drysdale Buchanan was appointed Professor of Anesthesia at New York Homeopathic Hospital in 1904, apparently without University affiliation.1) In fact, the only thing I knew about Wisconsin was that some of the doctors at Illinois Masonic went fishing there and that some of the student nurses came from there. I wrote to Waters requesting an interview but advising him that my intern duties allowed me only alternate Saturday afternoons and Sundays to go to Madison. His short answer was "come when you can." I then inquired if a given Saturday

afternoon in April would be all right, to which he answered "call me when you get here."

Late, on an April 1946 Saturday afternoon, I arrived in a cold, gray, and wet Madison with snow melting in the streets and called Waters at home. He asked if I could be at his office at the Hospital at 1:00 p.m. on Sunday. Of course I could but thought to myself: how can a Professor leave his home and come to the Hospital on Sunday afternoon to interview a young, unknown intern without any special recommendation? That was quite an unexpected behavior to me at the time, but then I still did not know Waters. I found him at his small office with the door open and was immediately received. Waters talked with me for about one hour but after the first five minutes. taken by his friendly personality and objective conversation, I knew where I would go if accepted. Such was the impact of his quiet, unassuming, but forceful personality. In fact, my only concern that Sunday was getting back to Chicago in order to start working at 7:00 a.m. on Monday.

I was accepted but did not realize at the time that such an extraordinary opportunity would completely change my professional, as well as my personal life. On October 1, 1946, I started the residency completely ignorant of anesthesia methods other than the Ombrédanne inhaler and the open mask.<sup>2</sup> Until then I had only administered anesthesia with balsoform (a French made mixture of ether, chloroform, ethyl chloride, and the balsam gomenol) using the Ombrédanne inhaler, the usual combination in Brazil, or ethyl chloride by open drop, with the patients necessarily breathing air spontaneously. I had never heard about controlled respiration and never had seen a laryngoscope or endotracheal tube. The atmosphere at the Hospital was congenial and soon it became evident I had found a pleasant and friendly place with everyone glad to help open my veil of ignorance. I spent the first month following Dr. Clayton Wangeman and watching everything he did. At that point I did not even know how to open a can of ether, but I quickly learned . The following month Dr. Malcolm Hawk followed me in turn, becoming my veritable shadow. On the third month I was on my own but either Drs. Wangeman or Hawk were constantly pacing the corridor watching over me through the open operating room doors. That certainly was what nowadays would be called total immersion. As the months passed they moved farther and farther away from the operating room doors. I well remember giving open drop ether for a splenectomy, with mediocre results until a rather deep plane of anesthesia was obtained. One of the first things I had to do was to disassemble and reassemble a Foregger water flowmeters machine under the guidance of Dr. Lucien Morris, who had preceded me by a few months in Madison. Knowing the tools of the trade proved helpful after returning to Brazil. Such an undertaking would be absolutely unthinkable nowadays. Lucien and I have been good friends ever since.

Darwin D. Waters started his residency at the same time I did, but it was a couple of months before I learned he was Waters' son. There simply was no preference, all residents being treated the same way, performing the same duties.

Fall brought the University of Wisconsin Saturday football games, completely new to me, and an occasional presence at Camp Randall Stadium to cheer for the Badgers. Thousands of colorfully dressed and energetic students and the Wisconsin marching band were a new and splendid sight. Winter succeeded fall and with it the basketball games and again the presence of thousands of cheering students. Snow covered the campus giving it another perspective. On Christmas, choral groups sang on the wards filling the air with unknown melodies, which since became familiar. Meanwhile, I was fast realizing I had found a veritable paradise combining learning with friendly ambiance under the unassuming tutelage of Waters. After a long, snowy Wisconsin winter, spring arrived and then gave way to summer and the radiance of the Campus, with sailboats on the lakes and the hordes of students, giving a new dimension to the environment. The two major operating rooms had large glass windows overlooking the pine trees on the grassy, gentle hill slope towards Lake Mendota. One brief look at the pleasant view renewed all energy for more hours of work. A totally new world was opening its doors for me. On July 29, 1946, while still an intern but in preparation for the residency, I bought the second edition of Fundamentals of Anesthesia, an Outline,<sup>3</sup> published in 1944 by the Subcommittee on Anesthesia of the National Research Council Division of Medical Sciences under the Chairmanship of Ralph Waters. This book became daily reading in Madison. I also could read all that was published in the four available English language Anesthesiology journals (Anesthesiology; Anesthesia and Analgesia Current Researches; The British Journal of Anaesthesia; and the Proceedings of the Royal Society of Medicine Section on Anaesthetics), plus an assortment of Pharmacology and Physiology articles in respective journals. The medical library was the first one I had free access to and became a

source of constant perusal and enlightenment. Waters' interest in historical events was contagious. I bought Keys' *The History of Surgical Anesthesia*<sup>4</sup> in 1948, visited the Mayo Clinic and had it autographed by the author.

On reading Waters' original article on carbon dioxide filtration. I noticed among the three references one reference from the brothers Alvaro and Miguel Osorio de Almeida.5,6 Alvaro Osorio de Almeida had been my Professor of Physiology during 1939. The referenced 1918 article in English was a summary of their work, published in French a few years before. They were the first ones to disprove Yandell Henderson's acapnia theory, thus furnishing proof to Waters that indeed carbon dioxide need not be retained to avoid "shock." They demonstrated that the circulatory collapse observed by Henderson in hyperventilated dogs was due to concomitant hypothermia and not to carbon dioxide depletion, as he theorized. Therefore, Waters found scientific basis for his belief that carbon dioxide needed constant removal from the body, allowing him to introduce its filtration during anesthesia and the conservation of heat and moisture, with beneficial effects for the patients. Thus, since 1923 the clinical method of carbon dioxide absorption came into daily use.

There were two weekly Staff meetings with Waters' presence, the Wednesday afternoon morbidity and mortality case discussion, and the Monday evening literature review meetings. They were attended by the Staff, the residents, the medical students on rotation in the service, occasional visitors, and counted with the presence of Sid Orth, then Associate Professor and, as of 1948, Professor of Pharmacology, as well as Noel Gillespie, who had come from England some years before to visit Waters and had stayed, hypnotized, as I was finding myself, by the Madison atmosphere. The meetings were a constant source of learning in view of the "Chief," as we all affectionately called Waters.

Waters always had a sensible approach to clinical problems, while Sid always had the right answer to experimental and clinical drug effects and Noel always seemed to express a dissenting view. As a result, the meetings were not only stimulating but also pleasant and a continuing learning experience. One of the unusual and humorous aspects of the meetings was that each resident, at successive meetings was in turn in charge of a bell which was rung every time someone spoke inappropriate words or sentences such as, "the surgeon went into the abdomen." As a result, we all could learn to speak properly, without acquiring many of the usually developed vices of language.

At Christmas Waters gave books to the residents, which I still possess. In 1946, with the book token, I bought Fulton's well researched, Harvey Cushing, a Biography.<sup>7</sup> In 1947 we received an unusual thin book entitled Self-cultivation in English,<sup>8</sup> written by George H. Palmer in 1897 and reprinted in 1936. In it Waters wrote the following: "Dr. Carlos Parsloe. With appreciation of his excellent English, but a hope that the principles set fourth herein may prove useful in Portuguese as well." There were occasional invitations for "tea" at the Waters' residence, with Mrs. Waters cheerfully making the residents feel at ease. Occasionally, when the schedule was running late on football Saturdays, Waters or Noel would come and relieve the resident so he could go to the game. Again, that was a totally unprecedented behavior.

The Waters academic triad since 1927, when he arrived at the Medical School,<sup>9,10</sup> consisted of the integration between clinical anesthesia, teaching, and research. That triad became a fulcrum, an example to be followed in the development of academic department activities over the nation and abroad. Upon arriving in Madison I found several foreign residents: Eric Nilsson from Lund, Sweden, Luis G. Bouroncle from Lima, Peru, and Jose Q. Guerra from Mexico, besides the American residents. The International gathering was evident from the beginning. During the two year period until 1948, others came: José Adolfo Basto Lima from Recife, Brazil, Jone J. Wu from Shanghai, China, and Karl-Gustav Dhuner from Göteborg, Sweden. Several visitors came to pay tribute to Waters: Drs. Juan A. Nesi from Buenos Aires, Argentina, Manuel Martinez Curbelo from Cuba, Edgar Pask from England, and Olive Jones from Oxford, England who stayed for many months administering anesthesia for neurosurgery, her main field of interest.

This gathering of foreign residents and visitors gives an idea of the considerable worldwide influence of Waters teaching. Waters gave lectures to the medical students but not necessarily to the residents. In fact, our learning came from practical discussions with the Staff and observation of Waters' daily presence in the operating rooms administering anesthesia. We vied, without success, to emulate his clinical acumen. General anesthesia was routinely given by means of cyclopropane induction and maintenance with a to-and-fro absorber using assisted or controlled respiration. What

Waters gave lectures to the medical students but not necessarily to the residents. In fact, our learning came from practical discussions with the Staff and observation of Waters' daily presence in the operating rooms administering anesthesia. We vied, without success, to emulate his clinical acumen.

a "joy" it was to thus anesthetize a patient with a face mask over a nasogastric tube and oro-pharyngeal airway, trying the best we could to keep a tight fit for the universally employed closed system. Controlled ventilation was manual with no respirators available. Urological procedures were performed with procaine or tetracaine spinals, with no epidurals used at the time. Caudal and trans-sacral blocks were employed. Radical perineal prostatectomies with extreme lithotomy and Trendelenburg position were performed with hypobaric nupercaine (1:1500) spinal. Boredom was provided by the "Avertin test" used to identify hypertensive patients who might be candidates for thoraco-lumbar sympathectomies. Following rectal Avertin we spent 3-4 or more hours recording blood pressure and pulse rate every five minutes. According to the blood pressure response, candidates were selected for the operation performed by the capable Professor of Neurosurgery, Eriksson.

On Fridays Dr. Gale, Professor of Thoracic Surgery, went to a neighboring hospital with one of the senior anesthesia residents to perform several thoracoplasties. Cyclopropane was employed and we all realized that it was difficult to prevent major bleeding. Also on Fridays a competent and pleasant plastic surgeon came from Chicago to perform harelip and cheiloplastic corrections at the Children's Orthopedic Hospital. Anesthesia consisted of ethyl chloride induction and ether maintenance by means of oro-pharyngeal insufflation. Later on, the children were intubated. The most difficult cases were the orthodontic molds with frequent, not to say constant, severe upper respiratory obstruction. My preference for pediatric anesthesia dates from that period.

During 1947, at my request, I was allowed to attend the first course of "Endoscopy for Anesthesiologists," given by Professors Hollinger and Cassels at the University of Illinois Research and Educational Hospitals in Chicago. It consisted of lectures, practical demonstrations on cadavers and on anesthetized dogs and attendance at the Endoscopy Clinic observing patient treatments. There were about twenty participants in the course. That experience proved valuable in handling occasional problems with intubation and later on for introducing bronchial blockers and Carlens or other double lumen tubes.



Figure 1. The Staff, current and former residents at the Easter Meeting, Madison, 1947. L to R: Front Row: Parsloe, Wylde, Apgar, Waters, Moir, Wangeman. Second Row: Cassels, Jacobson, Gillespie, Ruben, Taylor, Nilsson. Third Row: Lamont, Orth, Cormack, Davis, Leigh, Morris. Back Row: W. Bennet, Kindschi, Burke, Simpson, Jones, Dar Waters, Slocum. COURTESY OF THE WOOD-LIBRARY MUSEUM OF ANESTHESIOLOGY

The Aqualumni held the Easter Meetings every year in Madison. The 1947 and 1948 meetings were enjoyable, the atmosphere was cordial and the respect for Waters was distinct. The 1947 meeting was attended by former residents: Virginia Apgar, William Cassels, Milton Davis, F. C. Jacobson, Austin Lamont, Digby Leigh, J. Moir, J. E. Ruben, Harvey Slocum, and Ivan Taylor (fig. 1).

During 1946, with the coming of the chloroform centennial the following year, Waters wondered how the old agent would behave if administered by modern methods. An Oxford chloroform vaporizer was imported from England to enable more precise control than simple flow-over, over the vapor concentration. Several studies, both clinical and laboratory were performed assessing the physiological repercussions of chloroform administered with good ventilation and oxvgenation. The results of those studies were collected in a monograph published in 1951.12 Most, if not all, residents had the opportunity to give clinical chloroform anesthesia, which proved easy and smooth. For the purpose of improving control over the vapor delivered, Waters suggested that Lucien Morris devise a precision vaporizer. That was the incentive for the development of the "Copper Kettle,"13 which proved to be the best ether, and later halothane vaporizer. At the same time Jone Wu started to develop a precise micro-dropper for liquid agents. With the success of the kettle that project was abandoned. Waters suggested that the residents visit other services to observe different methods of anesthesia. I went with Karl Gustav Dhuner to the Mayo Clinic where we met Lundy and Seldon. At mid-second year, Waters recommended that the residents should spend six months at the Pharmacology laboratory developing some project. The idea was to learn the principles of research and to develop a critical appraisal of the literature. Some of the residents took the opportunity. I selected to study the alleged incompatibility between cyclopropane and oxytocic drugs. Work proceeded with Lucien Morris, under the supervision of Sid Orth, testing on dogs the effects of pituitrin, pitressin, and pitocin with different anesthetics, including spinals. No incompatibility was detected but the varying coronary constricting properties of the drugs became evident.14

All residents had to keep good clinical records and transfer the results to Hollerith punch cards by means of a set code of numbers. Noel Gillespie punched the cards and at the end of every year collected the results using a IBM card sorter at the Mathematics Department and published a report including all anesthetic administrations by resident, staff, operation, methods, as well as complications. Therefore, the Department had a complete record of its activities and each resident had a detailed account of all his anesthetic administrations.<sup>15,16,17</sup>

Not all was anesthesia. I met Edith and we were married in January 1948. I finished the residency on September 30, 1948 with a certificate, and letters of recommendation from Waters, which proved a veritable "open sesame" for valuable contacts. More importantly, I had found a set purpose in life and a never faltering resolve. My personal debt of gratitude to Waters is incommensurable and I gather that all his residents felt the same.

After leaving Madison, Edith and I drove to New Orleans and back to New York from where we took a ship to Brazil. Along the way I visited Dr. Chen at Eli Lilly Laboratories in Indianapolis, and many other Departments of Anesthesiology. I met Milton Davis, Perry Volpitto, John Adriani, Robert Hingson, Robert Dripps, Leroy Vandam, James Eckenhoff, Margery Deming at Children's in Philadelphia, E. Rovenstine and E. Papper at Bellevue, Virginia Apgar at Columbia, Meyer Saklad at Providence, RI, and Henry Beecher, Robert Smith and B. Hershenson in Boston. We then went to Montreal where Wesley Bourne took me to the Children's Hospital and to another hospital where I observed thoracoplasty performed with light Nupercaine spinal by the Howard Jones technique, with the patient sitting up until he turned "gray." Blood loss was at a minimum, but I never had sufficient courage to use that technique.

Wherever I went, the fact that I was just out of a residency with Ralph Waters opened every door. Such was the extent of the esteem and admiration everyone had for him. His influence is recognized in the United States and worldwide. I can still detect a sense of reverence to Waters every time I have occasion to say, no matter where, I was one of his last residents. Six of the original fifty-nine Waters-trained residents are here to celebrate his legacy of professionalism in anesthesia. The fact that his memory is remembered at this meeting,<sup>18</sup> in commemoration of the 75th anniversary of Academic Anesthesiology, dating from his arrival at the Medical School, University of Wisconsin and the State of Wisconsin General Hospital in Madison in 1927, is a testimony to his effective, friendly, productive leadership.

#### References

- 1. DR Bacon, "The Life of a Pioneer: Tay-Day-Bay," Sphere 45:2 (1993): 30-32.
- CP Parsloe, "The lifelong apprenticeship of an Anesthesiologist," in *Careers in Anesthesiology*, Vol. 3, ed. RB Fink, KE McGoldrick, (Park Ridge, IL: Wood Library-Museum of Anesthesiology, 1999): 23-84.
- Fundamentals of Anesthesia, an Outline, Subcommittee on Anesthesia of Division of Medical Sciences, National Research Council, 2nd Ed. (Chicago, IL: American Medical Association Press, 1944).
- 4. TE Keys, *The History of Surgical Anesthesia* (New York: Schuman's, 1945).
- 5. A Osorio de Almeida and M Osorio de Almeida "The Nature of Surgical Shock and Henderson's Theory of Acapnia," *JAMA* (November 25, 1918): 1710, in RM Waters, "Clinical scope and utility of carbon dioxide filtration in inhalation anesthesia," *Current Researches in Anesthesia and Analgesia* 3 (1924): 20-23.
- 6. C Parsloe, "The contribution of two Brazilian physiologists to the introduction of carbon dioxide absorption into clinical anaesthesia. An acknowledgement by Ralph M. Waters (1883-1979)," *The History of Anaesthesia*, ed. RS Atkinson and TB Boulton (London: International Congress and Symposium Series 134, Royal Society of Medicine Services Limited, London, 1989): 590-595.
- 7. JF Fulton, Harvey Cushing, a Biography (Springfield, IL: C.C. Thomas, 1946).
- 8. GH Palmer, Self-cultivation in English (Houghton, Mifflin Company, 1936).
- RM Waters, RH Hathaway, and WH Cassels, "The Relation of Anesthesiology to Medical Education," JAMA 112:17 (1939): 1667-1671, reprinted in Holding Court with the Ghost of Gilman Terrace: Selected Writings of Ralph Milton Waters, ed. DC Lai (Park Ridge, IL: Wood Library-Museum of Anesthesiology, 2002): 69-81.
- 10. RM Waters, "The Requirements of an Anesthesia Service," *Current Researches Anesth Analg* 11: 5 (1932): 219-223.
- 11. Patrick Sim, Librarian, Wood Library-Museum of Anesthesiology, personal communication.
- 12. RM Waters, ed., *Chloroform, A Study After 100 Years* (Madison: The University of Wisconsin Press, 1951).
- 13. LE Morris, "A New Vaporizer for Liquid Anesthetic Agents," *Anesthesiology* 13:6 (1952): 587-593.
- 14. CP Parsloe, LE Morris, and OS Orth, "The relationship of various anesthetic agents to the action of Pituitrin, Pitressin and Pitocin," *Anesthesiology* 11:1 (1950): 76-95.
- 15. RM Waters, "The Teaching Value of Records," J Indiana State Med Assoc 29:3 (1936): 110-112.
- 16. IB Taylor, JH Bennett, and RM Waters, "Anesthesia at the Wisconsin General Hospital: A Three Year Statistical Report. Part I. Anesthetic Methods and Postoperative Respiratory Complications," *Current Researches Anesth Analg* 16:4 (1937): 187-192.
- 17. IB Taylor, JH Bennett, and RM Waters, "Anesthesia at the Wisconsin General Hospital: A Three Year Statistical Report. Part II. Operative and Postoperative Complications (Continued)," *Current Researches Anesth Analg* 16:5 (1937): 262-264.
- Ralph M. Waters and Professionalism in Anesthesiology: A Celebration of 75 Years, conference, Madison, WI, June 6-8, 2002.

here is a need to address and clarify an existing and persistent confusion caused by a long sequence of colloquial use of the words "department" and "chair" or "chairman" in reference to the historical development of academic anesthesia teaching centers. The words "department" and "chairman" are generic terms

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## A MATTER OF SEMANTICS

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used respectively to describe organizational separation according to special function, and a position of authority. When applied indiscriminately to schools of medicine, a disparity often results because not all institutions choose to use comparable organization. Furthermore, universities have developed additional academic criteria, rules and connotations for the words "department" and "chairman." The word "department" includes implications of delegated responsibility and a degree of independence, as well as integrated contributions toward attainment of mutual purpose.

Semantics is defined as the study of the meaning of speech forms, especially of the development and changes in the meaning of words. The loose usage of a word or the misapplication of a term, as well as evolutionary changes in meaning brought about by inadvertent or even deliberate misuse can lead to subsequent misinterpretation and potential confusion. The phrase "Department of Anesthesia" is an example of such perturbation and a source of confusion for future historians.

The often-used appellation "Department of Anesthesia," with its current implication of medical school status, is quite misleading when used or considered in a historical context of the early years before and during development of modern medical anesthesiology. In many early situations, anesthesia was considered to be a hospital function and therefore under the aegis or purview of the hospital administration. Even though the early physician anesthetists were members of the hospital medical staff, in many places "anesthesia" had already become well established as a hospital department, and thus tended to be equated with "housekeeping" and "maintenance," rather than to a professional function.

Most of today's anesthesiologists have littleconcept about the extent and duration of the struggles to change the perception of anesthesia from that of a technical exercise, which anyone could do, to that of a respected branch of medical practice, responsible for patients' lives and for the maintenance of physiological function during surgical operation. For at least seventy-five years after the first credible demonstration of ether anesthesia at the Massachusetts General Hospital, anesthesia remained a neglected area of both medical practice and medical education. Since anesthesia was not a part of the curriculum for medical students. only a very few qualified physicians elected to limit their practice to anesthesia.

Consequently, in the United States, the growing need for anesthesia in support of surgery resulted in an alternative arrangement by which anesthesia developed as a hospital endeavor, utilizing technicians and nurse anesthetists. After this had become an established pattern, hospital administrators resisted the intrusion of physicians interested in anesthesia, not only as a normal reaction to change, but also because development of professional medical practice in anesthesiology interfered with and threatened what had become a major source of hospital revenue. This issue resulted in a problem for physicians in private practice of clinical anesthesia through the middle of the twentieth century, and caused major confrontations.

#### Background

In the early 1900s, concern was expressed about the chaotic situation of medical education in the United States. Subsequently the AMA Committee on Education, supported by the Carnegie Foundation, organized a review of existing medical schools. This somewhat cursory evaluation led to the highly publicized Flexner Report in 1911, following which many proprietary medical schools were closed and eliminated because they could not meet the required standard of fulltime faculty for the necessary basic science needed as background for clinical medicine. The report also emphasized the need for structured clinical experience in the university teaching hospitals.

An early hospital teaching appointment in anesthesia was that of Louis B. Harding, who was named an instructor at the State University of Iowa Hospital as early as 1912. In a few departments of surgery among the medical schools in the eastern part of the United States, there were appointments of volunteer teachers of anesthesia, or in token recognition of their clinical service, some few even gained the title of Clinical Professor, but the majority of schools did not include anesthesia in the medical student curriculum, and did not have anyone involved in teaching anesthesia. Thus, it was a unique step for a medical school when Ralph Waters was appointed as a member of the Department of Surgery, Medical Faculty University of Wisconsin. He was the first fulltime salaried professorial appointment in anesthesia anywhere in the world.

Despite the fact that the Academic Anesthesia Center. which Ralph Waters established at the University of Wisconsin in Madison, became the model for many subsequent academic departments of anesthesiology in medical schools throughout the world, the academic center at Wisconsin remained

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a division, or sub-department, of the Department of Surgery. It did not become an autonomous medical school department during Dr. Waters' active professional tenure.

The Academic Anesthesia-Teaching Center at the University of Wisconsin actually did become an independent medical school department in 1952 under the leadership of Sidney Orth, Ph.D., M.D.,<sup>1</sup> who had held professorial appointments in both pharmacology and anesthesiology for the preceding decade.

Professor Waters had been very fortunate; the environment of the newly expanded fouryear medical school at the University of Wisconsin was most receptive to his innovative plans for teaching anesthesia to both undergraduate medical students and post-graduate physicians. He found both basic science colleagues and clinicians willing to work with him on research problems and was also blessed with a benign surgeon who was actively supportive of his efforts to develop anesthesia as a specialty. Dr. Waters' engagingly dynamic personality undoubtedly contributed to the continuing success of his self-imposed mission to change both medical and public perception of his chosen field of anesthesia.

As members of the Aqualumni (Waters' students) went elsewhere after their indoc-

trination at Wisconsin, not all found welcoming situations. The response varied from enthusiastic support to lukewarm tolerance and frank resistance. Indeed, some were met with actual hostility. Among the latter was James Bennett, who went first to the University of Texas Medical Branch in Galveston. After having been at loggerheads with the surgeon for about two years, Dr. Bennett decided to try it elsewhere and went to the University of Cincinnati, which was a stronghold of nurse anesthetists and the reception was not much better. Others who had similar difficulties included Hubert Hathaway at the University of California, San Francisco, and Austin Lamont at Johns Hopkins University Medical School. Jim Bennett's efforts at Galveston were not totally unappreciated, for shortly after his departure, the administration at UTMB was again seeking help from the Wisconsin program. In negotiating with the Dean at UTMB, Harvey Slocum agreed to accept the position only if he were to be chairman of a separate department. With this agreement, Dr. Slocum went to Galveston in the spring of 1942.

From the information available to us now, it is evident that the first autonomous medical school Department of Anesthesiology became an accomplished fact at UTMB in 1942. The

second such Department was established at Vanderbilt in 1946 with Benjamin Robbins, M.D. as its chairman. Columbia bowed to progress by establishing a Department of Anesthesia in 1950 of which Emanuel Papper, M.D. became the chairman. However, there were some holdouts, notably the University of Pennsylvania where Anesthesia remained a section of the Department of Surgery during the leadership of Robert Dripps, M.D., until he became Vice-President for Medical Affairs at the University of Pennsylvania, when it became an autonomous department under the chairmanship of Harry Wollman in 1965.<sup>2</sup> Another notable instance is Charity Hospital where anesthesia remained a hospital department under the leadership of John Adriani, M.D. for nearly forty years. In 1978 Tulane Medical School, which had also used Charity Hospital for its medical students, developed a new department of anesthesia.

Over the years, the role of anesthesia gradually expanded by increased participation and teaching in various aspects of the organ systems of the body and in clinical application of basic sciences. By the end of the twentieth century, anesthesia had attained full stature with autonomous departments in the majority of our U.S. medical schools.

#### References

- 1. OS Orth, "A Visit with Department of Anesthesiology, University Hospital, University of Wisconsin," *Survey of Anesthesiology* 4 (1960): 591-594.
- 2. LD Vandam, "Robert D. Dripps," in *Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield, IL: C.C. Thomas, 1982): 143.

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t first glance, the title of this article might seem more esoteric than informative. I hope to show its relevance in our tribute to Dr. Ralph M. Waters for his life's work and our gratitude for his rich legacy of professionalism in anesthesia practice.

### Simpson S. Burke, Jr.

# PRECEPTS, PRINCIPLES, AND PRACTICE: THE PURSUIT OF EXCELLENCE



Simpson S. Burke, Jr., M.D. Aqualumnus

Uncommon words can lose their deeper meaning through careless use. For example, *Precept* refers to an element in an consistent *code of behavior* that is basically rooted in morality or ethics. The ancient maxim, "*First do no harm*" is a precept adopted by medicine in ages past. A contemporary transcription adds a context specifically related to anesthesia, and it becomes an important precept with ethically binding force.

> If you administer any kind of anesthetic to another person, you are assuming the complete personal responsibility ("power of attorney") to protect that individual from any harm for as long as necessary until the person has regained complete, normal control.

In his lectures and discussions, Dr. Waters emphasized the importance of the basic Precept for anesthesia practice—*Personal Responsibility*. In his conduct of anesthetic procedures, his example was even more impressive. Except for cases requiring special positioning of patient and personnel, Dr. Waters could be seen the whole time standing at the head and continuously in touch with his patient. Why? He was maintaining surveillance of the entire local scene and gaining grateful recognition of vital team participant; he had secured and was guarding access to the patient's airway and vital signs, especially *continuous* palpation of pulse for volume, rate, rhythm, and quality.

Achieving the goals inherent in the above Precept would not be easy. Calling for help might supply a Principle, "Constant Vigilance in the face of Danger." A picture within the word Principle is the effective "Reign" (influence) of a "King" (person) relying on faithful "Princes" (principles) in the governance of his "Realm" (life and work). By word and example, Dr. Waters consistently taught adherence to principles-vigilance, organization, preparation, concentration, observation. cleanliness, genuine caring for patients, for a few examples. He was known to emphasize the principle of being prepared in advance for unexpected difficulties. A student might be finding it difficult to maintain a patient's open airway manually, in the manner he was being taught. If the student suggested an endotracheal airway but had not prepared one, none would be supplied. With the Chief constantly by his side for needed rescue, the student might continue with aching hands until relieved by Dr. Waters, who never allowed clinical teaching to compromise patient safety.

I recall an experience (my own) when preparing a caudal-sacral block for rectal surgery. The "chief" stopped by to observe. Almost immediately he indicated he would finish the procedure. The reason, he explained, was the disarray on my block tray. I never forgot the feeling of that moment, and the lesson carried through the rest of my anesthesia career.

Although Professor Ralph Waters stressed strong adherence to basic principles, he was equally inclined to admonish those who engaged in argumentative discussions about narrow personal views. He would often suggest a search for more than one solution to a problem or a complete review of alternative procedures that might accomplish a desired result.

Bringing established precepts and principles together in Practice reaffirms their validity, reinforces their application, and sharpens clinical skills for interpersonal relations. Given fully realized opportunities for clinical observation, supported by approved protocols, and matched with critical analysis of carefully recorded data, clinical knowledge base can be expanded. Practicing proactive prevention of errors, early recognition of warning signs, and preemptive treatment of complications can produce a higher quality of anesthesia and measurably increase patient safety.

In my view, Dr. Ralph Waters learned early to incorporate important precepts and principles into his own practice. In his search for knowledge and understanding of anesthesia phenomena, he fully embraced scientific methods of investigation. As a teacher he was generous with time in demonstration and discussion. On the other hand, as a true Preceptor he expected a high degree of discipline in study and practice. Impatient to share his search for knowledge, Ralph Waters became an eminent yet humble world leader, who welcomed all those desiring to join with him in his quest to learn. Over time, many of his protégés returned to positions of leadership at major medical centers in their home countries. Individually and collectively, they sought to emulate and expand on the experience shared in Madison at the University of Wisconsin.

#### Part II: Application

Now, indeed, a ground swell of improved clinical anesthesia had begun in many privileged areas, but what about the multitude of smaller communities? As these concerns were germinating in my mind, Dr. Waters had already retired to live in Florida. Dr. William B. Neff, formerly an associate of Dr. Waters and Clinical Professor at Stanford University Medical

Center, was seeking candidates to join in staffing the Anesthesia Service of a new. 200-bed, Sequoia District Hospital. Authorized, planned, financed, and managed under provisions of the National Hill-Burton Act, this hospital appeared to offer opportunity for progress. Redwood City was an older modest community

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located between major medical centers in San Francisco and Stanford Palo Alto with extensive resources in education and medical care. Even so, a decision to enter "private practice" was a radical departure from previous plans for an academic career. The move to California finally won the day. I joined the Sequoia Anesthesia Group's cooperative affiliation of independent physicians, serving our community for the next twenty years. In a brief review of that experience, some observations on anesthesia services in a new community hospital in the 1950s and 1960s may help address today's dilemmas in a new country.

The transition from historic Anesthesia traditions in the University of Wisconsin to Sequoia District Hospital was easier than anticipated. Within a relatively short startup period, with occasional help from the nearby Stanford Medical Center, our anesthesia group numbered seven well-grounded, cooperative, congenial, competent physicians. Five had served as faculty in Medical Schools—Stanford, University of California, and Wisconsin. One member had disposed of his solo private practice of anesthesia. Together, the group offered a broad background of knowledge, experience, and ideas.

New clinical staff included many physicians who had completed resident programs and gained maturity from added practical experience. All were anxious to build their personal medical practice. Some of the established local practitioners, overworked during the manpower crunch of World War II, were now feeling a new pressure of competition and lack of knowledge.

In these circumstances, some unacceptable complications and conflicts occurred. An alert, capable administrator and his staff recognized the difficulties and quickly organized appropriated sections of the Medical Staff under qualified leaders. The anesthesia section played a significant role in evaluation of competence and documentation of staff privileges, especially for Surgical, Obstetric and Anesthesia practice. Actually this process required a year for completion, but it would arguably be a crucial step in organization and subsequent operation of the new hospital.

At the same time we faced another essential task—setting Hospital and Section goals. A partial representation is depicted in fig. 1.

The diagram depicts three action goals and three basic participant centers. They share in the building process and also in the benefits of the ultimate result. In this matrix there are nine cross-links suggesting two-way interactive channels of interdisciplinary exchange that would be necessary in a new open staff community hospital.

Consider the major groups that come together in an open staff hospital, like Sequoia, and what their different interests or purposes might be.



Figure 1. Major Goals in Hospital Care

In this diagram, the three participant groups (Patients, Physicians, and Administration) are set opposite three essential hospital goals in a  $3 \times 3$ , nine-place matrix. The resulting complex interchange is partially regulated with unit programs and protocols.

PATIENTS	Receive services
PHYSICIANS	Receive free work
	facility
PHYSICIANS	Provide the healthcare
ADMINISTRATION	Provides operational
	facility support

Now consider the goals to be determined: how Security will be guarded, what Services are to be offered, and the Satisfaction level to be expected.

SECURITY	<i>Provide</i> best available safeguards				
SERVICE	Provide best possible				
	healthcare				
SATISFACTION	Provide monitored				
	outcomes; also con-				
	sider the satisfaction				
	felt by providers as				
	added incentive to				
	maintain quality.				

Disregarding the rhetoric currently surrounding this subject, it seems reasonable that available, accessible, quality healthcare is a commendable goal for any concerned, community hospital. The issues, of course, are who, what, when, where, how, and even why? The discussion is relevant here because a competent, professionally directed anesthesia service is a complex hospital function that is not easily attained. An open staff policy was required of Hill-Burton District hospitals, yet nearly 100% Medical Staff voted to accept the record of approved privileges. In this way they also indicated a tacit agreement on the high correlation of safety in patient care with the knowledge, skill and attitude of attending physicians. The commendable cooperation of the Medical Staff also suggested a sense of shared responsibility with administration to maintain the public trust and satisfaction with the users of their hospital.

At the very beginning of Sequoia hospital's operation, the Anesthesia Section of the Medical Staff listed only three members-Drs. Neff, Farquharson, and Burke of the Sequoia Anesthesia Group. Other anesthetists were scheduled rather casually for elective operations, rarely for labor and delivery and mostly as an associate of the surgeon from a neighboring hospital. Except for schedule time conflicts, the Sequoia Group provided a published, 24-hour anesthesia call schedule for both Surgery and Obstetrics. Sequoia Staff Physicians were very cooperative. Otherwise, the situation was nearly chaotic. As soon as possible, a fourth member-Dr. Howard-joined the group, thereby registering the full group commitment to the hospital anesthesia services. The hospital Governing Board responded by closing membership in the Anesthesia Section with its associated practice privileges to any anesthetist who would not take a full share of emergency call as published for both Surgery and Labor & Delivery. The Board's action was perceived initially by some critics as an arbitrary ruling, but later it was widely acclaimed as a positive solution-PRECEPTS, Safety, Fairness, Responsibility; PRINCIPLES, Organization, Efficiency.



#### Figure 2. Participants for Anesthesia Services.

This diagram emphasizes the support system for a single anesthesia service, with indications of channels of communication in both organization and operation. Note the underlying Hospital Governing Board.

Most of the time, SERVICES of anesthesiologists (as they are now known) were supporting patient care via two channels, Physicians and Administration. The channels were not always tuned in harmony. Anesthetists who showed attitudes of mutual respect and concern for the general issues and outcomes of the hospital's mission were often invited to help find answers to major problems. Here was the way to constructive solutions with benefits to all interests. Pursuing this kind of low-key, cooperation, mixed with firm determination and patience, was a characteristic demeanor in Dr. Ralph Waters' professionalism.

Such traits, among others, were not only key to his success but also won for him the confidence, trust, respect and affection expressed by those who knew him. Looking backward, an important observation was a growing realization. The provision of organized anesthesia care is a full service function, designed and operated for the benefit of patients. Physicians (operators and anesthetists) and administration (anesthetists and organizers) work in this special partnership to foster maximum safety, efficiency, and availability. Many other participant elements are requiring more security, more kinds of services, and higher expectations for satisfaction in both process and outcome. Cost is a growing concern as medical applications of technology are steadily added by research. We believe Ralph Waters would have welcomed such innovation and trial, and we also believe he would never have relaxed his *Pursuit of Excellence* in caring for patients during anesthesia.

#### **Editorial Comment**

We are particularly pleased that this presentation was provided by Dr. Burke. There has been considerable emphasis on the continuing influence of Ralph Waters on anesthesia education. This occurred through the establishment by Waters trainees of numerous academic anesthesia centers for the training of resident physicians in anesthesia. An equally important but somewhat less recognized impact resulted from those Wisconsin trainees who chose to enter private practice and thereby raised the standards of patient care during clinical anesthesia as practiced throughout the country.

Dr. Burke's paper should challenge all of us to ask the daily question, "How can I do it better?"

he contributions of Dr. Ralph Waters to anesthesiology were numerous. They included: techniques, new therapy, educational curriculum, anesthesia patient care and the practical management of anesthesia care delivery. Although he often stated that he was not a "researcher," he constantly raised and pursued questions

## John E. Steinhaus

# RALPH M. WATERS, M.D.: INNOVATOR, INVESTIGATOR, AND INSTIGATOR

in all of the above areas. Medical publications in 1912 were limited, especially in anesthesiology, but he read the available papers and was very active in attending medical meetings, presenting papers and consulting with experts. He recognized that resources for the development of anesthesiology required the expertise of a medical center. This insight led him to join the faculty of the School of Medicine in Madison, Wisconsin, which had recently added third and fourth clinical years to the two-year school in basic sciences. Listed in fig. 1 are his objectives for this new position. The first of these was the best anesthesia care possible.



Figure 1. Objectives for Anesthesia education formulated by Ralph M. Waters at the University of Wisconsin, 1927.

#### Innovator

His dedication to better care is demonstrated by an early innovation which Ralph Waters established in 1918, the "Day Clinic"<sup>1</sup> for ambulatory surgery. A major change in anesthesia practice from hospital to the "surgicenter" since the 1970s was the subject of a letter in 1974 by Ralph Waters, responding to Wallace Reed, who had initiated the surgicenter. Dr. Reed had read the 1919 "Day Clinic" publication of Dr. Waters.<sup>1</sup>

A 1921 publication<sup>2</sup> reporting high-pressure oxygen resuscitation by Dr. Waters evidenced his early interest in resuscitation and the use of oxygen. Although both patients died, peripheral circulation with oxygenation was established in both suggesting the use of cardiac compression for cardiac arrest, which was adopted in the 1950s.

Although oxygen administration was used in medicine for certain critically ill patients, the oxygen tent was cumbersome and inefficient, and required the transport of a heavy "G" cylinder. A piped-in oxygen system was established in the Wisconsin General Hospital in 1934, both for the ORs and the patient rooms on the surgical floors. Oxygen by nasal catheter was administered to patients returning from surgery. The elimination of errors and cost caused by multiple tanks, gauges, and



Figure 2. Annual Anesthesia reports 1953-1958.

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Figure 3. A page from the 1957 report showing cases (underlined) separated into instruction and assistance.

personnel during emergencies established this new therapeutic method.<sup>3</sup>

Ralph Waters was a firm believer and practitioner of the importance of good records in medicine and anesthesiology.<sup>4</sup> In the anesthesia practice and for the residency training, preoperative evaluation and post-operative anesthesia records were emphasized. Furthermore, the data from these records were collected and punched on IBM cards. A report was published annually that provided information related to anesthetist, anesthetic agent complication, operation, and mortality. This report was a special interest of Dr. Noel Gillespie, who devoted, essentially, his full time to this report in his later years. Even so, all personnel of the department of anesthesiology participated in this activity. Fig. 2 shows five of the annual reports generated during my tenure as a resident and faculty at Wisconsin from 1953-58. Fig. 3 gives a page of the tabulation of my instruction and assistance for 1957 as a member of the faculty.

In Dr. Waters' concern for supporting the growth of anesthesiology, he recognized the importance of education. The curriculum, which he established, included lectures, demonstrations, and OR clerkship.5 During my third year as a medical student in 1944, Dr. Waters anesthetized a child in our lecture room using open drop ether. Although the patient vomited, he managed to clean the airway and to continue administering the anesthetic without interrupting his presentation. Later in that year he gave the special lecture for the annual medical student Field Day on "Artificial Respiration." In our main medical school auditorium, filled with some 200 students and medical school personnel, he demonstrated all methods of artificial respiration on a patient under basal anesthesia. In a darkened hall, with a spot light on the patient's exposed abdomen, he hyperventilated the patient with each technique from bag and mask to mouth to mouth, producing apnea. The suspense built with each period of apnea, and this third-year medical student edged forward in his seat along with most of audience until the early movement of the abdomen indicated the patient was alive and breathing. Although I had no special interest in anesthesiology as a specialty until some years later, this lecture demonstration is one of my few memories of an outstanding medical lecture.



Figure 4. Aqualumni 1937. Front row, left to right: Doctors Moffit, Wineland, Waters, Neff, Stiles, Treweek, Seevers, Rovenstine. Back row, left to right: Leigh, Hathaway, Alexander, Apgar, Bennett, Volpitto, Cassels, Hershenson and Taylor.

As a senior medical student, my clerkship in anesthesiology was only one week, due to a wartime eleven-week quarter, which also included five two-week surgical rotations. The popularity of the anesthesia clerkships was such that despite my many efforts, I could find no student who would trade a two-week anesthesia rotation, for my one-week period. A three-month preceptorship in a small, out state hospital was also a part of our senior year. After training in anesthesiology, I discovered in my logbook of that period, that I gave eight anesthetics. However, I made no notations or have little recollection that I had any anesthetic problems, or that it was unusual for a medical student to administer anesthetics without an anesthesiologist present.

Waters' third objective was the establishment of a residency program, which was directed toward trainees who would be experts in anesthesia care, who would, in turn train new anesthesiologists. The curriculum for the residency program included both a weekly literature seminar and a clinical case complication and mortality conference. In addition, the resident trainee participated in ongoing research projects to the degree that his time permitted. The publications on anesthetic subjects during Dr. Waters' tenure includes as authors many of the residents in training.

Dr. Lucien Morris' design of the "Waters Tree" particularly illustrates Dr. Waters' success during this activity. When Dr. Emery Rovenstine left Wisconsin in 1935 for Bellevue Hospital in New York, Dr. Waters arranged for and encouraged residents to join this new program. The correspondence between Waters and Rovenstine after this move was frequent and lengthy. An estimated volume of over 200 pages of correspondence occurred during 1935

and 1936 between R.M.W., the established Program Director and this new Director. For years, the residents whom Ralph Waters had trained, gathered annually in Madison, and were known as "Aqualumni." A photo of the 1937 gathering is shown in fig. 4. They included such outstanding heads of academic programs as Emery Rovenstine, Perry Volpitto, Virginia Apgar, and Digby Leigh. Also a member of this group was Maurice Seevers, later the Professor and Chairman of Pharmacology of national and international note at the University of Michigan. While at Wisconsin as an Assistant Professor of Pharmacology, he collaborated with many anesthesia residents and staff on a multitude of research studies, as well as administering anesthesia at least one-day a week. He was an early member of the American Society of Anesthesiologists as well as being a regular at the Aqualumni meetings.

Dr. Waters was also very aware of the need to educate other physicians in anesthesiology. Fig. 5 shows a poster from an exhibit at the Annual Meeting of the AMA in 1937. This presentation showed the contribution of the specialty to pain, fluid, respiratory therapies, and artificial respiration as well as general and regional anesthesia. It also demonstrated the scientific basis of anesthesiology.

#### Investigator

Although he had no formal research training and always disclaimed expertise in research, he had the essential characteristic of successful investigators: he constantly wanted to know "why"? Furthermore, he would pursue inquiries by searching the available medical literature and attending medical meetings. He made careful observations and records of his own anesthetic administration. Dr. Waters published twelve papers before coming to Madison in 1927. His serious interest in carbon dioxide led to his 1924 publication<sup>6</sup> of his investigation of an absorption technique, and to



Figure 5. A poster from an exhibit presented at the 1937 annual meeting of the AMA. This depicts the building blocks of knowledge that are required by competent anesthesiologists.

the introduction of the Waters' Canister, also in 1924 (fig. 6). Yandel Henderson's publication in 1915 reported that dogs died in shock from hyperventilation and the consequent hypocarbia.<sup>7</sup> The prevailing medical opinion in the early 1920s, based upon the above conclusion, was that diminished carbon dioxide, in the anesthetic breathing atmosphere, was dangerous. Consequently, carbon dioxide was often added to or allowed to accumulate in the breathing mixture.

Waters continued his studies on carbon dioxide absorption technique and reported advantages of reduced costs and possibly harmful physiological changes with hypercarbia. He pointed out that this technique reduced anesthetic gases released in the OR, and it made possible the introduction of anesthetic agents like cyclopropane, which was limited in supply and very expensive. After Dr. Waters joined the faculty of the School of Medicine at the University of Wisconsin, his interest in carbon dioxide continued. In collaboration with his new colleagues he published an additional series of papers on carbon dioxide. One study confirmed Henry Hickman's 1825 work that carbon dioxide could produce anesthesia. The research on carbon dioxide became more sophisticated especially in conjunction with Dr. Maurice Seevers.<sup>8</sup>

Among Dr. Waters' many interests was the introduction of new anesthetic agents. Although he is more widely recognized for his introduction of cyclopropane, his first publication at Madison was on tribromethanol. Several papers on this drug followed, noting beneficial physiological changes produced



Figure 6. The Waters to-and-fro canister for carbon dioxide absorption during anesthesia, with cuffed endotracheal tube.

by tribromethanol. A more successful new anesthetic agent, thiopental was administered for the anesthetic depicted in fig. 7. Dr. Betty Bamforth stated that this was the first administration of thiopental to a patient. That this occurred at the University of Wisconsin was probably due to the barbiturate expertise of the University pharmacologists Tatum and Seevers. Dr. Waters was unimpressed with its analgesic properties and its study was published later.<sup>9</sup>

Following the publication of studies by Lucas and Henderson on cyclopropane as an anesthetic in dogs, studies of this agent in animals were initiated by Dr. Waters in 1930. An extensive study of over 2,000 clinical administrations of cyclopropane was reported in 1934.10 This study concluded that inductions with this agent were easier than with other agents and that complications were similar or less than with diethyl ether. It is of interest that in this study and preceding animal studies, cardiac arrhythmias with cyclopropane were not found to be a problem. However, a later publication after more than six years and 7,000 anesthetic administrations of cyclopropane, serious ventricular arrhythmias were observed.11 A consequence of these complications was numerous Wisconsin studies and publications of electrocardiography during anesthesia. It is also interesting to note a conclusion in the 1937 publication, which states that, "cyclopropane is still considered an experimental drug."

In 1928 Guedel and Waters published their paper "Endotracheal Anesthesia, a New Technique" devoted to the cuffed endotracheal tube (fig. 6). This was followed by a paper on closed endobronchial anesthesia and in 1933, "Endotracheal Anesthesia and its Historical Development."<sup>12</sup> In this paper Guedel and Waters traced the introduction of endotracheal tubes from around 1800, to endotracheal tubes with cuffs used in various manners—into the early twentieth century. They gave G.M. Dorrance (1877-1949) credit for producing an endotracheal tube very similar to the one they used in 1928. Cyclopropane's adoption and common usage in Wisconsin, despite its cost, was possible with the cuffed endotracheal tube and the carbon dioxide absorption system.

The early effort to build a resuscitation mannequin at Wisconsin is more evidence of Dr. Waters' emphasis on teaching resuscitation by

From 1912 through 1926, before Dr. Waters' arrival in Madison, there were fifteen anesthesia related publications from the relatively strong departments of pharmacology and physiology. In the following fifteen years, from 1927 to 1941, there were ninety such publications. airway management<sup>13</sup> (fig. 8). Thirty years later Resusci Annie was a popular teaching aid.

#### Instigator

The best illustration of the impact of Ralph Waters on research related to anesthetic drugs and techniques is the University of Wisconsin's Department of Anesthesiology records that list the research laboratory

publications on anesthetic agents and related biomedical problems. From 1912 through 1926, before Dr. Waters' arrival in Madison, there were fifteen anesthesia related publications from the relatively strong departments of pharmacology and physiology. In the following fifteen years, from 1927 to 1941, there were ninety such publications. Dr. Waters' name appeared on fourteen of these, while other anesthesia faculty are named on an additional fifteen. The approximately sixty other papers covered a wide variety of anesthetic related research, largely from the departments of pharmacology and physiology, including such topics as local anesthetics, respiration, barbiturates, and opiates. Many of the papers starting in the mid-1930s were devoted to anesthetic problems such as cardiac arrhythmias,



Figure 7. Anesthetic record of the first patient anesthetized at the University of Wisconsin with Thiopental, 1934.

gas analysis, solubility coefficients, and respiratory alkalosis. The interest and cooperative research with the physiologists on the cardiac automaticity and cardiac irregularities led Dr. Walter Meek, Professor and Chairman of the Department of Physiology, to present the nationally known Harvey Lecture in 1940 entitled, "Some Cardiac Effects of the Inhalant Anesthetics and the Sympathomimetic Amines."<sup>14</sup>

The seven-year period from 1942 until Dr. Waters' retirement in 1948 lists another forty-three publications on a similar range of topics. Many of these papers listed four authors that frequently included a resident from anesthesiology, a graduate student from either physiology or pharmacology, along with the faculty person of the two departments, as it appears in reference No. 8. There was no set

Dr. Waters felt all doctors should be taught endotra Dr. Waters felt all doctors should be taught endotra-cheal intubation. Accordingly, he wanted a manneguin for teaching purposes. In response to his request, and with the cooperation of the orthopedics depart-ment, a light cloth-reinforced plaster cast was made of Dave's head and thorax. Jaw mobility was accom-plished with rubber bands, the tongue was made of sponge rubber covered with Penrose drain, the epiglot-tis and larynx were fabricated from rubber tubing. Thus Thus to be a superior device the depiged for device the second sec Thus "Dave" became a Wisconsin immortal used for stu-dent teaching for years. 1932 BILL NEFF

Figure 8. A description of a resuscitation model used for education purposes at Wisconsin in 1932.



Figure 9. A cyclopropane study including authors from three departments.

priority for who was listed as the first author, it might be any of the four. Not infrequently, an anesthesia resident would be the first author with Dr. Seevers of pharmacology as the second. If one looks back at the objectives Dr. Waters listed upon his arrival, one finds solid evidence that anesthesia residents were being trained in research and that research was being conducted cooperatively, especially between the two basic sciences, pharmacology and physiology (fig. 9). On the lighter side, to give you a sense of his full character, Dr. Waters liked the fictional character, Tom Sawyer, who enlisted others to "paint his fence."

Although there is no record of Dr. Maurice Seevers having formal anesthesia training, he administered anesthesia (on a part-time basis) that supplemented his basic science salary during the depression. He was also an early member of the ASA and was a regular member of the Aqualumni. The quality of the cooperative research effort can also be measured by the number of residents and graduate students listed in these studies, who later became nationally recognized department chairmen in physiology, pharmacology, or anesthesiology, such as Youman, Pheiffer, Shideman, Allen, Orth, and Rovenstine.

Dr. Noel Gillespie closed his biography of Ralph Waters, *Ralph Milton Waters: A Brief Biography*,<sup>15</sup> with a commentary written by Dr. Geoffrey Kaye, of Melbourne, Australia, who was a visitor to the department. Dr. Kaye is complimentary of the working relationship of Waters' department with the basic science departments at Wisconsin, but goes on to say that the Wisconsin department's unique quality reflects the personality of one man.

He further describes Dr. Waters as "a man of original mind" who avoided self-complacency and had little use for window dressing. A final quote, "The salient characteristic of Ralph Waters is his uncompromising honesty."<sup>15</sup> Given these 75 years to examine his records, his publications, the growth and development of the specialty of anesthesiology, and educational and training programs, which he initiated, one can only admire him as a superb role model and be grateful for his many contributions to the specialty of anesthesiology.

#### References

- 1. RM Waters, "The Downtown Anesthesia Clinic," Am J Surg 33 (1919): 71.
- 2. RM Waters, "Resuscitation: Artificial circulation by means of intermittent high pressure chest inflation with oxygen. A preliminary report," *Anesthesia and Analgesia Bulletin* (October 15, 1921).
- 3. RM Waters, RC Buerki, and HR Hathaway, "Oxygen therapy at the Wisconsin General Hospital," *Hosp* 10 (1936): 1-4.
- 4. RM Waters, "The teaching value of records," J Indiana State Med Assoc 29 (1936): 110.
- 5. RM Waters, HR Hathway, and WH Cassels, "The Relation of Anesthesiology to Medical Education," *JAMA* 112 (1939):1167-1171.
- 6. RM Waters, "Clinical scope and ability of carbon dioxide filtration," *Anesth & Analg* 3 (1924): 20-21.
- 7. Y Henderson and HW Haggard, JAMA 65 (1915): 1.
- 8. MH Seevers, et al, "Respiratory Alkalosis during Anesthesia," JAMA 113 (1939): 231.
- 9. TW Pratt, et al, "Sodium ethyl (1-methybutyl) Thiobarbiturate," Am J Surg 31 (1936): 464.
- 10. RM Waters and ER Schmidt, "Cyclopropane Anesthesia," JAMA 103 (1934): 975-983.
- 11. RM Waters, "Present status of Cyclopropane," Br Med J 2 (1936): 1012-1017.
- 12. RM Waters, EA Rovnstine, and AE Guedel, "Endotracheal anesthesia and its historical development," *Anesth & Analg* 12 (1933): 196-203.
- 13. WB Neff, "Wisconsin California Connection," Bull Calif Soc Anes 34 (1985): 3.
- 14. WJ Meeks, "Some cardiac effects of the inhalant anesthetics and sympathomimetic amines," *Harvey Lect Ser* 36 (1940-1): 188.
- 15. NA Gillespie, "Ralph Milton Waters, a brief biography," Br J Anaesth 21 (1949): 197-214.

#### nhalation anesthesia during the early years

Until the 1920s inhalation anesthesia was administered by open drop of either diethyl ether or chloroform on a gauze mask, or the administration of nitrous oxide with limited concentrations of oxygen was delivered via a reservoir bag and mask.

### James C. Erickson, III

# CARBON DIOXIDE ABSORPTION AND WATERS' INNOVATIONS

Potent volatile agents were added to nitrous oxide when needed to attain the desired depth of anesthesia.1 There were no intravenous drugs to speed induction. Pure nitrous oxide was often administered for gas induction and to attain maximum anesthesia. Inductions were usually accomplished in two or three minutes, after which 10% to 15% oxygen was added to the gas mixture to avoid cyanosis. "Too much oxygen" was avoided because it diluted the anesthetic. Diethyl ether, chloroform or ethyl chloride were occasionally added to deepen the anesthesia if better abdominal relaxation was needed. When exhaled carbon dioxide (CO<sub>2</sub>) accumulated in the rebreathing bag despite the high gas flows, vigorous "pushing" respiration often resulted, thus hindering the abdominal surgeon.

# The earliest attempts to remove CO<sub>2</sub> from inspired gases

In Britain the Reverend Stephen Hales (1677-1761) created an experimental device with two directional valves and an "air clearing" filter, intended to enable the wearer to breathe in "foul air."<sup>2a</sup> The valves caused the person to inspire air through a series of four filters which were sieve-like frames over which flannel was stretched to form a permeable diaphragm. The flannel was impregnated with various substances, which allowed increased durations of effectiveness. Without the dia-

phragm, the breathing circuit was tolerated for only one minute. By soaking the flannel in vinegar and then "sea brine," the time was extended to about three minutes. After trying various substances, Hales found that flannel filters impregnated with "highly calcined potash" permitted continuous breathing for 8 1/2 minutes. He recommended this filtering device for breathing in situations of befouled air, such as encountered in mines, ships' holds, fires and chemical laboratories.

An Italian, Abbe Fontana, demonstrated the effectiveness of breathing oxygen or air in a closed system in which the exhaled air was bubbled through "lime water" and in 1782, improved the system.<sup>2b</sup> The subject inhaled oxygen (contained in a bladder) via a masklike covering of the nose and then exhaled into a mouth piece, which was connected via a tubing to a jar of lime-water, arranged so the CO<sub>2</sub> laden air bubbled up through the liquid. Thus purified, it was added to the contents of the inspired gases. During the 1800s other inventors built portable CO2 absorbers usually coupled with oxygen supplies designed for rescue work, especially in mine disasters.<sup>2c</sup> These portable devices were not adapted for medical or anesthetic purposes.

#### Coleman's "economising apparatus"

The earliest effort to remove CO<sub>2</sub> during anesthesia was reported by Dr. Alfred Coleman

in the United Kingdom during 1868.<sup>3</sup> His "economising apparatus" directed the exhaled anesthetic gases through partially slaked lime and then back to the patient for rebreathing. Coleman realized a saving of "two-thirds to three-fourths of the quantity of protoxide as ordinarily consumed" but the necessary manipulations deterred most practitioners from adopting it and the apparatus did not gain popularity.

# The Modern Era: Jackson's and Waters' experiments

Dennis E. Jackson reported his experiments with CO<sub>2</sub> absorption in 1915 after two of his laboratory dogs survived for 24 hours in a closed cabinet by passing their exhaled air

The earliest effort to remove CO2 during anesthesia was reported by Dr. Alfred Coleman in the United Kingdom during 1868.<sup>3</sup> His "economising apparatus" directed the exhaled anesthetic gases through partially slaked lime and then back to the patient for rebreathing. through an alkaline solution.<sup>4</sup> Sufficient oxygen was added to satisfy their metabolic needs.

Ralph M. Waters applied this information to his clinical practice when he created a cylindrical canister filled with granular alkali and introduced it between the patients' mask and the rebreathing bag while

adding oxygen to the anesthetic mixture. Waters began his work with this "filter system" in 1919 and first reported it in 1924.<sup>5</sup> Waters' records and a publication in 1936 reveals his trials with different sizes of cylindrical metal canisters filled with the absorbent alkali.<sup>6</sup> The canisters were constructed with and without baffles at the ends and in various sizes.

Ultimately, a tubular container 12.0 cm long and 8.0 cm in diameter with baffles at both ends proved the best to direct the gases over the absorbent contained in the metal can-

ister for adult patients. It contained about 500 grams of alkali. All gases passed through the alkali twice with each respiration, hence the descriptive name "to and fro" breathing. The gases were initially introduced into the tail of the rebreathing bag, but re-evaluation showed that the addition of fresh gases into a port at the mask allowed more rapid changes in the depth of anesthesia (fig. 1).



Figure 1. A Waters canister with mask and rebreathing bag for an adult. Note the gas supply tubing attached to the mask adapter rather than to the tail of the bag. COURTESY WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY: J.C. ERICKSON, MD

After filling the bag with anesthetic, Waters added only enough oxygen to satisfy the patient's metabolic requirements, thus reducing the flows of both the anesthetic gases and oxygen. The advantages of this "to and fro" rebreathing system were enumerated in the 1924 article entitled, "Clinical scope and utility of carbon dioxide filtration in inhalation anesthesia." A second publication in 1932 enlarged on the initial claims and offered additional details regarding anesthetic management.<sup>7</sup>

- 1. There was a great improvement of economy of gases and vapors "because there is no waste of drugs into the operating room."
- 2. The odors of the anesthetics were kept away from the surgeons and assistants.
- 3. The potential hazards of explosions were reduced.
- 4. The economical rebreathing of the anesthetic gases and vapors allowed him to use smaller cylinders of gases, a great convenience in the days when containers of gases and vapors were usually transported to the surgeons' offices for each case.
- 5. Heat and moisture conservation were improved by the rebreathing technique.

Waters also noted the following disadvantages:

- 1. The need to maintain airtight connections of all components of the system and a tight fit of the mask on the patient's face. This requirement provoked resistance from anesthetists who found it difficult to avoid leaks, especially in the presence of nasogastric tubes. It also precluded the use of the closed system in oral and nasal surgery.
- 2. A constant flow of oxygen was needed to satisfy the patient's metabolic requirements.
- 3. Replacement of the spent carbon dioxide absorbent was necessary at intervals. Waters replaced the alkali with soda lime after five hours of use, while others found that it could be used for about 10 hours.
- 4. The filter (canister) could be sterilized in an autoclave.

A variety of canisters were developed to permit the exhaled tidal volumes of about 400

ml to 500 ml (adults) to pass into the absorbent for its cleansing action after each breath. To accommodate the size and respiratory differences of pediatric patients, canisters of 350 grams, 180 grams (child size) and 90 grams (for newborns) were made of clear Lucite as well as the usual metal cylinders. Of course, the respiratory dead space was minimized by the smallest canister. A 750 gram (Jumbo) canister was even produced for exceptional patients. The Foregger Company discontinued manufacture of Waters' canisters during the 1960s, but they still may be found in the dusty closets of some anesthesia departments.

The maneuver of inserting the canister into the system and maintaining it in proximity to the patients' face, while keeping a tight fit caused some anesthetists to shun the closed system. They complained that it was too difficult or "just impossible!" Intravenous agents were not yet available to speed the standard inhalation inductions and uncooperative or unruly patients tried the patience and challenged the ability of even the most skilled anesthetists. When cyclopropane was introduced, the closed system proved to be the preferred method for administration of that potent inhalation agent.

Woodbridge suggested that the fine alkali dust in the soda lime should be blown out of the canister prior to the induction of anesthesia.<sup>8</sup> Anesthetists were encouraged to force a vigorous expiratory blast through the canister to blow away the fines, thus avoiding bouts of coughing, laryngospasm and bronchospasm.

During the latter years of the 1920s, Brian Sword and Waters investigated the use of unidirectional valves and devised the first "circle system" thus removing the bulky canister from the proximity of the patient's head.<sup>9</sup> This now ubiquitous technique accomplished the same degree of carbon dioxide removal as the toand-fro system and greatly improved the ease of anesthesia administration for head and neck and neurosurgical operations.

#### Summary

Dr. Ralph M. Waters' investigations of respiratory physiology and his innovations for carbon dioxide removal in a closed rebreathing siology. He paved the way for the development of improved gas delivery systems and the eventual introduction of cyclopropane.

system were major contributions to anesthe-

#### References

- 1. WD Gatch, in Anesthesia, ed. JY Gwathmey (New York: Appleton & Co., 1914): 100-116.
- 2a. RH Davis, *Breathing in Impossible Atmospheres* (London: The Saint Catherine Press Ltd., 1947): 187-188.
- 2b. RH Davis, *Breathing in Impossible Atmospheres* (London: The Saint Catherine Press Ltd., 1947): 189
- 2c. RH Davis, Breathing in Impossible Atmospheres (London: The Saint Catherine Press Ltd., 1947): 190-200
- 3. WDA Smith, *Under the Influence* (Park Ridge, IL: Wood Library-Museum of Anesthesiology, 1982): 84.
- 4. DE Jackson, "A New Method for the Production of General Analgesia and Anaesthesia with a Description of he Apparatus used," *J Lab & Clin Med* 1 (1915): 1-12.
- 5. RM Waters, "Clinical Scope and Utility of Carbon Dioxid [sic] Filtration Anesthesia," *Current Researches in Anesthesia & Analgesia* 3 (1924): 20-26.
- 6. RM Waters, "Carton Dioxide Absorption from Anaesthetic Atmospheres," *Proceedings of the Royal Society of Medicine*, 30, Sectional p.1 (October 2, 1936): 1-22.
- 7. RM Waters, "Carbon Dioxid [sic] Absorption from Anesthetic Mixtures," *Current Researches in Anesthesia & Analgesia* 11 (1932): 97-110.
- 8. PD Woodbridge, "Better Gas Anesthesia at Less Cost: The Carbon Dioxid [sic] Absorption Method," *Current Researches in Anesthesia & Analgesia* 12 (1933): 161-173.
- 9. BC Sword, "The Closed Circle Method of Administration of Gas Anesthesia," *Current Researches in Anesthesia & Analgesia* 9 (1930): 198-202.

he practice that came to me, largely referred by the pharmacists downstairs, most often proved to be drug addicts seeking relief in those days before the Harrison anti-narcotic law." It would be easy to attribute this comment to a frontier physician in the late 1800s, but the truth is it came from one of the leading

# John P. Street

# **RALPH WATERS M.D.: MORE THAN A PIONEER**

anesthesiologists of the twentieth century. Ralph Waters shared this story about his first few months of general practice in Iowa in the winter of 1913. Other stories he told about surgery and anesthesia in those days send a shiver up the spine. The requirements for medical specialization in Midwestern hospitals at that time were not based on proven competence but rather on "the possession of sufficient audacity to attempt a procedure."<sup>1</sup>

Dr. Waters' credentials as a pioneer in anesthesiology are beyond reproach. He began his anesthesiology practice almost a century ago and possesses a lengthy list of accomplishments as a scientist and physician. He also worked tirelessly, helping establish and maintain anesthesiology organizations to further the reputation and status of anesthesiology.<sup>2</sup> And, of course, he was the founder of the first university-based resident program.<sup>3</sup> This paper focuses on a different aspect of Dr. Waters' career that seems to have received little recognition—his excellence as a teacher.

As a former high school teacher I was naturally interested in the teaching aspect of his career. Since Dr. Waters' archives are located in the Steenbock Library at the University of Wisconsin-Madison, I decided to invest some time doing research on the topic. Two days of reading resulted in the discovery of an exchange of letters between Dr. Waters and

a young physician in Oregon that provide ample evidence of Dr. Waters' commitment to teaching. One of the hallmarks of excellent teaching is the quality of feedback that a teacher provides. Whether in the classroom or the operating room, quality teachers provide feedback that is timely, honest, thorough, and respectful. This is especially important in medicine where mistakes can have tragic results. Unfortunately, effective feedback in medical education tends to be the exception rather than the norm. Studies have found that while residents appreciate corrective feedback, they perceive that feedback is not given often enough, and many times is delivered in an inappropriate manner.<sup>4,5,6</sup>

An acquaintance of mine, who is not Native-American, spent time living among Crow Indians in Montana. After several weeks she was fortunate to be invited to attend a council of tribal elders. During the council she committed a faux pas that was recognized by evervone in the circle but the offending party. To remedy this ignorance, the eldest member of the group began recounting a story in which he had made a similar social blunder. After he finished, the other members of the circle proceeded to recount similar mistakes in their lives, often with a good deal of humor. The lesson formed a lasting impression upon my friend, not for the social protocol it imparted, but for the humility and sensitivity inherent

in the teaching of the lesson. The tribal elders were willing to display their own fallibility in order to teach. This is not often observed in medical education where a façade of infallibility often insulates the teacher from the student.

The letters that are excerpted here were written in 1936. The decade of the 1930s proved to be an important time for anesthesiology. Important advances were being made in the delivery of anesthesia. New gas machines now delivered improved agents, regional anesthesia was gaining importance, and IV methods were introduced. In the midst of a severe depression, hospitals employed nurses and residents to provide anesthesia in order to reduce costs.7 During these turbulent times, Dr. Waters and other leaders in anesthesiology pursued recognition for the specialty from the medical establishment. As a "founding father" of modern anesthesiology, Dr. Waters took a personal interest in how the specialty was practiced, demanded high standards, and he readily provided advice to physicians around the nation.

I believe the following excerpts from Dr. Waters' correspondence are evidence of his excellence as a teacher.

Late in 1936, a young physician from Oregon wrote to Dr. Waters seeking advice about a tragic occurrence in the operating room. The handwritten six-page letter bears many notes from the pen of Dr. Waters as he analyzed its contents. The young doctor was a graduate of the University of Wisconsin Medical School and had just finished his internship. In the letter he recalled "an anesthetic death" of one of his patients one month before. The letter provides extensive detail about the condition of the patient and the conduct of the surgery, and the resident characterized the case as "most unusual and incomprehensible."<sup>8</sup>

Dr. Waters quickly replied to the letter with a three page, single-spaced typewritten letter. He began by stating that the case had been used anonymously as a teaching tool at the weekly case conference. He followed this with a self-deprecating comment that the letter had "undoubtedly done me some good in convincing me that as a teacher I would probably make a good plumber." The letter goes on to explain in detail the cause of the death

As a "founding father" of modern anesthesiology, Dr. Waters took a personal interest in how the specialty was practiced, demanded high standards, and he readily provided advice to physicians around the nation.

and how it could have been avoided. "My extreme disappointment is involved in the fact that you could think the case over for a month and not have arrived at the proper solution. This only means to me that our teaching here is gravely at fault and I am sorry."

This letter is a good example of Dr. Waters' frank, some might say blunt, style of feedback. "How in the world you could have failed to answer your own question is more than I can say since you stated at the very outset that the apparatus, which you were using, 'did not absorb carbon dioxide very well at any time." Although very direct in his criticism, Dr. Waters went to great lengths to support the young man and soften the blow. "I do not mean to be critical with you personally because in my correspondence there are probably at least one-half dozen identical cases." Another excerpt further illustrates Dr. Waters' willingness to examine his own teaching effectiveness. "I sincerely hope that I am not making this appear to be a discourteous razzing of you personally... I am sorely chagrined personally that you could have been a part of the undergraduate course here at Wisconsin and not be able to answer correctly the cause of the occurrence which you described."

Dr. Waters' concluded his letter by providing more emotional support for the young doctor and an invitation for further correspondence. This letter is written entirely for you alone. It is not an arraignment of you and your work, and you must not take it as a blow to you....Any blame involved is blamed to me as a teacher and certainly not to you as a pupil....I certainly hope that you will not be inhibited from continuing to send us any problems, which may arise in your experience. They are extremely valuable to me and to those who are working with me....With kindest personal regards and best wishes for your success...<sup>9</sup>

The young doctor took advantage of the opportunity to write again and inadvertently invited additional correction and teaching. To his credit the young physician does accept full blame for his mistake. However, he was not content to leave well enough alone, and went on to castigate other members of the hospital health care team.

> I regularly insulted her [a nurse anesthetist] by violently condemning her technique because of low  $O_2$ , and then too much  $CO_2...O_2$  in surgery is given via cumbersome tents, which was another thing I used to razz them (surgery residents) about....when it comes to knowing  $O_2$ ,  $CO_2$  and anesthetics, there is a pitiful lack of knowledge. Not only that, there are a few bull-headed staff men here, especially our head surgeon and virtual dictator of the institution, who have many wrong ideas....The anesthesia taught here is terrible.<sup>10</sup>

As the young man would soon find out, unbridled criticism of colleagues was not appreciated by Dr. Waters, who was committed to raising both the standards of practice in anesthesia and the professional recognition accorded the specialty. Dr. Waters was not one to pass up an important teaching opportunity and once again he responded quickly. But, true to form, he took the high road and began his letter with a compliment before offering his feedback. "Bully for you. I liked very much ...the way you took my rather harsh criticism. The only criticism that I could offer is of your attitude..." Dr. Waters then proceeded to offer a short lesson in professional conduct.

> There are many ways of doing the same thing in this world and oftentimes the other fellow's way is much better than your own....You should at no time, of course, admit out loud to yourself and not on paper to anyone other than your old associates that you do not feel your present associates, both superiors and equals, to be best in the world. Friendly argument to try and change another man's view is, of course, always legitimate, but in making your offer to such an argument, always be very careful not to spoil the good effect of the points which you make by stating them in such a way as to antagonize your opponent and make him unsympathetic. I am sure you have too much good judgment to have made such a terrible mistake.<sup>11</sup> [Emphasis added]

Given the arrogant and "bull-headed" attitude the young doctor displays in his second letter, Dr. Waters' reply was very generous in its stated assumptions and gentle in conveying a lesson in professionalism. "I am appearing to criticize you in your attitude toward the rest of the staff only by way of warning in case you had not a clear appreciation of the difficulties of maintaining useful relations with those around you." Again, Dr. Waters concluded his letter with an invitation to contact him with any future problems.

It would have been understandable if Dr. Waters had not responded to the young physician's second letter. He was extremely busy and he had already conveyed with clarity and precision the important message on  $CO_2$  and patient health care. He certainly was under no obligation to reply, but his level of commitment to anesthesiology and to those who sought his advice would not allow him to ignore the letter. He was compelled to teach and he did so with excellence. I find an excerpt from the young doctor's second letter sums up my thoughts regarding Dr. Waters' abilities as a teacher. "Your letter shows what a true and splendid teacher you are—it taught me a tremendous lesson." Dr. Waters was certainly much more than a pioneer in anesthesiology. I think he would have been right at home sitting in the Crow council of elders.

#### References

- 1. RM Waters, "Pioneering in Anesthesiology," Postgraduate Medicine 4:3 (1948): 265-270.
- 2. CM Burkle, "The political career of Ralph M. Waters: 'This is your society for the future,'" ASA *Newsletter* Vol. 65:9 (2001): 19-20.
- 3. LD Vandam, "History of anesthetic practice," in *Anesthesia*, ed. RD Miller (Philadelphia, PA: Churchill Livingstone, 2000): 1-11.
- 4. DM Irby, "What clinical teachers in medicine need to know," Academic Medicine 69:5 (1994).
- 5. MG Hewson and ML Little, "Giving feedback in medical education: Verification of recommended techniques," *J General Internal Medicine* 13:2 (1998): 111-116.
- 6. J Ende, "Feedback in clinical medical education," JAMA 250:8 (1983): 777-781.
- 7. DR Bacon, "John S. Lundy, Ralph Waters, Paul Wood: The founding of the American Board of Anesthesiology," *Bull of Anesthesia Hist* 13:3 (1995): 1, 4-5, 15.
- 8. Letter to Ralph Waters, November 6, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 9. Letter from Ralph Waters, November 12, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 10. Letter to Ralph Waters, November 21, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 11. Letter from Ralph Waters, November 27, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.

he lobby and hallways of most hospitals are lined with historical pictures of staff and buildings. Fig. 1 is one such picture from the Brigham and Women's Hospital in Boston. It shows the surgical house staff in 1923. This group is homogenous not only in race and gender, but also because all were born in the United States.

# **Ramon Martin**

# RALPH WATERS, M.D., ANESTHESIA EDUCATOR



Figure 1. Surgical Staff and Housestaff, Peter Bent Brigham Hospital, Boston, 1923.

These characteristics are repeated with succeeding pictures until the late 1960s. This was not unique to the Brigham alone. A picture of the Aqualumni in 1939 (fig. 2) is indeed unique because it runs counter to the prevailing medical community. A list of residents trained by Dr. Waters (table 1) demonstrates

a number of women, as well as individuals from countries other than the United States. Closer inspection of the Waters' Tree (fig. 3) shows the top branches depicting the countries of origin of his trainees.

Dr. Waters, as an anesthesia educator, attracted and taught his skill and art to men and



Figure 2. Aqualumni present at the 1939 meeting. From left to right: Doctors Rovenstine, Waters, Seevers. Second row from left to right: Sircar, Leigh, Hathaway, Neff and Gordh. Back row from left to right: Cassels, Apgar, Slocum, Conroy and Taylor.



Figure 3. The top branches of the Waters Lineage Tree depict the countries of origin of his trainees.

women who came from around the world. This willingness to teach without limits ran counter to the nationalistic and isolationist tendencies prevalent in the world at that time. This paper will explore the possible reasons that Ralph Waters was a unique educator. An initial brief description of the prevailing world/nation will detail the negative influences of nationalism and isolationism. The economic depression and anti-immigration also combined to close national borders. The Flexner Report had a profound effect on medical education in the United States and had both positive and negative influences on the qualities that Ralph Waters valued. Several people had positive formative influences on Dr. Waters, such as Elmer McKesson and Francis and Laurette McMechan. The University of Wisconsin provided a unique place for Dr. Waters to comfortably teach and prosper. This desire and ability to teach all who were interested was passed down to those who learned from him, and in turn was passed down to their students.

#### Nationalism

After World War I, there was a decline in international exchange and cooperation as countries sought isolationism through nationalism. This marked a radical change from the late nineteenth century, when the industrial revolution sparked global trade. "Labor, goods and capital were still primary," wrote John Maynard Keynes in his essay, "National Self Sufficiency," but were to be used at home to promote national goals and to enrich a country within its own borders.

The "Gold Standard," along with central banks, became an international means to exchange currency between countries. The former was adopted by several countries because it brought order to monetary transactions. The central banks were important because they could guide the flow of money. These measures were abandoned in the early 1920s as demand for protection of national economies increased. The result limited exchange of currency outside of national boundaries.

The national economic downturn of 1920-21, followed by the speculative stock market rise of 1921-29 and finally the crash in 1929, reinforced the notion of national self-interest. The response to the Depression in most countries was to withdraw from world-wide involvement and focus solely on domestic markets. Countries such as Germany and Japan marshaled their industries to arm and eventually expand their national boundaries to neighboring countries and territories.

The business of each country was glorified, not only during the economic expansion of 1921-29, but thereafter as well. Industry contributed a significant portion to the relief and recovery efforts, particularly in the United States.

This attention to narrow self-interest resulted in an indifference to social concerns, such as workmen's compensation, child labor, slum clearing, and women's suffrage. All of these issues had come to the forefront during the late nineteenth century. There was opposition to reform, particularly if it was thought to be "foreign."

#### **International Migration**

During the nineteenth century emigration reached a peak. The shifts in population were partly caused by politics or ideology. However, the industrial revolution created jobs and financial opportunities in several countries. This resulted in large shifts in European immigration to the United States. At its peak, over one million people a year immigrated to the United States. After World War I, the economic downturn of 1920-1921 resulted in a backlash against immigration. The U.S. Congress passed Restriction Acts in 1921 and 1924 that progressively decreased the number of immigrants. In addition, countries were defined as preferred (for immigrants to come from) or non-preferred. The preferred countries were from Northern Europe. The immigrants from non-preferred countries were only admitted as temporary agricultural workers or domestic servants. The depression further heightened anti-immigration feelings.

#### **The Depression**

The economic impact of the depression had an immediate and lasting impact on every aspect of society. The resulting unemployment was as high as 37.6% in the United States and even higher in European countries. Although federal expenditures increased to fund public works projects, it still only amounted to 2.5% of the Gross National Product (compared to 22% in 1990). The bulk of funding for recovery came from state budgets and private industry. In comparison to \$200 million that the Federal Government spent on construction projects in 1929, states spent \$2 billion. Private industry contributed \$9 billion. The federal government had no social welfare programs in operation so that the burden fell to states and private industry.

#### Table 1

	The	Aqualu	mni		
Residents	Trained by	Doctor	Ralph	Milton	Waters

Frederick A.D. Alexander, M.D.	Austin Lamont, M.D.
Virginia Apgar, M.D.	Bruce V. Landry, M.D.
Howard M. Ausherman, M.D.	M. Digby Leigh, M.D.
Betty J. Bamforth, M.D.	Jose Adolfo de Basto Lima, M.D.
Ann Bardeen-Henschel, M.D.	Alexander M. MacKay, M.D.*
Max Baumeister, Jr., M.D.	John A. Moffitt, M.D.
Willard Bennett, M.D.	Jane Moir, M.D.
James Bennett, M.D.	Lucien E. Morris, M.D.
Dorothy M. Betlach, M.D.	William B. Neff, M.D.
Dr. Luis G. Bouroncle	Sven Eric Nilsson, M.D.
Norma B. Bowles, M.D.	Sidney Orth, M.D.*
Simpson S. Burke, Jr., M.D.	Bryce Ozanne, M.D.
William H. Cassels, M.D.	Carlos P. Parsloe, M.D.
W. Allen Conroy, M.D.	Alfredo Pernin, M.D.
William Francis Cormack, M.D.	Emery A. Rovenstine, M.D.
Milton Davis, Jr., M.D.	J. Eugene Ruben, M.D.
Karl-Gustav Dhuner, M.D.	Maurice Seevers*
Franklin M. Dowiasch, M.D.	Adolph Shor, M.D.
Robert D. Dripps, Jr., M.D.	Ronald A. Simpson, M.D.
Richard Foregger, M.D.	Barindra N. Sircar, M.D.
Olle F. Friberg, M.D.	Harvey C. Slocum, M.D. (Col. M.C.)
Gordon M. Garnett, M.D.	John A. Stiles, M.D.
Noel A. Gillespie, M.D.*	Ivan B. Taylor, M.D.
Torsten Gordh, M.D., Sr.	David N. Treweek, M.D.
Jose Q. Guerra, M.D.	Perry P. Volpitto, M.D.
Merel Harmel, M.D.	Clayton P. Wangeman, M.D.
Hubert R. Hathaway, M.D.	Darwin D. Waters, M.D.
Malcolm H. Hawk, M.D.	Rosaline L. Wilhelm, M.D.
Bert Hershenson, M.D.	Albert J. Wineland, M.D.
Larry H. Hogan, M.D.	Jone J. Wu, M.D.
Ferdinand C. Jacobson, M.D.	Robert M. Wylde, M.D.
Donald R. Kindschi, M.D.	Paul Yordy, M.D.

\*Staff, not a resident

In the two decades after World War I, the economic roller coaster of boom times followed by the Depression was accompanied by an underlying mood of isolationism and nationalism. Medicine was not immune to this, because there was decreased exchange between national medical societies.

#### **Flexner Report**

Commissioned by the Carnegie Foundation for the Advancement of Teaching in 1910, Abraham Flexner authored a monograph that critiqued the state of medical education at the beginning of the twentieth century. Medical schools were unregulated and marked by a large variability in student preparedness, as well as quality of pre-clinical and clinical teaching. Recent scientific discoveries that could have an impact on patient care were not routinely taught to students, as in many medical schools students were taught by physicians in private practice. Flexner recommended that medical schools be integrated in a university system to insure that students were adequately prepared with a standard curriculum, which contained enough science that was recent. The Report also stated that students should also be taught by fulltime faculty and that research be used to promote advances in clinical practice. States and medical societies supported these recommendations because it gave them some control over the number of students admitted and, therefore, over the number of physicians entering practice. It also provided control over licensure and helped to stabilize the income and maintain the social status of physicians. The formation of the American Association of Medical Colleges was formed as an aggregation of 127 U.S. and Canadian schools. This resulted in the closure of many smaller schools, particularly in rural areas.

An unintended effect was to decrease the number of minority, disadvantaged students, and to halt the increase in the number of women entering medicine. In 1870, 1% of practicing physicians were women. This had increased to 5% by 1920, but stayed at that level for the next fifty years.

Overall, the Flexner Report had a positive influence on Ralph Waters by creating an environment for the physician-researcher-teacher at a university center. Several individuals also had a positive influence on Dr. Waters. There are more complete accounts of the accomplishments of Ira McKesson and Francis McMechan published elsewhere. What follows is a brief description of these individuals and their attributes that may have influenced Ralph Waters.

#### Ira McKesson

Dr. McKesson was a multitalented physician who invited Ralph Waters to Toledo, Ohio in 1915 to learn the use of the Nargraf anesthesia machine. Dr. McKesson, in addition to being a physician, mechanic, and designer, was also the founder and director of the Toledo Technical Appliance Company, which manufactured the Nargraf anesthesia machine, suction pumps, intermittent flow valves, etc. Dr. McKesson was a teacher with a passion and gift to explain physiologic mechanisms. He enjoyed teaching neophytes not only the technical aspects of his devices, but also the underlying mechanisms and the effects on physiology. While in Toledo with Dr. McKesson, Ralph Waters attended a meeting of the Interstate Organization of Anesthetists where he first met Francis McMechan.

#### **Francis McMechan**

Dr. McMechan, despite being crippled by ankylosing arthritis at an early age, was a force in the development of anesthesia not only in the United States but also throughout the world. He occupied a number of founding and leadership roles in both the U.S. and Canada. He was also editor of the *Quarterly Supplement* of the *Anesthesia and Analgesia* in the *American Journal of Surgery* and the Although Dr. Waters traveled little while he was Chairman at Wisconsin, he also believed in the need to reach across national boundaries. He was able to attract and welcome residents from around the world. Current Researches in Anesthesia and Analgesia. He reached out to other societies throughout the world because he thought that the vitality and advancement of anesthesia needed input and exchange across national boundaries. Accompanied by his wife, Laurette van

Varsevold, he traveled to Britain and continental Europe in 1926 and 1928 to attend society meetings and visit medical centers. In 1929 he also traveled to Australia and New Zealand for similar meetings.

Although Dr. Waters traveled little while he was Chairman at Wisconsin, he also believed in the need to reach across national boundaries. He was able to attract and welcome residents from around the world.

#### **Midwestern Influence**

In the United States feelings of inferiority in both clinical and research skills led to a sense of distrust between American and European medical societies, especially British societies. Within the U.S., there were similar feelings between the Eastern medical establishment and those societies of the Midwest and West coast. This led to a split between the AMA, which was based in Chicago, and the Association of American Physicians, which represented the older Eastern states' physicians' groups.

The relatively new states in the Midwest U.S. were not as tradition bound as those on the East Coast. In general, the prevailing Midwest attitude was egalitarian, allowing for individual initiative. It was felt that all people were born equal, if not in ability, then in opportunity. While these were guiding principles in the formation of this country, the opportunities in the middle and western regions of the country were abundant for all.



Figure 4. The first graduating class at the University of Wisconsin Medical School shows a group that is almost half female.

#### RAMON MARTIN



Figure 5. Dr. Leroy Vandam and residents. He came to Brigham and Women's Hospital and changed the face of Medicine and Anesthesia.

#### University of Wisconsin

The University of Wisconsin provided a unique environment for Ralph Waters. The Dean of the Medical School, Charles Bardeen, recruited a young and enthusiastic faculty. Erwin Schmidt, the Chairman of the Department of Surgery, was instrumental in recruiting Ralph Waters. Dr. Schmidt wanted to change the role of the anesthetist in the operating room from technician to physician. In addition to providing clinical anesthesia, Dr. Waters had the opportunity to teach medical students and to establish the first university based teaching program in anesthesia. There were also numerous opportunities for collaborative research with Arthur Lovenhart. Chauncey Leake, and Arthur Tatum.

A picture of the first graduating class at the University of Wisconsin Medical School (fig. 4) shows a group that is almost half female. While the number of women in this graduating class is unique for this time period, the subsequent overall average of women comprising 5% of the graduates was common throughout the country and remained at this level until the late 1960s.

#### Conclusion

Dr. Ralph Waters was a unique individual, clinician, researcher and educator, who taught all who came to him. He was able to attract men and women from around the world and teach them his principles. They in turn taught others. I am fortunate to have been touched by one such individual, Dr. Leroy Vandam, who came to the Brigham and Women's Hospital and changed the face of Medicine and Anesthesia (fig. 5).

#### Bibliography

- Bacon, DR and Ament, R. "Ralph Waters and the beginning of academic anesthesiology in the United States: the Wisconsin Template," *J Clin Anesth* 7 (1995): 534-43.
- Bonner, TN. "The Social and Political Attitudes of Midwestern Physicians 1840-1940: Chicago as a Case History," *J Hist Med* 8 (1953): 133-64.
- Campbell, G. "Wisconsin women have a long history in medicine," Wisc Med J 12 (1995): 708-9.
- Gordh, T. "Ralph M Waters and Swedish Anesthesiology," J Clin Anesth 6 (1994): 221-26.
- James, H. *The End of Globalization. Lessons from the Great Depression.* Cambridge, MA: Harvard University Press, 2001.
- Klein, M. Rainbow's End. The Crash of 1929. New York, NY: Oxford University Press, 2001.
- More, ES and Greer, MJ. "American women physicians in 2000: a history in progress," JAMWA 55 (2000): 6-9.
- Morris, LE. "The continuing influence of Ralph M Waters on education in anesthesiology," In Anaesthesia: Essays on Its History, edited by J Rupreht, et al. Berlin: Springer-Verlag, 1985: 32-35.
- Vandam, LD. "Early American Anesthetists. The Origins of Professionalism in Anesthesia," Anesthesiology 38 (1973): 264-74.
- Waters, RM. "The Development of Anesthesiology in the United States. Personal Observations 1913-1946," J Hist Med 1 (1946): 595-606.

•• V ou're from Wisconsin; you give the anesthetic." That's what graduates of the University of Wisconsin Medical School heard wherever they went. Why? When Ralph Waters came to the University to initiate an anesthesia department, he had four objectives:

## Leroy Misuraca, Ann Bardeen-Henschel, and John Steinhaus

# PLANTING THE SEED: RALPH WATERS' SECOND OBJECTIVE AND THE CLASS OF 1945



Ann Bardeen, M.D. Aqualumna

- 1. to provide patient service
- 2. to teach medical students
- 3. to train residents
- 4. to encourage cooperative investigation

This paper will review the success of his second objective, "to teach what is known of the principles of anesthesiology to all candidates for the medical degree."<sup>1</sup>Our University of Wisconsin Medical School class graduated on June 26, 1945. It proved to be the epitome of Dr. Waters' success with his second objective. Ten\* of the 73 graduates became anesthesiologists (14%), the highest percentage of any UW graduating class from the first anesthesiologist in 1929 through 2001. The class was one of the last that Dr. Waters taught and thus benefited from what he had learned in almost twenty years of teaching.

What was it like to be a medical student in the mid 1940s? The wartime medical curriculum had been condensed to three years, internships abbreviated to nine months, immediately followed by active duty in the armed forces for most male graduates. Medical schools in the United States devoted little, if any, time to anesthesiology. Students would have seen anesthesia administered only by nurses, reluctant family practitioners or even medical students with scarcely any training. "The production of surgical anesthesia [was still too often considered] a technical procedure of little interest to thoughtful members of the profession."<sup>2</sup>

Although as students we knew about Dr. Waters' accomplishments, surely we could not appreciate the scope of his reputation. What did we see in him and the academic environment at Wisconsin that directed so many of our class to anesthesiology? To try to find an answer we surveyed the ten who became anesthesiologists; their recollections are the basis for this paper. Other members of the class occasionally administered anesthesia as part of a family practice, similar to the way Dr. Waters started in Iowa, but they were not full-time specialists and were not included in the survey.

We were first exposed to anesthesia in our sophomore Pharmacology lab—literally. Each student took a breath of cyclopropane. The most adventurous took a big breath and fell

<sup>\*</sup>Noel Gillespie might officially be considered number eleven. He received an American medical degree with the class of 1945 although he was already a physician and anaesthetist in Great Britain. He came to Wisconsin to work with Ralph Waters as a member of the anesthesia faculty. We weren't likely to think of him as a classmate.

down. Would you be your own test subject today? Sid Orth, who was appointed Chief of Anesthesiology after Dr. Waters retired, taught the pharmacology of anesthetics. He was our first basic science teacher who was also a clinician. We saw pioneering anesthesia research that included members of the basic sciences and other departments of the medical school, a true multi-disciplinary approach before that became today's buzzword.

In our junior year Dr. Waters' lecture/ demonstrations were both basic and practical. He stressed the function of "the transport system" instead of separate elements of oxygen supply and demand, acid-base balance, or pulmonary and cardiac function. He put patients (but never his audience!) to sleep for us in the classroom. He told us that we didn't need complicated equipment for anesthesia - even in the jungle one could roll up a newspaper to make an ether cone. During our anesthesia rotation as seniors in the operating room we saw only physicians providing anesthesia. We were more resident than student, sitting at the head of the table, applying the lessons of physiology and pharmacology, seeing the immediate effects of what we did. We were allowed to make mistakes, and if we upset the surgeon, Dr. Waters was there to remind the surgeon that this was a teaching hospital.

We attended anesthesia staff meetings and heard frank discussions of the management of patients we had taken care of. A "critic" or "censor" assigned to assure accuracy and precision in language kept jargon out, an unexpected reward for one of us who had been an English major for a semester or two. Members of the staff who supervised us made us feel accepted as colleagues in a way not sensed in other specialties. Noel Gillespie stood out, an exotic foreigner with an accent who expanded our horizons with his enthusiasm and dedication.

The medical school was proud of its innovative preceptorship program, which proved to be a significant addition to the teaching process. Senior students were assigned to selected clinicians and clinics throughout the state to see the "real world." One classmate recalls how Dr. Waters' classes had prepared him to take a special advantage of the preceptorship, saying, "I left medical school with more confidence in my anesthesia knowledge than in any other subject."

Although interest in anesthesia and respect for its hazards were limited in the first half of the twentieth century, the medical community widely recognized the combination of Dr. Waters, Wisconsin, and the discipline of anesthesiology. Compared to our peers from other medical schools, we had a head start that made a career in anesthesiology a realistic choice. Dr. Waters inspired us directly, no remote chief for him. His lectures and demonstrations put life into science and its application. He was an historian, a polished author, an honest reporter, an organizer, an administrator, an effective medical politician; he could do it all. The memory of Dr. Waters in the classroom is still clear after 58 years: dignity, equanimity, and competence, a physician role model for a medical student, the memory defined by the photograph of the man with the pipe. What an inspiration!

#### Conclusion

Why then did so many of the class of 1945 become anesthesiologists? I think this meeting devoted to Dr. Waters and professionalism answers the question. His professionalism was the kernel of the seed Dr. Waters planted in his students: *anesthesia is the practice of medicine*. At Wisconsin General Hospital we met John Snow and we saw only physicians, not technicians, in the practice of anesthesiology. We saw this "new" specialty with its exciting potential for making a difference in the care of individual patients and for being pioneers in improving the quality of medical and surgical care everywhere. We saw anesDr. Waters inspired us directly, no remote chief for him. His lectures and demonstrations put life into science and its application. He was an historian, a polished author, an honest reporter, an organizer, an administrator, an effective medical politician; he could do it all. thesia administered according to community "standards" and we saw Dr. Waters' standards. We saw motivation and opportunity unmatched in any other branch of medicine. Dr. Waters showed us why to become anesthesiologists and he showed us how.

In 1965 the Class of 1945 established the Ralph M. Waters Medical Scholarship as its twentieth year gift to the medical school. The scholarship is awarded to third-year students selected by the Student Honors and Awards Committee on the basis of merit, ability, and scholarship.

#### **Class of 1945 Notes**

#### **Ann Bardeen-Henschel**

Although Dr. Waters was a family friend, I met him in the operating room for the first time when I was six and having my tonsils out. I found the records when I was a resident. Even then his rapport with patients was such that one knew he would bring them through safely. During medical school he impressed me with his interest in his patients and students, his wide knowledge of medical subjects, and his interest in the basic sciences.

My choice of Anesthesia as a specialty was further stimulated by a resident in Pathology, who pointed out, that one could have less patient continuity in case of parenthood and family life than with most other subjects. Besides, it was dependent on a modest knowledge of other subjects without limitations. I have never regretted that choice. After interning in Jersey City, a stint in Medicine (Student Health) at Cornell University satisfied the general practice background that Dr. Waters always preferred for his new residents.

During my residency I had more questions about my age than my gender. I decided a tour abroad would enlighten me about anesthesia in other locations. The American Association of University Women agreed to support me with \$2,000 for a year's study with Dr. Mushin at Cardiff. I obtained the Diploma in Anaesthetics of the Royal College of Surgeons as proof of my labors. Following that I was an instructor at the WHO Anesthesia Center in Copenhagen and toured several centers to see their special techniques. Having come from Dr. Waters' training, I was accepted by all very graciously.

In Britain I met Ernst O. Henschel, an Austrian internist. After passing his Canadian Board in Internal Medicine in Saskatchewan, he decided anesthesia was more to his liking. We moved to Wisconsin where he trained at Wood VA Hospital under Sherwood Gorens, and then he became the Chief there. When the Dean of the Marquette Medical School (later the Medical College of Wisconsin) agreed to make Anesthesiology an independent department, he became Professor and Chief of Anesthesiology there as well. Lacking another easily obtainable Board-certified anesthesiologist, he put me on the fulltime staff, first as Assistant, then Associate Professor. He proceeded to develop his department until his death in 1979. I have continued in that department.

#### **Ray Green**

- Some anesthesia for surgery and OB as intern at Marshfield General Hospital
- Ph.D. in Pharmacology

I have always admired Ralph Waters' status in anesthesiology and enjoyed the time in anesthesiology we spent in medical school. When I had the opportunity to continue teaching pharmacology and also take a residency in anesthesia at the University of Kansas Medical Center, that's what I did.

- Chief of Anesthesiology VA, Kansas City
- Marquette University Medical School
- Methodist Hospital, Madison, WI

#### Allan Dale Hoff

My interest in anesthesia was tweaked the first time R.W. anesthetized a patient in front of our class in the lecture room. The patient became more and more deeply anesthetized while R.W., with his back to the patient, continued to lecture to us. The bag was barely moving and we, the students, sat squirming in our seats. It was a frightening and impressive performance.

When I was on the anesthesia service Dr. Waters sat me down and showed me how to keep a patent airway while he anesthetized the patient with chloroform and N2O. Everything went okay and Erwin Schmidt proceeded to perform a cholecystectomy. As I sat there I suddenly realized Dr. Waters was gone. Having read what a deadly drug chloroform was, I gradually turned down the concentration until the patient started moving and Dr. Schmidt was screaming for Dr. Waters, who was nowhere to be seen. He did show up and corrected things, but I was mightily impressed with my anesthesia experience.

I interned at Kansas City Research Hospital where I had a good anesthesia rotation with Dr. Frank Hurwitz, a friend of Dr. Waters.

After my army duty I spent a year in general practice. I enjoyed it but found myself administering anesthesia for tonsillectomies for the other GPs. Although I did an adequate job, I realized that there was a lot more to it. There was an anesthesia machine present but I didn't know how to use it. It was then I decided I wanted to be a specialist in anesthesia. I inquired about a residency at UW only to discover that Dr. Waters was retiring. Not knowing who would succeed him, I contacted Allen Talbot who convinced me to join him in a residency in Chicago at Hines VA (University of Illinois) with W. Allen Conroy and Max Sadove. It was a good residency, but I had no OB anesthesia training and very few female patients. In 1951 in Madison I joined Drs. Bob Wylde, Darwin Waters, Larry Hogan, and Carl Siebecker, all trained under Dr. Waters. I retired in 1984.

#### Albert Jaber (1920-2000)

- Internship Highland-Alameda Co Hospital, Oakland, CA, with anesthesia rotation
- Residency UC San Francisco
- Practice French Hospital, San Francisco, and Alameda Hospital, Alameda, CA

#### Leroy Misuraca

In our senior year three of us arrived at our assigned preceptorship hospital on a Sunday night. An appendectomy was underway, the anesthesia administered by a physician who was a part-time "anesthesiologist." We ran down to the operating room in time to see the patient, a healthy high school student, convulse before the operation was finished. We stayed in his room for hours, but nothing we could do was of any use. He died the next day, never having regained consciousness. From then on, I seemed to gravitate to the head of the table whenever I was in surgery; the clinic's anesthesia nurse was happy to help me and to let me help her. I suspect the surgeons were just as happy to have me out of their way. I left medical school with more confidence in my anesthesia knowledge than in any other subject.

During my internship I gave a crash course on the principles of anesthesia and the technique of open drop ether to the other interns the night before they started their anesthesia rotation. Almost none of them had ever administered anesthesia; the hospital wisely limited them to open drop ether. At the same hospital someone gave a student nurse Pentothal for a D&C. It took days for her to wake up. The consultant neurologist ascribed the prolonged awakening to hysteria. If you were from Wisconsin, you knew better. Being away from the university brought a shocking appreciation for Dr. Waters' efforts to challenge community standards.

My first army assignment was a two-month "microresidency" in Chicago with W. Allen Conroy who had trained with Dr. Waters. That led to an assignment as Chief of Anesthesia and the Operating Section at an army general hospital in the Philippines. Sixteen months following graduation I was a member of the American Society of Anesthesiologists; the seed Dr. Waters planted had sprouted. After the army and a bout of TB, came three years of a "Waters' residency" with Drs. Slocum and Allen in Texas, then private practice in southern California. Finally in the 1970s I left the operating room to establish our hospital's new Critical and Respiratory Care Services and to become the fulltime Director, retiring at the end of 1998.

#### **Ray Ponath**

Because of training at UW, I was occasionally drafted to give anesthesia in emergencies (during internship at Milwaukee County Hospital). Once I did a cholecystectomy with open-drop ether; both patient and I survived. Because of excellent training under Dr. Waters and the reputation of our medical school, my first temporary army duty as a medical officer was assignment to work under Dr. Bonica at Madigan General. After two months under his tutelage my assignment at the Army Hospital on Guam was as Chief of Anesthesia and OR in spite of my lack of residency at that time. It was natural for me to continue with the specialty when I was offered the residency on return to the United States.

#### Harriet Scheid (1919-1966)

- Residency, probably Denver
- Practice St. Anthony's Hospital, Denver, CO

#### John Steinhaus

Anesthesiology was a well-organized and accepted specialty at UW. It was popular and to my amazement I gave eight anesthetics during the Janesville preceptorship. My post-doctoral research on local anesthetics completed the "conversion."

Field Day at the UW School of Medicine was a celebration for medical students that included research presentations, a free lunch, softball games, the Junior Skit, and a noted medical lecturer. In 1944, because of wartime travel restrictions the lecture was given by Ralph M. Waters, on the topic of artificial respiration. In the SMI lecture hall some 200 people sat in darkness with a spotlight on a patient under basal anesthesia while Dr. Waters lectured and demonstrated all forms of artificial ventilation from bag and mask to mouth to mouth. His hyperventilation with each technique produced a patient whose exposed abdomen was absolutely quiet. You can probably imagine that this third-year medical student, along with most of the audience, was on the edge of his seat waiting for the first shallow breaths that indicated a patient alive and breathing. Dr. Waters continued his lecture during the apneic period as though he was completely confident of the outcome of the demonstration. It was one of my few never forgotten medical lectures.

#### Allen Talbot ( - 2001)

- Residency University of Illinois-Hines VA
- Practiced in Appleton, then in Neenah, Wisconsin

#### Loron Thurwachter

As a student I was once doing anesthesia for Erwin Schmidt's thyroid case when the patient bucked on the tube. Dr. Schmidt said, "Get that student out of here!" Dr. Waters calmly reminded him that we are a teaching hospital. After some help with the dosage, I finished the case.

I had no exposure to anesthesia during internship at U.S. Naval Hospital, Oakland, CA. After naval duty in Seattle I was unable to get a surgical residency due to oversupply of applicants. I started a Junior Surgical residency at Columbia Hospital (Milwaukee) where a medical anesthetist convinced me that I should consider the field of medical anesthesia, which was wide open. My exposure to Dr. Waters and the medical school anesthesiology program helped make my decision.

#### References

- 1. RM Waters, "Pioneering in Anesthesiology," Postgraduate Medicine 4:3 (1948).
- RM Waters, foreword to "Some Papers on Nitrous Oxide-Oxygen Anesthesia," reprinted in *Hold-ing Court with the Ghost of Gilman Terrace* (Park Ridge, IL: Wood Library-Museum of Anesthesiology, 2002): 14.

#### LEROY MISURACA, ANN BARDEEN-HENSCHEL, AND JOHN STEINHAUS

	anes	grads	%		anes	grads	%
1929	1	29	3	1966	3	85	4
1930		26	0	1967	10	92	11
1931		30	0	1968	5	95	5
1932		44	0	1969	1	93	1
1933		40	0	1970		95	0
1934	1	29	3	1971		100	0
1935	1	46	2	1972	+	94	0
1936	1	41	2	1973	4	106	4
1937		37	0	1974	2	125	2
1938	2	41	5	1975	3	122	2
1939	2	44	5	1976	10	135	7
1940	1	43	2	1977	8	149	5
1941	<u> </u>	43	0	1978	11	172	6
1942	1	31	3	1979	16	152	11
1943	1	108	1	1980	10	160	6
1944	4	47	9	1981	8	152	5
1945	10	73	14	1982	17	162	10
1946	5	69	7	1983	14	154	9
1947	3	58	5	1984	17	150	11
1948	4	55	7	1985	14	161	9
1949	3	51	6	1986	13	150	9
1950	4	72	6	1987	14	160	9
1951	2	69	3	1988	12	153	8
1952	2	67	3	1989	9	146	6
1953	5	73	7	1990	8	139	6
1954	4	79	5	1991	16	136	12
1955	3	69	4	1992	11	124	9
1956	7	74	9	1993	4	145	3
1957	7	75	9	1994	8	141	6
1958	7	75	9	1995	3	149	2
1959	5	69	7	1996	4	129	3
1960	3	70	4	1997	7	138	5
1961	1	81	1	1998	10	130	8
1962	1	83	1	1999	9	131	7
1963	2	69	3	2000	6	149	4
1964	2	82	2	2001	12	140	9
1965	2	78	3				
					1		

### Anesthesiologists by Graduating Class Source: UW Madison Medical Alumni Association
This presentation is focused on E. A. Rovenstine, a first generation resident of Waters. To start, the author would like to quote an ancient Chinese proverb: "Learn new things by reviewing the old." It is hoped that as we celebrate Waters' legacy, we gain new perspective about the future of Anesthesiology. After

## Boardman C. Wang

EMERY ANDREW ROVENSTINE: A FIRST GENERATION WATERS RESIDENT AND THE EASTWARD EXTENSION AND GLOBAL SPREAD OF THE WATERS LEGACY

Emery A. Rovenstine, M.D. Aqualumnus

years of tutelage in Madison under Waters, Dr. Rovenstine branched out to New York City and at NYU started a center for medical education in anesthesia after the Waters model.

The success of North Shore University Hospital (affiliated with NYU) rated number one among the top fifty in the United States by AARP is attributed to "Human touch not technological superiority."1 This is also true in the case of Dr. Emery Andrew Rovenstine. Those of us familiar with the hallmark of his distinguished legacy can testify for this wholeheartedly. We honor this great man with remembrances that range from feelings of gratitude for gestures of friendship and a ticket to a ballgame for a homesick recent immigrant, to much larger gestures like the establishment of the prestigious Rovenstine Memorial Lectures, which are the highlight of both the ASA and NYSSAPGA annual meetings with presentations by world renowned physicians and scientists.2

#### What made this great man a legend?

## 1. Dr. Rovenstine had a lifelong commitment to education.

After high school graduation, Dr. Roven-

stine taught primary school in a one-room schoolhouse in his hometown in Indiana. Many years later, after teaching anesthesia to students from all over the world for decades, he recognized the need for continuing education for World War II returning veterans and established the Postgraduate Assembly in Anesthesia in 1945. Dr. Rovenstine also had a keen interest in regional anesthesia and established a nerve block course attended by many noted anesthesiologists including Robert Dripps and LeRoy Van Dam. LeRoy still keeps his notebook from this course.

#### 2. Dr. Rovenstine was a visionary leader.

He recruited and inspired young physicians to carry the torch for the advancement of anesthesiology.<sup>3</sup> With the advent of antibiotics, he predicted early on that people would live longer and there would be a steady increase in the need of healthcare, including anesthesia. He accurately forecasted the electronic era when he stated, "we will be hearing from the engineers."

## 3. Dr. Rovenstine valued basic science.

He fostered working relationships with Homer Smith, a world-renowned renal physiologist, and Frank CoTui, etc. as the foundation of academic anesthesia. Right after arrival at Bellevue, Dr. Rovenstine designed a record system of comprehensive documentation of all events during anesthesia and surgery, which became the foundation for clinical anesthesia research as well as for quality patient care and improved outcomes.

# 4. Dr. Rovenstine was humble, gracious and tenacious.

He never raised his voice with anyone. His residents were exceptionally loyal and called him "chief." He told them not to worry about

because, money u will not have e to spend it." reover, he never sued personal alth and decided forego lucrative vate practice in er to devote his e to teaching, earch and patient e. He lived in mall apartment East 57th Street while many of his

trainees lived in big houses. His initial salary was \$3,600 per year and a portion of this came from a private donation by Dr. Arthur Wright, Chairman of Surgery.<sup>4</sup> In a handwritten letter to Dr. Waters, Dr. Rovenstine once described in detail the challenges he was facing. He went on to say, "But you might think I was losing my nerve, disappointed. This is not true, if ever any place needed anesthesia, here it is and if I ever get things going here I will be repaid with satisfaction and what an experience it will be." How we wish we had Dr. Rovenstine's wisdom to guide us through the challenges of health care systems today.

# 5. Dr. Rovenstine was a mentor and guiding force in shaping the career of many lead-

# ers in anesthesiology as well as academic medicine.

Dr. Rovenstine assisted E. M. Papper in organizing the Associationn of University Anesthetists, After Dr. Rovenstine's tenure as ASA President in 1943, several of his residents went on to serve in the same capacity – Perry Volpitto, E. M. Papper, Richard Ament and Louis Blancato. Two of his residents became deans of medical schools: Stuart Cullen at University of California at San Francisco, and E. M. Papper at University of Miami. Several of his trainees chaired departments in medical schools. John Adriani, who wrote early classics in anesthesia, chaired at University of Louisiana; Perry Volpitto at Georgia; Stuart Cullen at University of Iowa and University of California, San Francisco. After retirement from the deanship, Dr. Cullen shifted to public service and was elected City Councilman and eventually Mayor of Belvedere, California.5 Dr. Frederick Haugen chaired at Oregon, and Dr. Papper chaired at Columbia for a considerable period of time before taking the deanship in Miami. Dr. Orkin was a distinguished Professor and Chairman of the Department of Anesthesia at Albert Einstein College of Medicine for many years before retirement. He also served as President of the American College of Anesthesiologists.

Additionally, Virginia Apgar, M.D., who was Chief at Columbia for a number of years before the department became autonomous and reorganized to an academic department under Dr. Papper, also belongs to the hall of fame. Dr. Apgar was an outstanding resident of Rovenstine, although she was trained primarily at Madison, Wisconsin under Ralph Waters and came to Bellevue for the "finishing touch." Among many accomplishments, she designed the simple yet unique system of assessing neonatal health. The Apgar score, published in 1953, adopted worldwide, represents a significant advancement not only for anesthesiologists but also neonatologists, and the way perinatology is practiced. She played violin well. After retirement from Columbia she did a fantastic job with the March of Dimes.

Some of the unpublicized residents of Rovenstine deserve mentioning. Charles Burstein,<sup>4</sup> a former Director of Anesthesia at Special Surgery in New York, who wrote one of the early books in anesthesia, provided safe anesthesia during the war for the boldest operation by Dwight Harken of Harvard of shrapnel removal from inside the heart chamber of nineteen soldiers, without mortality, in the early 1940s. Charles was a true gentleman and scholar. Sarah Joffe, M.D., a 1942 resident at Bellevue, became the director of Beth Israel, succeeding Sol Hershey. During her tenure as NYSSA President, she was credited for reformatting the PGA. In 1985 she became the first President of Light House in the Manasota Center for the Blind and Visually Impaired, in Florida, seven years after retirement from Beth Israel. Dr. Bacon stated, "Because she did such a good job it changed a lot of male attitude." She received the well-deserved Distinguished Service Award during the December 2002 PGA meeting.<sup>34</sup>

Before closing, the author would like again to quote an ancient Chinese proverb, "Remember the source of the stream while drinking the water." As we celebrate the accomplishments of Dr. Rovenstine and those of his distinguished residents, we remember his roots in Madison, Wisconsin and his beloved mentor, Dr. Ralph Waters.

### References

- 1. J Bargmann, "The top hospital in America," AARP (May-June, 2002).
- 2. GA Hershey, "The Rovenstine Inheritance–A Chain of Leadership," *Anesthesiology* 59 (1983): 453-458.
- EM Papper, "E. A. Rovenstine teacher, clinician and scientist," Historical recollections disseminated at the Celebration of the 50th Postgraduate Assembly in Anesthesiology, held at the Hilton New York in New York City, December 1996, sponsored by The New York State Society of Anesthesiologists for its annual Postgraduate Assembly in Anesthesiology.
- 4. L Orkin, "The saga of Emery A. Rovenstine, MD," Historical recollections disseminated at the Celebration of the 50th Postgraduate Assembly in Anesthesiology, held at the Hilton New York in New York City, December 1996, sponsored by The New York State Society of Anesthesiologists for its annual Postgraduate Assembly in Anesthesiology.
- 5. M Sokoll, personal communication; WK Hamilton and PC Larson, "Stuart C. Cullen 1909-1979," *Anesthesiology* 52:2 (1980): 112.

illiam B. Neff was born in Philadelphia on July 1, 1908 and died September 26, 1997 at his home in San Carlos, California. After completing medical training in a homeopathic school, Hahnemann, in 1930, Bill learned about anesthesia during his 1930-1931 internship in Montreal with Harold Griffith

## John W. Severinghaus

# WILLIAM B. NEFF, M.D.

and started his residency there. When the anesthesia travel club came to Montreal that year, Neff met Ralph Waters and learned of the emphasis Waters put on the basic science backgrounds in physiology and pharmacology in his anesthesia training program. Neff then switched to the two year Madison residency in 1932. As a resident he co-authored the first paper on clinical use of cyclopropane, published in Anesthesia and Analgesia in 1934. After short periods in private practice in Montreal and with Squibb Co. in New York, Neff became Director of the anesthesia section at the Department of Surgery at Stanford in San Francisco in 1937. It was his cyclopropane work that interested his peers at Stanford, but when the surgeons found they had to abandon the cautery, they rebelled. In response, Neff introduced "balanced anesthesia," using intravenous narcotics and barbiturates and nitrous oxide.

Stanford's medical school moved from San Francisco to Palo Alto in the late 1950s, which left unoccupied space in the Lane Library in San Francisco. With help from Chauncey Leake at UCSF and the California Society of Anesthesiologists, Neff started an anesthesia history museum in San Francisco. It was named the Arthur E. Guedel Memorial Anesthesia Center, for Waters' close friend Arthur Guedel who died in 1956. In 1973 the Guedel



Aqualumnus

collection of books, journals, and apparatus moved to the empty second floor and basement of the Lane Library, its present location.

Neff's friendship with Richard and Ruth Gill brought Gill's curare expedition collection to the Guedel Center. Neff served on the Guedel Center's board almost to the end of his life. With help of many anesthesiologists and friends, the Guedel Memorial Center became a major anesthesia library and audiovideo resource, donating journals and extra books to many third world medical schools. It houses a large collection of historic anesthesia equipment.



Figure 1. Ralph Waters and Bill Neff at the time of the ASA Annual Meeting in Florida, October 1959. COURTESY LESLIE RENDELL BAKER.

## Bibliography

Calmes, SH. "Anesthesiology in California: The early years," Bull Anesth History 17:1 (1999): 8-12.

Rendell-Baker, L. "Unsung heroes of anesthesia: Dennis E. Jackson, William B. Neff, Robert A. Hingson," *Anesthesia History Association Newsletter* 12:4 (1994): 8-11.

#### SELMA HARRISON CALMES

**D** r. Virginia Apgar (1909-1974), who was the first physician chief of anesthesia at Columbia and who developed the Apgar Score for newborns, first arrived in Madison January 2, 1937,<sup>1</sup> after a two and one-half year search for anesthesia training. Her experience as a visitor in the department of anesthesia at the University

# Selma Harrison Calmes

# DR. VIRGINIA APGAR: THE EFFECT OF DR. RALPH WATERS ON HER CAREER



of Wisconsin was to lay the groundwork for her future career. After leaving Madison she often wrote Dr. Ralph Waters, chair of the Wisconsin department, for professional and personal advice; their correspondence continued until Apgar died. This paper documents some of Apgar's experiences at Madison, and how these and Waters shaped her career. Sources were letters between Apgar and Waters, annual reports of the Columbia department, a diary in the Virginia Apgar Papers at Mt. Holyoke College, and the Ralph Waters Papers at the Guedel Memorial Center, the Wood Library-Museum of Anesthesiology, and the University of Wisconsin-Madison Archives.

Virginia Apgar grew up in an unusual family. Her father was a committed scientist-inventor although he worked in a variety of other jobs. His basement lab was the site of radio wave experiments and numerous inventions. His home-built telescope provided him with the data for scientific papers on the moons of Jupiter. Apgar was close to her father and soon became involved in experiments and interested in science. This interest led her to choose medicine as a career,<sup>2</sup> an unusual decision for a woman then. She survived financial difficulties and graduated from Mt. Holyoke College in 1929 and Columbia University's medical school in 1933.<sup>3</sup>

Apgar was determined to be a surgeon when she graduated from Columbia. She won a prized surgical internship at Columbia, starting October 1933. (Start dates for internships at Columbia were staggered then; internships lasted 18 months.) By August 1934, less than a year after starting internship, she was seeking anesthesia training. Her change to anesthesia was most likely stimulated by Dr. Alan Whipple, Chairman of Surgery, who was trying to improve anesthesia at Columbia. Like many academic surgeons of the time, he realized that surgery could only improve if anesthesia improved. This called for physician input and research.4 At that time at Columbia, anesthesia was given by nurses. Occasionally consultant physicians (Paul Wood and Tom Buchanan) were brought in for socially prominent patients.5 Whipple saw Apgar as the possible person to bring medical anesthesia to Columbia. Another factor in Apgar's change may have been that female surgeons had little chance for success in the competitive surgical world then.4

To find suitable training, Apgar wrote Dr. Frank McMechan, Secretary General of the Associated Anesthetists of the United States and Canada, the national anesthesia organization of that time. His letter to her first listed training opportunities in Canada, followed by those in the United States.<sup>6</sup> Of interest is that Waters and the Wisconsin department were fifth on the U.S. list, after Brian Sword in New Haven, Lincoln Sise at the Lahey Clinic, Henry Ruth in Philadelphia, and E. I. McKesson in Toledo. Given the Wisconsin program's prominence, it is hard to understand why it was not listed first. She wrote to each person listed and then made a list of anesthesia training programs in the U.S.; apparently she did not consider Canadian programs. Only nine U.S. locations offered anesthesia training in 1934. Length of training ranged from two weeks to three years and most did not pay a salary.<sup>7</sup>

Apgar wrote to Waters August 10, 1934 and listed her credentials. He responded five days later that all positions were full and would be for probably three more years.<sup>8</sup> After finishing internship, she stayed on at Columbia and worked with the nurse anesthetists. She was listed as "Assistant in Surgery" until June 30, 1936.9 In April 1936 she had an appointment with Dr. Emery Rovenstine, a Wisconsin trainee who had recently become head of anesthesia at NYU-Bellevue and who was seeking residents. He wrote to Waters, "I will see her today but do not think I will give her a place."<sup>10</sup> He did not give her a place, and she was then appointed "Resident in Anesthesia," at Columbia,<sup>11</sup> although there was no residency. Rovenstine was probably reluctant to accept women trainees, who were usually only accepted at that time if no men were available.

Although McMechan noted Apgar's unusual and desirable characteristics from her initial letter—and wrote Waters in mid-August 1934, "She seems to be an unusually ambitious person and might prove to be an excellent find for the specialty irrespective of her sex. Do what you can for her."<sup>12</sup>—there is no evidence of further correspondence between Waters and Apgar until April 1936. Shortly after the Rovenstine interview, she wrote Dr. Waters again, seeking further training. She explained

that she preferred to stay in New York City: "Since Dr. Whipple prefers that I stay in New York, I had hoped to receive an appointment under Dr. Rovenstine at Bellevue on July 1. Other plans have been made, however, and I am left with two years on my hands to spend as profitably as possible. Naturally I thought first of Wisconsin."13

In April 1936 she had an appointment with Dr. Emery Rovenstine, a Wisconsin trainee who had recently become head of anesthesia at NYU-Bellevue and who was seeking residents. He wrote to Waters, "I will see her today but do not think I will give her a place."

The service was full, but Waters offered her a "visitor" position.<sup>14</sup> (Waters had only a few true "resident" positions, which involved a Board of Regents appointment.<sup>15</sup> Probably most of the Waters trainees came informally, including many of the notables such as Robert Dripps of the University of Pennsylvania.) He was clearly interested in her relation to Whipple and the apparent commitment from him that she would develop medical anesthesia at Columbia in the future. She refused this offer and stated that, although she preferred to train at Madison or Bellevue, she would apply to the Mayo and Lahey Clinics.<sup>16</sup>

In October, 1936 she had a conversation with Waters, most likely at a meeting in New York City. When he returned to Madison, he then approached the hospital superintendent who agreed to provide board for her as a "visitor" to the department. No rooms were available, due to "too many house officers at present." Waters stated, "It might be that when you get here you could find a hole in the wall in which to stay."<sup>17</sup> After much discussion on where she would live while in Madison, she arrived January 2, 1937. She was the fourth of the fourteen women who would train at Wisconsin and appeared to receive the most support.<sup>18</sup>

She kept a diary while in Madison. This records typical experiences that all anesthesia trainees will remember having experienced. ("Frightful mess today, patient almost died.") While there, she suffered from a common difficulty for women physicians at the time, lack of housing. (Interns and residents lived and ate at the hospital, to make up in a small way for the very low pay then.) For several weeks, she even had to sleep in Waters' office because there was no place else for her to stay. In spite of the housing difficulties and her unique position (she was the only woman in the department at this time), she was able to learn in the stimulating Madison environment. She did cases, participated in the weekly conferences by presenting complications, attended medical student lectures, and was exposed to the research going on. She learned Waters' philosophy: focus on medical students in order to attract excellent people to the specialty, deliver excellent clinical care; research would be a byproduct of teaching and clinical care.<sup>19</sup>

After leaving Madison the end of September, 1937, Apgar went to Rovenstine at Bellevue, who had previously turned her down, for an additional six months training. Several other Madison residents were sent for their final work from Madison to Bellevue during this time; Hubert Hathaway arrived the next month.<sup>20</sup> Apparently, now that she had some time at Wisconsin, she was acceptable to Rovenstine—or else he was desperate for residents and had to take a woman.

January 1, 1938, she returned to Columbia as "Director of the Division of Anesthesia and Attending Anesthetist."<sup>21</sup> It was common at the time for anesthesia to be a section of a department of surgery; this was even the case at Wisconsin during Dr. Waters' tenure. She submitted a plan for the department to Dr. Whipple, a plan that followed Waters' plan for his own department. Her focus would initially be medical student teaching, then clinical care and, finally, research. Slowly, and in spite of enormous difficulties, she built a strong clinical department with an excellent teaching component. Through this period there was extensive correspondence with Waters about these problems, especially at difficult times, such as her first cyclopropane explosion, which killed a city socialite. She also sought his advice on manuscripts, and Waters was notably frank. Whether to serve overseas in World War II was also discussed in their correspondence.

In the mid-1940s a crisis developed at Columbia about research in the anesthesia division and this led to the end of her leadership position. The surgeons felt there should be a stronger research emphasis. Although papers had been published by the department, there were no dedicated researchers or basic research. Apgar made several proposals to fix this situation and planned to recruit a vice-chair for research. None of the candidates she tried to recruit accepted. Finally, Dr. E. M. Papper from Bellevue, who had a strong research background, was brought in as the new chair. After he arrived, the department separated from the Department of Surgery and became free standing.<sup>22</sup> After a year's sabbatical leave, Apgar went into obstetric anesthesia, an area in which she had always been interested and which was greatly neglected at the time.

After a chance remark by a medical student, she developed the Apgar Score. This was first presented in 1952 and was published in 1953.<sup>23</sup> She developed and led a team of pediatricians and researchers that went on to document that regional anesthesia was far superior to general anesthesia in terms of maternal and fetal outcomes. They also compared different neonatal resuscitation techniques and developed programs to teach these to pediatricians. They were able to document that low Apgar Scores meant the baby needed prompt resuscitation. This was an enormously successful effort and had international impact. In 1959 Apgar accepted an offer to lead the National



Figure 1. Virginia Apgar (back row, fourth from left) at the 1937 Aqualumni reunion, Madison, Wisconsin. For identification of other individuals, see page 60.. COURTESY WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY

Foundation's (previously the March of Dimes) new effort to decrease the incidence of birth defects. She had moved up to Vice President for Research at the National Foundation by the time she died in 1974.<sup>3</sup>

Throughout her time at Columbia, Apgar continued her Wisconsin ties. She felt an intense obligation to Waters because of what he had taught her. She attended every Aqualumni reunion except in 1945 (fig. 1). In pictures taken during the reunions, she is often pictured by Dr. Waters, who clearly was a father figure to her, and to many of the other trainees. She served as an officer of the Aqualumni organization and organized the fund-raising for purchase of a car for Dr. and Mrs. Waters when Waters retired to Florida in 1949 (fig. 2). In return, it appears Waters thought she was worth helping, writing, "Be very sure always that I shall be glad to do anything I can to help you in your efforts." 24

By far the most successful of the fourteen women trainees at Wisconsin, Apgar brought unusual personal attributes of intense energy and high intelligence to her anesthesia training. These attributes were recognized by the leaders of anesthesia from the time she first inquired about training. Profoundly influenced by Waters, she followed his approach when she had her own department: first student teaching, second clinical care, and then research. In her particular situation, the research was not successful, especially compared to Wisconsin. At Wisconsin, there was a very close relationship between anesthesia and pharmacology, so anesthesia research was probably easier than it would be at Columbia. The heavy clinical load and shortage of staff meant she spent her time in the operating room and not in the lab. Although failing to produce enough research led to the end of her leadership position at Columbia, this "failure" allowed her to move

#### SELMA HARRISON CALMES

into obstetric anesthesia and to develop the Apgar Score. Ironically, a major reason the Score was accepted was due to her research, which built a scientific basis for the Score. And, at the end of her life, she was selecting all the research projects that the National Foundation would fund.

Although Waters' approach to improving anesthesia was not successful for her at that institution, it did lead to new opportunities for her. These new opportunities led to great personal success and major contributions to obstetric anesthesia and neonatal care at a time when both these areas were greatly neglected.

Apgar's personal qualities allowed her to overcome what might seem like a failure. Clearly, her experience at Wisconsin and her relationship with Waters were critically important in her achievements.





UNIVERSITY OF WISCONSIN-MADISON ARCHIVES

#### References

- 1. Virginia Apgar, letter to Ralph Waters, December 28, 1936, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- Virginia Apgar, unpublished manuscript, no date (known to be written while she was at the National Foundation), untitled autobiography, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- RJ Waldinger, "Virginia Apgar," in Notable American Women: The Modern Period. A Biographic Dictionary, ed. B Sicherman and CH Green (Cambridge, MA: The Belknap Press of Harvard University Press, 1980): 27-28.
- Dr. George Humphreys, interview by author, September 4, 1981. Transcript in possession of author.

- 5. Emery Rovenstine, letter to Ralph Waters, January 21, 1935, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 6. Francis McMechan, letter to Virginia Apgar, August 8, 1934, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 7. Untitled, undated list of training sites, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 8. Ralph Waters to Virginia Apgar, August 15, 1934, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 9. Signature unreadable, no typed name, letter to Virginia Apgar, June 17, 1935, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 10. Emery Rovenstine, letter to Ralph Waters, April 8, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 11. M. Fleming, letter to Virginia Apgar, June 15, 1936, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 12. Francis McMechan, letter to Ralph Waters, August 18,1934, Ralph Waters Papers, Arthur E. Guedel Memorial Anesthesia Center, San Francisco, CA.
- 13. Virginia Apgar, letter to Ralph Waters, April 21, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 14. Ralph Waters, letter to Virginia Apgar, April 27, 1936, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 15. Betty Bamforth, transcript of a talk given at the University of Wisconsin-Madison, Virginia Apgar Papers, Archives Collection, Wood Library-Museum of Anesthesiology, Park Ridge, IL.
- 16. Virginia Apgar, letter to Ralph Waters, April 30, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 17. Ralph Waters, letter to Virginia Apgar, October 29, 1936, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 18. SH Calmes, "Women in the first academic department of anesthesiology," in *The Fifth International Symposium on the History of Anesthesia* (Amsterdam: Elsevier Science). In press.
- 19. RM Waters, "The requirements of an anesthesia service," *Current Researches Anesth Analg* 11 (1932): 219-223.
- 20. Virgnia Apgar, letter to Ralph Waters, November 13, 1937, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 21. M. Fleming, letter to Virginia Apgar, June 15, 1937, Virginia Apgar Papers, Mount Holyoke College, Archives and Special Collections, South Hadley, MA.
- 22. E. M. Papper, interview by author, January 12, 1981. Transcript in possession of author.
- 23. V Apgar, "Proposal for a new method of evaluation of the newborn infant," *Current Researches Anesth Analg* 32 (1953): 260-267.
- 24. Ralph Waters, letter to Virginia Apgar, November 19, 1937, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.

**R** alph Waters had a profound influence on academic anesthesiology in Texas. His connection to the teaching department at the University of Texas Medical Branch in Galveston, where James Bennett, M.D. became the first physician Head of Anesthesia in 1939, is well documented.<sup>1</sup> Dr. Bennett was followed by

Adolph H. Giesecke and David Jackson

# F. A. DUNCAN ALEXANDER M.D., THE FIFTH BRANCH OF THE AQUALUMNI TREE



F.A. Duncan Alexander, M.D. Aqualumnus



Figure 1. Aqualumni, 1938. L to R. Front row: Hubert Hathaway, David N. Treweek, Ralph Waters, Digby Leigh, F.A. Duncan Alexander. Back row: William M. Cassels, Virginia Apgar, Harvey Slocum, Emery Rovenstine, Jim Bennett, M. Seevers, John A. Stiles, Ivan Taylor. COURTESY WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY



Figure 2. Dr. F. A. D. Alexander performs exhaled air artificial ventilation with his "Bazooka" circa 1942. COURTESY WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY



Figure 3. Veterans Administration Hospital, McKinney, Texas, 1946. Courtesy George Race, MD

#### ADOLPH H. GIESECKE AND DAVID JACKSON

Harvey P. Slocum, another Waters trainee who went to Galveston in 1942 as founding chairman of an independent Department of Anesthesiology. However the story does not end there. Waters also had a profound influence on the evolution of academic anesthesiology in northern Texas, beginning in 1946, that is not well-known and is poorly documented.

The Aqualumni Tree was created by Lucien and Jean Morris.<sup>2</sup> Each branch represents a trainee of Ralph Waters who went out from Wisconsin to form an academic department dedicated to the training of anesthesiologists, according to the educational principles established by Waters. F. A. Duncan Alexander was the fifth branch of the Aqualumni tree. Like the others, he was extremely intelligent, innovative, and productive. Unlike the others, he was an alcoholic in the times when recovery programs for addicted physicians were not available.3 His destiny was to be a medical vagabond. He moved from place to place, immediately impressed all with his charm and ability, worked brilliantly to achieve an innovation, but eventually was discovered in the worst manifestations of his addiction, and was forced to move to a new place with the help of some sympathetic friend to start over. Alexander did have some significant achievements. but remains probably the least remembered of the illustrious Aqualumni.

His migrations brought him to Texas in 1946 where he was Chief of Anesthesiology at the Veterans Hospital in McKinney (30 miles north of Dallas) until 1955. He was present to welcome Dr. Pepper Jenkins in 1948 when Pepper became Chairman of Anesthesiology at Parkland Hospital and Southwestern Medical School in Dallas. Pepper admired the innovative work that Alexander was doing in the management of chronic pain, and the two became good friends. He made Pepper a consultant at the VA Hospital and in turn became a voluntary Professor at the Medical School. He established a small residency-training program in McKinney. The best known of his trainees was Dr. Lewis Lewis, who became a committed friend, caring for Alexander in his old age until his death. Dr. Lewis was the source of much of the information for this report.

Born in Canada in 1908, Alexander received primary, secondary, collegiate, and medical education in Ontario.<sup>4</sup> He took 18 months of residency in anesthesiology in Madison Wisconsin and six months at Bellevue Hospital in New York, under the cooperative agreement between Rovenstine and Waters. He returned to Madison for another 14 months followed by a research fellowship in psychopharmacology. During this fellowship, he proposed using "nitrogen shock therapy" for schizophrenia.5 Basically, he substituted inhalation of nitrogen to induce hypoxic seizures in place of insulin or metrazol seizures, which were standards in 1936. As a result of his careful observations and recordings, we have accurate knowledge of the progressive clinical manifestations of hypoxia.

In 1937 Alexander became Director of Anesthesia, Gas Therapy, Blood Banks, and Physiological Services at Albany Hospital. He also held the academic title of Associate Professor of Anesthesiology, Physiology, and Pharmacology at Albany Medical College, in New York State. His popularity as a speaker grew, and he was well known in the American Society of Anesthesiologists, where he became First Vice President in 1942. He established an active training program at Albany. His most important protégé was Benjamin Etsten, who was a resident from 1938 to 1941 and attending staff anesthesiologist from 1942 to 1949. Etsten became Chairman of Anesthesiology at Tufts University, Boston in 1949.

It was in Albany that Alexander and Charles E. Martin invented the "Bazooka" for exhaled air, artificial ventilation. This device was patented in 1942 under the proper name "Alexander Mouth-to-mouth Insufflator." Shaped like a bazooka with one end in the rescuer's mouth and the other end fitted with a mask, it would provide sanitary mouth-to-mouth respiration. For neonatal resuscitation, it could be fitted with a small mask and the pressure relief valve adjusted to a low setting.<sup>6</sup>

In 1942 Alexander enlisted in the Air Force. According to his resume he was Chief of Anesthesia and Operating Room section in three hospitals, including the 160<sup>th</sup> General Hospital in England. In 1945 he narrowly escaped a court martial, thanks to the timely intervention of a fellow anesthesiologist<sup>7</sup> and was ultimately discharged from the military in 1946, moving to the VA Hospital in McKinney, Texas.

The hospital was a series of connected pavilions in a wooded section of the north Texas prairie: a picturesque, peaceful, bucolic scene. In this setting, undistracted by the turmoil of a metropolis, Alexander was able to do some of his best work. He was surrounded by veterans of the war who suffered from a variety of chronic pain syndromes associated with their

wounds or other past stresses. His pain clinic flourished because he was extremely popular with his patients. He was probably the first to demand radiological localization of needle placement before permanent nerve block. He

He was probably the first to demand radiological localization of needle placement before permanent nerve block. He made large albums of x-ray photographs for various blocks, of needles in situ.

made large albums of x-ray photographs for various blocks, of needles in situ, and pictures showing the typical pattern of distribution of injected radiopaque dyes when the tip of the needle is in the proper place. These albums are now in the possession of his grandson, Dr. David Jackson.

Most authorities credit Dr. John Bonica with developing the concept of a multidisciplinary approach to pain problems. However, Dr. Bonica himself, in his chapter on the evolution of pain medicine, gives credit to F. A. D. Alexander for simultaneously and independently having a similar idea. Bonica writes, "At approximately the same time, F.A. Duncan Alexander had independently developed the same concept, initiating a multidisciplinary pain diagnostic and therapeutic program at the Veterans' Administration Hospital in McKinney, Texas in 1947."<sup>8</sup>

Alexander served as President of the Collin County Medical Society. His occasional addictive indiscretions were tolerated by his fellow physicians, who respected his popularity and feared that a replacement would be impossible to recruit to this secluded area of Texas. In 1955 the hospital was taken over by a high-minded administrator who forced Alexander to resign.

He moved to the University of Iowa as a Research Associate for two years, then became a Research Fellow in Psychopharmacology and Consultant in medical education at Victory Hospital in Brooklyn, New York until 1958. He completed his career as an emergency room physician in Ellis Hospital, Schenectady, New York, retiring in 1972. After retirement he lived in the home of Dr. Lewis Lewis, who looked after him until his death in 1983.<sup>9</sup>

Alexander was an enigma to his colleagues. He was a near genius, full of ideas, all of which were potentially great. He lectured widely but did not publish much. He was an effective teacher in an informal clinical setting. He was manifestly popular with his colleagues and patients. He did important innovative work on physiology of hypoxia, anaerobic metabolism, management of chronic pain, adult and neonatal resuscitation, and psychopharmacology. He has faded from our memory because of his addiction to alcohol, which cast a dark shadow of disapproval over his career.

One wonders what his career might have been if he had the advantage of the modern physician recovery programs, which have literally saved the lives of hundreds of physicians, their families, and their careers.

#### References

- 1. CR Allen, A Fifty Year History of The Department of Anesthesiology, 1942-1992 (The University of Texas Medical Branch, 1992).
- 2. LE Morris, "Ralph M. Waters' legacy, the establishment of academic anesthesia centers by the 'Aqualumni," ASA Newsletter 65 (2001): 21-24.
- 3. WB Neff, "The Wisconsin-California connection," *Anesthesia History Association Newsletter* 4 (1986): 1-6.
- 4. Marquis' Directory of Medical Specialists, 1981-1982.
- 5. FAD Alexander and HE Himwich, "Nitrogen inhalation therapy for schizophrenia," *American Journal of Psychiatry* 96 (1939): 642-655.
- 6. FAD Alexander and CE Martin, "A simple apparatus for resuscitation of the newborn," *American Journal of Obstetrics and Gynecology* 44 (1942): 351-354.
- 7. LE Morris, personal communication, September 2001.
- 8. JD Haddox and JJ Bonica, "Evolution of the speciality of pain medicine and the multidisciplinary approach to pain," in *Neural Blockade in Clinical Anesthesia and Management of Pain*, ed. MJ Cousins and PO Bridenbaugh (Philadelphia: Lippencott-Raven Publishers, 1998): 1123.
- 9. LE Lewis, personal communication, August 2001.

r. Harvey Chittenden Slocum, M.D. was born in Lakewood, Ohio on May 3, 1909 and died in San Antonio, Texas on October 3, 1992 at the age of 83. Harvey received his degree from the University of Buffalo in 1932, practiced for four years as a GP in Wilson, New York and then completed a three-year

## James F. Arens

# HARVEY SLOCUM AND A CHANGE IN STATUS FOR ANESTHESIA



Harvey Slocum, M.D. Aqualumnus

residency in anesthesia at the University of Wisconsin, Madison in 1940.

The nursing school at University of Texas Medical Branch was founded in 1890, and the medical school was started one year later in 1891. By 1938 UTMB figured there should be a place for anesthesiology in the School of Medicine curriculum, and a Section of Anesthesia was established within the Department of Surgery. Dr. James H. Bennett, another Waters graduate, was appointed as Assistant Professor in Surgery and functioned under Dr. A. O. Singleton, the Chairman of Surgery, from 1938 to 1940. Soon after his arrival, conflicts developed between the caseload demands and Dr. Bennett's desire to teach medical students and develop a residency. In 1940 Dr. Bennett resigned his position "for professional, financial, political and personal reasons" and went to the University of Cincinnati.

When he left, nurse anesthetists and medical students administered inhalation anesthesia and surgeons administered spinals. A few surgeons reluctantly recognized that perhaps the quality of anesthesia under Dr. Bennett was better than after his departure.

The Dean, Dr. John Spies, recognized the problems of developing a good Anesthesia Department under the dominance of a very strong Surgery Chairman. (Interestingly, anesthesiology was a Section of Surgery at M.D. Anderson Cancer Center until 1997 when Dr. Thomas Feeley became the Division Chief.) However, developing such an autonomous department was not easy in 1942 with the outbreak of World War II and a full-scale civil war going on between the students and faculty at UTMB. In fact, in May, 1942 UTMB was put on probation, and during this chaos Drs. Slocum and Charles Allen arrived.

On March 9, 1942 Dr. Harvey Chittenden Slocum was appointed as Assistant Professor and Head of the Department of Anesthesiology, an autonomous department at UTMB and the first such in the South. In September 1942 Dr. Chauncey Leake, from the University of California at San Francisco, was appointed Dean and by 1943 UTMB was off probation.

Dr. Spies went about recruiting a Department Chair of Anesthesia by writing on August 9, 1940 to Dr. Paul Wood, the Secretary-Treasurer of the American Board of Anesthesiology (ABA), stating:

> THE UNIVERSITY OF TEXAS HAS IN MIND THE CREATION OF A FIRST-RATE DEPARTMENT OF ANESTHESIA WHICH WILL SERVE ALL CLINICAL PURPOSES AND IN ADDITION, DO SOME HIGH-GRADE

TEACHING AND RESEARCH. (STOP) WE WOULD BE ABLE TO OFFER A VERY GOOD POSITION TO ONE WELL-TRAINED PHYSICIAN ANESTHETIST. (STOP) THEN IN TURN, WE WOULD EXPECT HIM TO DEVELOP THE DEPARTMENT AND MAKE RECOMMENDATIONS **CONCERNING THE REMAINDER OF** THE PERSONNEL. (STOP) IN THIS CONNECTION, WE WOULD AP-PRECIATE IT VERY MUCH IF YOU WOULD SEND US A DIRECTORY OF SCHOOLS OF ANESTHESIA WHICH ARE APPROVED FOR PROPER TRAINING OF ANESTHETISTS. (STOP)

The ABA was approved in 1941 by the ABMS, after having been first formed as an affiliate of the American Board of Surgery in 1938.

Dr. Wood replied, "We will work to that end" and provided a list of approved training programs. In October, 1941 the University of Texas Board of Regents authorized the establishment of an autonomous Department of Anesthesiology at UTMB. In February, 1942, Dr. Spies went to Chicago to interview Dr. Slocum, an Instructor in Anesthesiology at Wisconsin.

On February 20, 1942 the UTMB Faculty Executive Committee sent the following telegram to Harvey Slocum:

> WOULD YOU ACCEPT POSITION AS ASSISTANT PROFESSOR AND HEAD DEPARTMENT OF ANES-THESIOLOGY UNIVERSITY OF TEXAS MEDICAL BRANCH AT SAL-ARY SIX THOUSAND DOLLARS PER YEAR. (STOP) IF ARRANGEMENTS FOR SUCH POSITION CAN BE COM-PLETED, REPLY COLLECT WEST-ERN UNION TO S.R. SNODGRASS JOHN SEALY HOSPITAL. (STOP)

Dr. Slocum's reply was:

WOULD LIKE TO ESTABLISH DEPARTMENT OF ANESTHES-IOLOGY IN COOPERATION WITH THE DEPARTMENT OF SURGERY, RESPONSIBLE ONLY TO FACULTY EXECUTIVE COMMITTEE. (STOP) THEREFORE CANNOT LOGICALLY BEASSISTANT TO ANYONE. (STOP) MATTER OF RANK UNIMPORTANT AT THE MOMENT AS LONG AS PRESENT BUDGET FLEXIBLE ENOUGH TO REMAIN AVAILABLE IN ITS ENTIRETY. WOULD EXPECT TO HAVE PHD ASSISTANT WITHIN SIX MONTHS. (STOP)

Dr. Rainey, President of the University responded:

APPOINTMENT APPROVED BY MAJORITY OF BOARD EFFECTIVE MARCH 1, 1942. (STOP) WOULD BE GLAD TO HAVE YOU ARRIVE GALVESTON AS SOON AS POS-SIBLE. (STOP)

Prior to 1942 there had been two appointments of MD anesthetists with responsibility for clinical anesthesia as heads of teaching programs in medical school teaching hospitals. There was Perry Volpitto at Medical College of Georgia, Augusta, Georgia (1937) and John Adriani at Charity Hospital, New Orleans, Louisiana. Although each was given an academic Professorial title, these were hospital departments; neither was initially an autonomous medical school department. Such status was attained much later, in 1956 at Medical College of Georgia, Augusta, Georgia, and 1979 at Tulane in New Orleans, Louisiana. According to currently available information, the establishment of Anesthesiology as an autonomous medical school department at University of Texas Medical Branch in 1942 was the first in the Southern U.S. and may have been the first in the country.

In December of 1942 Dr. Emilio Hoeflich became the first anesthesia resident at UTMB. Dr. Slocum, over the years, developed a strong working relationship with the surgeons because

According to currently available information, the establishment of Anesthesiology as an autonomous medical school department at University of Texas Medical Branch in 1942 was the first in the Southern U.S. and may have been the first in the country. Slocum convinced Dr. Singleton to let Dr. Charles Robert Allen intubate patients with cleft lips and palates. Dr. Truman Blocker then became chief of plastic surgery and the practice continued; many of Blocker's trainees would hire UTMB anesthesiologists when they went into practice.

Harvey served as a Consultant to the Army for many years. During the Korean War the Army was desperate for anesthesiology leadership. Harvey said, "I've never served my country and I need to do so on my terms." He entered the Army as a Bird Colonel, having never served one previous day in the military. He spent a considerable amount of time at Walter Reed where he introduced the concept of hyperventilation for neuro patients as well, as NEEP by tying a rock to the bottom of a descending bellows.

I first met Dr. Slocum in Germany in 1964 as he was preparing for a visit to Germany by General Eisenhower, the retired Chief of Staff. At this time, Harvey was serving as Commander of the U.S. Army Medical Service Area in Europe. Harvey's main concern was the number and location of the latrines in the parade area. This was not a subject I expected to discuss.

Harvey returned to UTMB as a full professor, now under Charles Robert Allen. When residents worked with Harvey, no stools or chairs were allowed at the head of the table. Harvey served as a Director of the American Board of Anesthesiology from 1950 - 1961. He invited the Board to hold the orals in Galveston at a beach hotel. The Board was mortified when it realized that Black candidates could not stay at the hotel.

In 1981 Dr. Slocum became the first recipient of the Texas Society of Anesthesiologists' Founders Award (today called the Distinguished Service Award). Dr. Slocum was the consummate gentleman and had a passion for fast cars (a Shelby Ford). It took me time to realize that the passion that both Dr. Slocum and Dr. Adriani had for anesthesiology was instilled in them from the giant we are honoring today: Dr. Waters.

### **Bibliography**

Allen, Charles Robert. A Fifty-Year History of the Department of Anesthesiology, 1942-1992. University of Texas Medical Branch.

ustin Lamont, one of the earlier Aqualumni, came to Madison in 1942 to spend six months with Dr. Ralph Waters to acquaint himself with the field of anesthesia. He had been asked by Dr. Alfred Blalock, the recently appointed Chairman of the Department of Surgery at Johns Hopkins,

# Merel H. Harmel

# AUSTIN LAMONT, M.D. (1905-1969)

to organize a program in anesthesia to teach the principles of anesthesia to surgical house officers and to bring a more professional level of anesthesia to the Department of Surgery. Upon Blalock's recommendation. Isaiah Bowman the President of Johns Hopkins University, granted Lamont a year's absence with pay to accomplish this purpose. While Blalock would have preferred Lamont to go to Boston with Harry Beecher, whom he knew, Lamont, after conferring with Robert Dripps and others, decided to spend six months with Ralph Waters and Noel Gillespie in Madison. He then spent another six months with Emery Rovenstine in New York City at Bellevue Hospital. These decisions may have played a critical role in the subsequent history of Lamont's tenure at Hopkins. The importance of Lamont's association with Waters and Rovenstine in formulating his conception of anesthesia as an academic enterprise within the University-teaching, research, and clinical care-cannot be overemphasized. Indeed, the importance of Lamont's devotion, leadership, and cogent advice in advancing the status of anesthesia as an academic discipline at a critical juncture in its development has been recognized only recently.

Born in New Jersey in 1905, Austin Lamont came from a privileged background. The Lamont family spent summers in Maine, and from his earlier years this life on the coast fostered his life long love of sailing and his consuming interest in the aerodynamics of sailing. Throughout his life the Maine coast, especially in Vinalhaven, his home in later years, admirably served his needs for retreat and renewal.

Merel H. Harmel, M.D.

Aqualumnus

Austin Lamont, M.D.

Aqualumnus

His father, a partner in J. P. Morgan, served on diplomatic missions in addition to his duties as a prominent banker. Indeed, when J. P. Morgan was reorganized in 1943, Thomas Lamont became the chairman of the board. Austin's brother Corliss became a distinguished philosopher and humanist on the faculty of Columbia University, and his brother Thomas followed in his father's footsteps at the Morgan Bank. Austin attended the Phillips Exeter Academy and then went to Harvard University, graduating in 1927. He had decided upon a career in classics, and applied to and was admitted to New College at Oxford University. Sometime between his departure for Oxford and his arrival at New College he abandoned his interest in the classics and decided upon a career in science. He was awarded his Bachelor's degree in Physiology in 1931, and a Master's degree in absentia in 1935. On his return to the States in 1931, having decided upon a career in medicine, he attended The Johns Hopkins University School of Medicine from which he graduated in 1937.

During his time at Oxford, he took full advantage of the opportunity to travel, and in the course of events romantically pursued and married Nancy Lloyd who was in Europe at that time. Her father, James Sullivan, was a prominent artist from Boston. Austin and Nancy Lamont had four children. They were divorced after twenty-five years. Austin subsequently married Bodine Lieber, a longtime friend.

After his graduation from Hopkins, Lamont was awarded a fellowship in surgery, and worked with Warfield Firor (at Lamont's request, without pay) in the surgical laboratories on the pathophysiology of tetanus. Firor had been appointed as the Acting Chairman of Surgery, following Dean Lewis. Sometime in this period Austin's father had suggested that Austin would be wise to engage in a professional career in which he might be assured of an income should the family resources become unavailable. Lamont consulted with Firor, who told him that, "there were almost no well-trained physician anesthetists in the country and that this was a field that had great future promise."

This was fortuitous, for in 1941 Alfred Blalock was appointed to the Chair in Surgery at Hopkins. Blalock had been a medical student and house officer in the surgical programs at Hopkins but was not made Resident (Chief Resident). He was offered the post of Chief Resident at Vanderbilt, where Barney Brooks had just become Chairman of Surgery. Blalock had a distinguished career at Vanderbilt where he did his classic work on shock and pulmonary hypertension. He was acutely aware of the challenges that lay ahead in thoracic and what was to become cardiac surgery. He felt there was an important role for physicians to bring in more professional expertise than was then available in anesthesia.

Blalock must have discussed his interest in a program in anesthesia for surgery with Firor. One must surmise that this was the source of Blalock's invitation to Lamont in 1941 to organize a program in anesthesia in the Department of Surgery at Hopkins. Lamont, ready for a new challenge and stimulated, perhaps, by his father's argument, accepted the appointment. By this time he was an associate in the Department of Surgery. This was not the first time that a member of the surgical staff was asked to devote himself to anesthesia. At the turn of the century, Dr. Halstead, the first Professor of Surgery at Hopkins, had finally recognized that the administration of anesthesia by surgical house officers and medical students left something to be desired. In 1908 he asked Willis Gatch, a junior surgical house officer, to undertake the responsibility for developing anesthesia at Hopkins. Unfortunately, Halstead abruptly terminated Gatch's tenure three years later when Gatch made an unfortunate comment on rounds about one of Halstead's patients. Gatch later gained fame with the "Gatch Bed." On leaving Hopkins, Gatch was appointed to a Professorship in Surgery in Indianapolis, and subsequently became the Dean of the Indiana University School of Medicine, from which he retired in 1946.

Lamont, after his year in clinical training, returned to Hopkins in 1943 to take up his duties and was appointed instructor in surgery-anesthesia. Anesthesia at Hopkins, after Gatch's dismissal, had continued to be administered by house officers and medical students. Gradually, over the years (and during Halstead's chairmanship) the superior quality of anesthesia performed by nurse anesthetists was being recognized, and they were given the responsibility for surgical anesthesia. In 1917 a program dedicated to the formal training of nurse anesthetist was initiated at Hopkins, first with one student, and shortly thereafter, a second. Therefore, when Lamont finally arrived in the operating theater at Hopkins in 1943, all anesthetics except for spinals were given by nurse anesthetists and their students. By this time, Hopkins had an important school for nurse anesthesia, under the direction of Ms. Olive Berger.

Lamont's concept of an anesthesia department that included physician anesthesia, residency training, and a resident research program was forged by the model presented in both Wisconsin and New York. Indeed, Waters was vigorously opposed to nurse anesthesia in academic anesthesia programs for medical students and postgraduate physicians. Blalock, on the other hand, with encouragement from Dr. Henry K. Beecher, the Professor of Anesthesia and Chairman of the Department of Anesthesia at the Massachusetts General Hospital, was steadfastly in favor of nurse anesthetists who were subject, of course, to control by the surgeon. Beecher seriously questioned whether physicians would be able to provide the manpower to fulfill the service requirements in anesthesia nationwide. It is no wonder that Lamont and Blalock would come to a parting of the ways.

I first met Lamont in 1943 as a surgical intern on Dr. Blalock's service. At that time there were few, if any, anesthesia rotations in surgical training programs anywhere in the United States. With Lamont's arrival, all eleven surgical interns were each scheduled to spend one month on an anesthesia rotation. It would seem that anesthesia was off to a splendid start at Hopkins. Austin Lamont was a man of keen intellect, remarkably skillful, charismatic, with a dry, delightful wit, a person of unquestioned principle, dignity, and elegance. Indeed, he had an aura that was enhanced by the casual grace with which he wore his clothes. I shall never forget his amusement and pride in a suit he wore, made in 1912 for his father by tailors in Saville Row. While not envisioning a career in anesthesia when I began my surgical internship, circumstances serendipitously led me to become Lamont's first, as well as the only, resident to finish the program at Hopkins during his tenure. Two other Hopkins graduates spent a brief period with Lamont, Deaver Kehne and John Elder. Kehne ultimately became a psychiatrist, and Elder followed Lamont to Pennsylvania to continue training under Robert Dripps. Theodore Stacey, trained in the Service, joined the staff in anesthesia for a period. Leroy Vandam finished his surgical residency at the Beth Israel Hospital in Boston, and went into the Service where he developed severe eye complications. He came to Baltimore to be treated by Dr. Jonas Friedenwald. This affliction effectively ended his promising surgical career. After a year in treatment, while casting about for a way to continue his career in medicine, he met Lamont, who offered him the opportunity to work in the laboratory until it would be possible for him to enter training in anesthesia. Blalock had asked Vandam to help Richard Bing set up the first cardiac catheterization laboratory at Hopkins. This accomplished, Vandam followed Lamont to Philadelphia for his clinical training with Dripps. Thus began a life-long friendship between Lamont and Vandam.

Lamont, prior to his resignation, had persuaded me to apply for a National Research Council Fellowship to study cerebral circulation with Kety and Schmidt at Penn. This was wartime, and there were not that many applicants, so I was fortunate enough to receive the appointment. With Lamont leaving, Blalock asked if I would stay at Hopkins. Both Lamont and Dripps, both of whom I consulted, advised me to remain at Hopkins for the sake of " academic anesthesia." I was prepared to remain at Hopkins and give up or postpone the fellowship, but a critical encounter with Dr. Blalock changed my mind and I went on to Penn.

Lamont's primary interest was to further academic anesthesia. Nowhere was his critical objectivity more evident than in views concerning Hopkins. I have often wondered if Lamont had been financially dependent on his post, whether he would have continued to negotiate with Blalock and remain at Hopkins. His departure heralded an arid period of more than thirty years in which anesthesia at Hopkins was unable to acquire true academic stature. That institutions are able to change is evidenced by the leadership and stature of anesthesia at Hopkins today.

Lamont's tenure at Hopkins was but three short years, at a time when the excitement associated with the "Blue Baby" operation brought physicians from all over the world to Baltimore. Lamont had established a residency, initiated laboratory research, and a teaching program for medical students. However, the relations between Lamont and Blalock were on a downhill course. With the war on, limited resources were available to Blalock and the medical school, and his main thrust was in the development of the Department of Surgery. Lamont's modest requirements were not, or could not, be met. The end result was that Lamont was not able to obtain the support necessary to accomplish his mission. Independent and principled as he was, he resigned in 1946. The nurse anesthetists, highly regarded by the surgeons, continued to provide anesthesia service. Lamont joined Robert Dripps at Pennsylvania where he remained until his untimely death in 1969.

Lamont's concept of an academic department, and the role of physicians in anesthesia, was at odds with Blalock's vision of anesthesia within his department. The problems between them, which led to Lamont's departure in 1946 for Dripp's Philadelphia is perhaps best expressed in a letter written several years later, in 1965, from Lamont to Mark M. Ravitch, a friend and surgical colleague from Hopkins days:

> My own resignation was due to Blalock's opposition to my wish to increase the number of physician anesthetists and decrease the number of anesthetic nurses. I did not want to spend the rest of my life supervising nurses and I did not see how we could have a department of university caliber without

more physicians. At the time there was me and one resident. Blalock said that things were fine as they were though he thought that I should leave the nurses less supervised so that I could do more research. My conscience would not permit this. Blalock never misled me, nor broke any promises. He had said before I went into anesthesia that he wanted a real university department, but at that time neither he nor I knew what was involved. The fact that our ideas evolved differently is no evidence of bad faith on the part of either.

This letter reveals Lamont as he was: dispassionate, fair, and objective, a man of principle and conscience.

It is noteworthy that the subsequent appointment of Donald Proctor, an otolaryngologist and pulmonary physiologist, as chief of a division of Anesthesia at Hopkins briefly gave anesthesia professional, academic status. This venture also failed because of differences and lack of support from Blalock.

Lamont's role at Penn was that of friend, counselor, teacher, and above all champion of academic anesthesia. When in Baltimore Lamont had organized the local society of anesthetists, reflecting his experience at Wisconsin where Dr. Waters' Wednesday afternoon conference gave substance to anesthetic encounters. Lamont was a dedicated advocate of the value of discussing clinical experience for its fundamental educational worth. As an academic physician he had been salaried and was exposed to the acrimonious relationship between the ASA and the academic community over compensation and professional recognition during the forties and fifties. In 1950 to effectively counter the prevailing influence of the anesthetic establishment (interestingly with Beecher's encouragement), Lamont drew up a proposal for an organization of academic anesthetists. For the ensuing three years Beecher, Dripps, and Papper,

with Lamont tried unsuccessfully to repair the breach between academia and organized anesthesia (ASA and ABA). In 1953 the Association of University Anesthetists came into being. Lamont's role was crucial. Shunning leadership, he became the first secretary of the new organization.

During his years at Penn, Lamont was a splendid support to Dripps, was an accomplished teacher, and a resource for many, with his calm and balanced advice and, on occasion, a hand for the needy. But his main intellectual fervor was always directed toward his passion for anesthesia as an academic enterprise in the University. In many ways he served anesthesia, the department at Penn, and his colleagues as an Eminence Grise. Upon his death, Dripps and the Department recognized his many contributions to Penn with the Austin Lamont Fellowship in Clinical Anesthesia. His surgical colleagues established the Lamont Block in Plastic and General Surgery as a memorial. Finally, the Austin Lamont Professorship, endowed by his family, memorialized his vital and significant role in the development of academic anesthesia

On a personal note, Austin Lamont will

ever be my teacher, mentor, and abiding friend. After leaving Penn we saw each other

infrequently, but he was always there for guidance and counsel. I saw him last as he lay abed at Hopkins Hospital, to which he had returned during his final illness. Gaunt, ravaged by pain, he was still the Austin

During his years at Penn, Lamont was a splendid support to Dripps, was an accomplished teacher, and a resource for many, with his calm and balanced advice.

Lamont of wit and elegance. He faced his death with equanimity and compassion for those who loved him.

Austin Lamont's career was mainly behind the scenes. He gave sage and balanced advice, formulated and implemented significant ideas. Above all, he was a man of principle and elegance, dedicated to establishing anesthesia as an independent academic discipline in the university school of medicine. He understood full well the vision of Ralph Waters. Indeed, we are where we are today, in no small measure, because of Austin Lamont.

### Bibliography

Muravchick, A, Rosenberg, H. "Austin Lamont and the evolution of modern academic American anesthesiology," *Anesthesiology* 84 (1996): 136-141.

interviewed with Dr. Dripps in June of 1959 after eight years in solo rural general practice, where, at times chickens or potatoes were my professional fee. My interview in his office on the fifth floor at the Hospital of the University of Pennsylvania (HUP) took all of five minutes. He asked me if I was married (yes), if I had

## Allen E. Yeakel, A.D. (A Dripplet)

# PERSONAL RECOLLECTIONS OF ROBERT D. DRIPPS AND THE PROGRAM AT PENN



Robert D. Dripps, M.D. Aqualumnus

any children (four) and when I could start (July 1). And that was it. I had met a lean, fit man who was busy and decisive.

The next two years confirmed these initial impressions. He was a man of exceptional intellectual acuity, alacrity, fair-minded, and devoted to teaching every aspect of academic anesthesia. His enthusiasm, interest and constant presence in the operating theatre made him an immediate and enduring role model. When you spoke with Dr. Dripps, you knew that he was always paying close attention to you. After group discussions he unfailingly delivered a carefully reasoned summary leading to a plan of action, being it the management of a clinical case, the conduct of a research investigation, or a management problem.

I soon learned not to miss a Friday complications conference, for I learned as much there as by any other method, benefiting from the analyzed misjudgments of others and myself. But, the atmosphere was ever non-pejorative, the focus constantly on accuracy of reporting without regard to anything but good clinical practice. Dripps knew how to keep this objective uppermost. One afternoon a resident presented a case in which the patient's blood pressure kept dropping despite his best efforts; nothing he tried was working. Finally, when disaster seemed imminent, Dr. James Eckenhoff, who was chairing the conference from one of the three "thrones" occupied by himself, Dripps, and Henry Price, interrupted the hapless resident and asked, "What would you do at this point, Bob?" Dripps pulled at his chin briefly and thoughtfully replied, "Jim, I think I'd sell!" His humor broke the tension and lessened the resident's anguish. Dripps' subsequent analysis then lucidly explored the physiology, pharmacology, and interventional choices needed. The resident and we in the gallery learned some anesthesia that afternoon and that we could be absolutely honest in our presentations, for the benefit of all. The only humiliation was self-inflicted.

This atmosphere of staff-student-resident congeniality, Dripps cultivated at other levels. For example, he had the hospital kitchen send a food cart daily to the anesthesia residents' lounge on the OR floor with lunch, including hot soup. I came to know fellow residents and staff by sharing conversation as well as informal medical discussions on a daily basis in that relaxed setting. We came to know our junior and "tweeny" staff from all over the world. Dick Atkinson and June Brett from the U.K., Brian Craythorne from Ireland and others from Italy, Australia and Scandinavia. Not infrequently, Dripps himself, Eckenhoff, Henry Price and Tom Cannard joined in on discussion of all sorts of issues, often with refreshing levity. There was some horseplay as well. One day I watched Steve Prevoznik tear a Philadelphia telephone book in half with his bare hands!

The Thursday evening (attendance required) formal lecture was another not-tobe-missed event. Guest speakers who were at the leading edge of the specialty expanded our exposure to new ideas and approaches to our art. Dr. Betcher on hypnosis, Dr. Lundy on intravenous anesthesia, the inimitable Dr. Digby Leigh on pediatric anesthesia. It was a parade of the masters of that day. At one of these meetings, Dr. Ray Parmley offered me a copy of a small volume entitled, As a Man Thinketh, by James Allen from a cardboard box he carried with him. That little book, with its frayed binding and dog-eared pages is a precious nugget from Dr. Dripps' training program.

Dr. Dripps' devotion to teaching was eloquently and dramatically demonstrated the evening it was announced that McNeil Corporation had offered him either \$50,000 cash or an endowed Chair of Anesthesiology at Penn. He opted for the chair. It was a living example of James Allen's second essay in Parmley's gift, "Out from the Heart."

Dr. Dripps had great interest in letting his residents pursue their own interests within his training program. He and the staff approved my wish to try using older anesthetic agents, and supervised my administration of ethylene, ethyl chloride, vinyl chloride and numerous cases with trilene. Of course, every resident at HUP cut their teeth on inductions with diethyl ether. Pretty messy at times, but we surely learned airway management. I came close to trying chloroform for an orthopedic case. Dripps encouraged me to study the agent and plan its clinical use. I worked out the flows needed through a copper kettle filled with chloroform on a Foregger machine with water manometers. But at the last moment he

sent word to me that he could not be there with me and to proceed with another method. I never knew whether he was simply detained, or whether he had thought better of the possible medicolegal aspects of using chloroform at that time.

Nevertheless, conventional regulations did not deter him. I was in my second year as a resident when a young veterinary student appeared in our ranks as an anesthesia resident, administer-

Dr. Dripps had great interest in letting his residents pursue their own interests within his training program. He and the staff approved my wish to try using older anesthetic agents.

ing to patients just as we did without benefit of a medical degree. How Dr. Dripps managed this remains unknown to me, but I had the opportunity to work with Dr. Larry Soma, who later became the first Chief of Veterinary Anesthesia in the United States. Through this contact I was invited to administer epidural anesthesia to several sheep, another unique experience of training under Dr. Dripps. Perhaps Dr. Soma deserves a leaf on Dr. Morris' Aqualumni Tree?

One afternoon I was sitting in the small staff staging office with Dr. Richard Jones when we both smelled something burning. The odor became stronger. We went out into the corridor following the scent to the right toward the ENT suite. There, in the vestibule. which served as an anesthesia induction site. we found a first year resident bent over, intent on intubating a young girl for a T and A. He had not noticed that during the ether induction her arm had relaxed and fallen laterally, coming to rest with the back of her hand on the top of a steam radiator. The metal fins of the radiator were burning through her skin and some of her extensor tendons. As disastrous a complication as this was, by 5:00 p.m. that afternoon the situation was stabilized. Dr. Dripps, having been notified immediately, came to the ENT suite, inspected the scene, saw to the patient's further safety and then notified and spoke with the parents. I learned they were fully informed of the events, utter regrets were expressed and reassurance given that all reparative plastic procedures would be carried out without expense. As far as I know, there were never any legal repercussions. A different age? Yes, but also a man of honesty, expressive empathy, and action.

For all his sophisticated qualities and talent Dr. Dripps was eminently likable and human. He made some human mistakes. One I know of occurred following his urologic surgery. He received a spinal anesthesia for a non-radical procedure. Awake in the recovery room, feeling good and having fasted, he wanted a milkshake. That was forbidden, of course, but Dr. Dripps had considerable influence with the recovery room nursing staff. He finally persuaded them and got his milkshake. Soon thereafter he had to be taken back to the operating room because of excessive bleeding. Since his patient now had a really full stomach, Dr. Eckenhoff opted for a rapid I.V. induction of general endotracheal anesthesia. Dr. Dripps brought up the milkshake during this procedure, but thanks to Dr. Eckenhoff's skillful management aspiration was avoided and an uncomplicated recovery ensued. I do not recall that case being on the Friday conference.

I hope these tales have conveyed to you a sense of Dr. Dripps' spirit, quick intelligence, and élan. Recently I came across a passage, which struck me as a fitting tribute to Dr. Ralph Waters, Dr. Robert Dripps and all the other "droplets," who carried on the Waters legacy:

> THE LEARNED WILL SHINE LIKE THE BRILLIANCE OF THE FIRMA-MENT, AND THOSE WHO TRAIN MANY IN THE WAYS OF TRUTH WILL SPARKLE LIKE THE STARS FOR ALL ETERNITY.

> > Daniel 12:3

r. Sidney Orth was born on June 29, 1906 in Cincinnati, Ohio and died unexpectedly at home, in Madison, Wisconsin on February 2, 1964. Most of his academic career was at the University of Wisconsin in Madison. In 1929 he received, from the University of Illinois, a Bachelor of Science degree in athletic

# **Carlos P. Parsloe**

# O. SIDNEY ORTH (1906-1964): A PHARMACOLOGIST IN ANESTHESIA



Aqualumnus

Carlos P. Parsloe, M.D. Aqualumnus

coaching with teaching majors in mathematics and physiology.

Subsequently, he spent one year teaching and athletic coaching in a high school, returning to the University of Illinois to complete work for the Master of Science degree in Physiology, obtained in 1932. Interestingly, during that period, several of his nine research papers were devoted to electronarcosis,<sup>1</sup> certainly without realizing that ten years later he would become deeply involved in anesthesia research, and twenty years later he would become Professor and Chairman of a prestigious Department of Anesthesiology, at the University of Wisconsin in Madison.

While in Illinois, he spent his summers at the University of Wisconsin in Madison, working under Professor Walter J. Meek towards a doctorate in Physiology. In 1931 he and Ottilia Caroline Blodau of Madison were married. They had no children, but they developed strong interests in rose gardening and in Kennel Club activities.

From 1937 to 1942 he was Instructor in Physiology at the University of Wisconsin in Madison, completing his Ph.D. in Physiology in 1939. Meanwhile, he finished his medical studies, receiving the degree of Doctor of Medicine in 1942.<sup>2</sup> In Madison, Sid, as he was called by everyone, came under the influence of Professor Ralph Waters who, since 1927, had started a close integration of clinical Anesthesia with the basic sciences of Physiology and Pharmacology. Therefore, from the beginning Sid worked in collaboration with the research projects in Anesthesia, participating in the experimental studies of the cardiovascular effects of cyclopropane, which eventually led to the description of cyclopropane-epinephrine arrhythmia interrelationship.<sup>1</sup>

The basic sciences at Madison during 1936-1952 were his environment. There, Sid worked with Walter Meek in Physiology and Arthur Tatum in Pharmacology, where the influence of Chauncey Leake and Maurice Seevers was felt. In 1942 he moved to the Department of Pharmacology as Assistant Professor, was promoted to Associate Professor in 1945 and to Professor of Pharmacology and Anesthesiology in 1948.3 One of Ralph Waters' seminal contributions to anesthesia was the clinicalbasic sciences integration, which worked so well under his charisma. In this respect Sid had a two-fold role: he was in charge of laboratory investigations, and participated in the Anesthesia weekly meetings. I first met Sid during my residency with Ralph Waters, 1946-1948, when he attended the Wednesday afternoons case discussion meetings and the Monday evening literature review meetings.

#### CARLOS P. PARSLOE

Those meetings were a constant source of learning, with Sid having the last word on any drug effect in question.

Sid was by nature a "happy person" with a ready smile and a friendly approach to

Sid had a two-fold role: he was in charge of laboratory investigations, and participated in the Anesthesia weekly meetings. personal interactions. With these predicates he was considered "a friend of the student."<sup>1</sup> All medical students liked his classes in Pharmacology, while all residents received

answers to their many questions. He was liked by the medical students, anesthesia residents, and faculty and nursing personnel alike. I only remember seeing him with an angry expression once. At one of the end-of-school-year medical students pranks, Sid was respectfully a part of the proceedings, enjoying the practical jokes as much as the students and the audience, even when he was made to wear a raincoat before receiving a bucket of water over his head.

He went daily to the animal laboratory, overseeing the way all animals were treated. He liked dogs and with Ottilia owned one, Patty. As an indication of his genuine responsibility he was involved in helping repeal an anti-vivisection bill that had been presented to the State Legislature. In the weekly Rotary luncheons he had contact with community leaders and could express his views as a researcher in both animals and humans. He invited the legislator to visit the animal laboratory to find out for himself how the animals were treated. As a result, the legislator decided to withdraw the bill.4 The daily newspaper, The Wisconsin State Journal, interviewed Sid during that particular period and printed in March, 1952 a picture of him kneeling down and patting a dog in its cage. Sid's views on animal experimentation were reproduced as follows: "I value the lives of both dogs and humans. It is simply that I value the lives of humans more." And, "If the dogs could talk I know they would say they are proud of their contribution towards the good of mankind."<sup>5</sup>

Sid belonged to numerous scientific and medical organizations. He was a Diplomat of the American Board of Anesthesiology, Inc.,<sup>6</sup> had a membership in the American Physiological Society, the Society for Pharmacology and Experimental Therapeutics, and the Society for Experimental Biology and



Figure 1. O. Sidney Orth (1906-1964). COURTESY THE WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY

Medicine. He was a Fellow of the American Association for the Advancement of Sciences. He belonged to the Dane County Medical Society, the Wisconsin Medical Society, and the American Medical Association, the Wisconsin Society of Anesthesiologists, and the American Society of Anesthesiologists, Inc.<sup>3</sup> He was a founding member of the Association of University Anesthetists in 1955, becoming its President-elect in 1963. Unfortunately, his premature death prevented him from actually fulfilling the Presidency. He was elected to the Board of Governors, American College of Anesthesiologists in 1963.<sup>1</sup> His active participation in Medical School affairs included many important committee assignments, such as member of the Executive Committee, Chief of the Medical Staff, and a member of important ad hoc committees where he was active, frank and direct.<sup>2</sup> He became President of the Madison Rose Society and belonged to the Downtown Rotary Club and the Badger Kennel Club.

During 1946, with the approaching centenary of the introduction of chloroform in anesthesia in 1847, Waters thought it would be worthwhile to re-examine the clinical use of this old agent if administered by modern methods with precise vaporization and maintenance of ventilation and oxygenation. During 1947-48 Sid, with the help of a few residents, carried out laboratory investigations on the effects of chloroform on the liver, kidneys, and the circulation. Those experimental studies were paralleled by concomitant clinical studies employing modern methods of administration. Most residents, including myself, had the opportunity of administering clinical chloroform anesthesia, which proved to be easy and smooth. The results of those studies were collected in a book edited by Waters with Sid as co-author in three chapters.7 In 1947, the American Medical Association held its meeting in Atlantic City where Waters read a paper on chloroform<sup>8</sup> and presented, with Sid and residents, a scientific exhibit on the chloroform studies and its history.9 Some of the residents, Lucien Morris, Donald Kindchi, and myself went along to help with the exhibit.

During 1948, before finishing the residency, I spent six months in the Pharmacology laboratory, investigating in dogs a suggested cyclopropane-pituitrin incompatibility. More properly, although the project was mine, I should say that I helped Lucien Morris to perform the experiments since he had more knowledge of research than I did.<sup>10</sup> Sid was the mentor of that study.

After Waters' retirement in 1949, and the

brief Chairmanship of Miller MacKay, Sid was appointed Professor of Anesthesiology and Chairman of the Department in 1952. He remained a happy person, but now he had his hands full with the running of a busy clinical Department and finding sufficient clinical Staff for the growing surgical needs, particularly cardiovascular surgery. It was my good fortune to have spent almost three years, during 1952-54, and another 9 months during 1963, working in the Department. I arrived in Madison in March,1952 with the position of Research Associate with clinical duties in the Department of Anesthesiology. Soon after, Sid invited me to a Rotary luncheon as his guest. That period in Madison offered me the opportunity of a closer contact with Sid and to get to know more of his encyclopedic knowledge of Pharmacology. He ran the Department well and made a point of following Waters' habit of being present in the operating rooms daily, administering anesthesia whenever possible. Sid was not as accomplished a clinical anesthesiologist as Waters, but then one could say that, indeed, nobody was. Clinical needs were paramount in those days and little time was available to develop research projects. Nevertheless, some were performed, such as work with the pneumatic balance resuscitator, which Sid carried out with Milton Davis, and oxymetry studies, which were done by Bob Capps and me.

We employed a Millikan Waters Conley ear oxymeter that required frequent time consuming calibrations, warming the ear lobe and pressurizing a rubber membrane over the lobe. It did not prove to be a practical clinical monitor since the earpiece needed to be removed for periods of 15 to 20 minutes, in order to prevent thermal burns of the pinna. Nevertheless, it served to demonstrate early on the temporary but often unrecognized periods of rapid decreases in oxygen saturation following thiobarbiturate-relaxant drugs for induction of anesthesia and intubation, unless oxygen was administered concomitantly. And perhaps, for the first time, it demonstrated the decrease following suction for removal of tracheo-bronchial secretions, as well as the decrease during open drop induction of anesthesia with ethyl chloride or di-vinyl ether, especially when a towel was placed around the mask, unless oxygen was administered simultaneously.<sup>11</sup> Once the saturation decreased, the administration of oxygen caused an immediate rise in the oxyhemoglobin saturation. Another study, prompted by European reports of D-tubocurarine effects on blood coagulation, revealed that the clinical employment of different muscle relaxants had little or no effect on blood clotting.<sup>12</sup> This study was carried out with the indispensable help of Harold Deutsch, then Associate Professor of Physiological Chemistry, now Emeritus Professor at the University of Wisconsin Medical School. Robert Capps, at the time a medical student, was daily in the operating rooms with an EKG machine taking random records during clinical anesthesia. The large database provided by such studies was of direct clinical significance. John Steinhaus was studying experimental cocaine toxicity and the clinical uses of intravenous lidocaine. John Steinhaus' and Bob Capps' work was directly relevant to clinical anesthesia. John worked for his Ph.D. with Professor Tatum, and Bob with Sid Orth.<sup>4</sup> It is important to mention that both of them became President of the American Society of Anesthesiologists after working in the Departments of Pharmacology and Anesthesiology in Madison. Thus, the traditional Waters concept of clinical-basic science integration was maintained.

In 1953, the International Anesthesia Research Society held its annual meeting in Quebec. Sid was scheduled to attend the meeting to discuss J. M. Quastel's paper on biochemical aspects of anesthesia, and I was going to present the paper on blood coagulation and muscle relaxants. However, Sid was unable to go to Quebec and at the last minute asked me to take his place in the discussion of Quastel's paper. I was quite reluctant since my knowledge of biochemistry was not that complete, to say the least, and I hardly could face a discussion on "narcotics and cell metabolism" with the Professor of Biochemistry at McGill University in Montreal.<sup>13</sup> I had to tell Sid of my impossibility to take his place, to which he suggested that I ask Dr. Wesley Bourne, Professor of Anesthesia at McGill. Needless to say, the first thing I did upon arriving in Quebec was to look immediately for Wesley, who, to my relief, accepted the suggestion without flinching his eyes.

Sid received many foreign residents: Eduardo Fonio and Reinaldo Barreto from Argentina; Luiz Ribemboim, Sergio Paes Leme, Gilberto Cunha, Heitor Serapião, and Luis Carrero from Brasil; Alma Thorarinsson from Iceland; Rama Rao and K. P. Ramachandram from India; Marek Sych from Poland; João Marques from Portugal; and Harold Wang from Taiwan. Therefore, the international gathering that had started with Waters was carried on successfully.

Sid's name appears in over 100 publications, articles, and book chapters.<sup>2</sup> He was a Refresher Course speaker at the ASA annual meetings.<sup>6</sup> In 1960 he published in Survey of Anesthesiology a brief description of the Department at Madison.<sup>14</sup> He received invitations to speak abroad and went to Mexico City in 1957, and to Recife, Brazil in 1958. Professor Marek Sych invited Sid to lecture in Krakow, but he died a few hours after mailing the letter of acceptance.<sup>4</sup> In 1960 during the Second World Congress of Anesthesiologists in Toronto, which Sid attended, the General Assembly of the World Federation of Societies of Anaesthesiologists chose the Brazilian Society of Anesthesiology to organize the Third World Congress of Anesthesiologists in 1964. As Chairman of the Scientific Committee, I asked the Executive Committee to invite Sid. Unfortunately, he died in February of that year. His name, together with Noel A. Gillespie's,

both from Madison, appeared "In Memoriam" in the front pages of the *Scientific Program.*<sup>15</sup> Sid's widow Ottilia sent a thank you letter dated September 17, 1964.

It is with a humble and grieving heart that I send this letter of appreciation in recognition of your kind tribute in honor of the memory of my late husband, Doctor O. Sidney Orth. It is my hope and prayer that your meeting will proceed with the enthusiasm and spirited scholarism represented by the loyal support given by my late husband through his faith, his devotion, and his hopefulness for an auspicious III World Congress.<sup>15</sup>

Sid's career in Pharmacology and Anesthe-

siology in Madison was relatively short, but productive. Those fortunate enough to have worked with him well remember his ready smile, his good humor, his kindness to everyone around him, and his friendly approach to human relations. On Sid's request, I anesthetized his father, Charles Lambert Orth. On Ottilia's request I was one of Sid's pallbearers at his funeral on February 4, 1964, one day before returning to Brazil. The opening words of the Memorial Resolution of the Faculty of the University of Wisconsin on the death of Professor O. Sidney Orth were the following: "We salute Dr. Orth as a significant force in the progress of anesthesiology, as a versatile and dedicated teacher and as a cherished and generous friend."2

### References

- 1. "We Salute," Anesth & Analg 42:1 (1963): 19-20.
- 2. B J Bamforth, KL Siebecker, WB Youmans, and OA Mortensen, Chairman, Memorial Committee, Faculty of the University of Wisconsin, Document 1625, May 4, 1964.
- 3. Oswald Sidney Orth, application for Membership, The American Society of Anesthesiologists, Inc., received August 4, 1952.
- 4. R. S. Barreto, L. Morris, L. Ribemboim, J. Robbins, P. Sim, J. Steinhaus, personal communication.
- 5. Wisconsin State Journal, March 1952
- 6. ASA Newsletter 38 (1964): 2
- 7. RM Waters, ed., *Chloroform, A Study after 100 Years* (Madison: The University of Wisconsin Press, 1951).
- 8. RM Waters, "Chloroform," American Medical Association 96th Annual Session, July 9-13, 1947, Atlantic City, NJ.
- RM Waters, OS Orth, FJ Pohle, DR Kindschi, LE Morris, "One Hundred Years of Chloroform," Scientific Exhibit, American Medical Association 96th Annual Session, July 9-13, 1947, Atlantic City, NJ.
- 10. CP Parsloe, LE Morris, and OS Orth, "The relationship of various anesthetic agents to the action of pituitrin, pitressin and pitocin," *Anesthesiology* 11:1 (1950): 76-95.
- 11. RT Capps, CP Parsloe, and OS Orth, "Oxymeter Studies During Anesthesia," unpublished observations.
- 12. C Parsloe, H Deutsch, and OS Orth, "The Effects of Muscle Relaxant Drugs on Blood Clotting," Anesth & Analg 33:6 (1954): 358-365
- 13. JM Quastel, "Narcotics and Cell Energetics, International Anesthesia Research Society 28<sup>th</sup> Annual Congress Program," *Anesth & Analg* 32:5 (1953): 59.
- 14. OS Orth, "The Department of Anesthesiology in Madison," *Survey of Anesthesiology* 4:6 (1960): 591-594.
- 15. Scientific Program, III World Congress of Anesthesiology, São Paulo, Brazil, 1964.
- 16. Sid and Ottilia Orth, personal correspondence.

**D** r. Perry P. Volpitto was born in Italy in 1905. His father, a Protestant minister, came to the United States in 1910 and brought his family to join him the next year. Perry grew up in Western Pennsylvania where his father headed a Presbyterian mission for immigrant Italian coal miners. He graduated from Washington

## John E. Mahaffey

# PERRY P. VOLPITTO, M.D.: THE BEGINNING OF ACADEMIC ANESTHESIOLOGY IN THE SOUTH



Perry P. Volpitto, M.D. Aqualumnus

and Jefferson College, and in 1933 obtained his M.D. degree from Western Reserve University School of Medicine.

Following graduation from medical school, Dr. Volpitto completed a rotating internship at the University of Wisconsin Hospital. During his rotation on the anesthesia service, Dr. Volpitto became aware of the challenges offered by anesthesia and was especially stimulated by the enthusiastic teaching of Dr. Ralph Waters. After a year in a Neuropsychiatry residency, he applied and was accepted into Dr. Waters' residency program, beginning in July 1935. In January 1936 circumstances led Dr. Volpitto to Bellevue Hospital in New York City to complete his residency. Six months prior, Dr. Emery Rovenstine had left the faculty of the University of Wisconsin to start an anesthesia residency at Bellevue Hospital. Shortly after arriving in the City, Dr. Volpitto joined the New York Society of Anesthetists (that we now know was the forerunner of the American Society of Anesthesiologist) in which he served a very prominent role.

Dr. Volpitto was exposed to two outstanding teachers and mentors during his early training, when the specialty of Anesthesiology was still in its infancy. Not only was Perry's interest in anesthesia stimulated at the University of Wisconsin, while there he was introduced to Mary Stevens, an attractive young nurse. She came to New York City from Madison and they were married during his residency in October 1937. Many of us remember her as a charming and gracious hostess in her home. Shortly thereafter they moved from the "Big Apple" to the small city of Augusta, Georgia.

Dr. Volpitto was appointed Associate Professor of Anesthesia at the University of Georgia College of Medicine. In 1938 Perry organized the first training program for anesthesia residents in the South at the University Hospital in Augusta. Although the school had been founded in 1828, the hospital was a combined teaching and private patient hospital, as were most teaching hospitals in the South. The first anesthesia resident entered the program in July 1939.

Over the years, especially following World War II, Dr. Volpitto developed innovative methods of teaching medical students the fundamentals of surgical anesthesia. Dr. Volpitto was primarily clinically oriented and felt limited in his investigative capabilities. Recognizing this, he developed a cooperative, collaborative research effort with the basic science departments. This led to more medical students having contact with the anesthesia faculty, when the students were most receptive to anything clinically oriented. This also served as a stimulus to improvement in the investigative efforts of both the Anesthesia Department and the basic science departments, especially Pharmacology. He also implemented a "dog surgery" experience, which simulated surgery in the operating room with a multidisciplinary approach, with medical students serving as surgeon, assistant surgeon, anesthesiologist, and surgical scrub nurse. Joe Johnson, later one of Perry's residents and faculty, relates that the most terrifying job of all was that of the "anesthesiologist." Joe says, "Eight layers of gauze, properly trimmed corks, wicks of just the proper caliber and length, the proper drip technique and (above all) Guedel's signs and stages of anesthesia all became obsessions on our afternoon as 'anesthesiologist'...Dr. Volpitto thought little of my ability to properly get that dog 'to sleep.""

In addition, Dr. Volpitto introduced the medical student externship. Selected students were trained in the basics of anesthesia during the summer months. These students were employed on a part-time basis to provide uncomplicated anesthesia care, primarily obstetrical analgesia. In addition to assisting with some of the manpower needs, it proved to be an effective method of recruiting future residents.

I am very familiar with all of these methods because one of Perry's former residents and faculty members was Chairman of the Anesthesiology Department at the Medical University of South Carolina when I arrived on the scene in 1958. Dr. John Brown had been at MUSC for about 10 years and was utilizing the methods that he felt had been very effective, and which he had learned from Dr. Volpitto.

In 1950 the medical school in Augusta assumed its present name, the Medical College of Georgia, and in 1956 The Eugene Talmadge Memorial Hospital was opened as the teaching hospital for the Medical College of Georgia. At the same time, Anesthesiology was established definitively as a department at the request of Dr. Volpitto. Dr. Perry Volpitto served as Departmental Chairman until he stepped down in 1972. He retired on June 30, 1973 with Emeritus Professor status. Dr. Zack Gramling, a faculty member and one of his former residents, assumed the chairmanship of the department following Dr. Volpitto's retirement.

In 1963 Dr. John Steinhaus invited all the departmental chairmen in the Southeast to attend an organizational meeting at Emory University in Atlanta, Georgia. At this initial meeting SUDAC (Southeastern University

Department of Anesthesia Chairman) was formed. It was decided that the organization would meet annually and would consider educational issues in the broadest sense. It was also decided that the program would rotate through the various representative departments and only chairmen would be invited as participants. In most situations, the meeting was held in the city of the host chairman.

After serving as a delegate and serving on the Board of Directors of the ASA, Dr. Volpitto rose through the ranks to be elected President of the ASA in 1965. During his tenure as President, Dr. Volpitto passionately and successfully defended Anesthesiology as an independent practice of medicine when he appeared before the **U.S. Senate Finance** Committee.

I was fortunate enough to be a charter member of this group, as well as was Dr. Volpitto. I believe that he hosted the second meeting in Augusta. This was always a very informative meeting and gave me an opportunity to know Perry as well as the other chairmen on a more personal basis. Dr. Volpitto was a very dapper dresser and his well-groomed graying mustache gave him a distinguished appearance. He seemed to have a preference for black and white, two-tone shoes that only served to compliment his appearance. Dr. Volpitto was an active member of a number of medical societies. He served as Past President of the Richmond County Medical Society (1946), the Southern Society of Anesthesiologist (1947), the Georgia Society of Anesthesiologist (1948), and the Association of University Anesthetists (1961). In 1975 he received the Distinguished Service Award of the Medical Association of Georgia.

Dr. Volpitto served in many capacities in the American Society of Anesthesiologists. After serving as a delegate and serving on the Board of Directors of the ASA, Dr. Volpitto rose through the ranks to be elected President of the ASA in 1965. During his tenure as President, Dr. Volpitto passionately and successfully defended Anesthesiology as an independent practice of medicine when he appeared before the U.S. Senate Finance Committee. For his outstanding contribution and dedication to the specialty of Anesthesiology, he was awarded the ASA Distinguished Service Award in 1974.

Dr. Volpitto was not only a committed physician and anesthesiologist, he was a gentleman, a man of conviction, and a man who demonstrated his integrity. Dr. Waters and Dr. Rovenstine would take pride in having been a part of his accomplishments. He was indeed, an asset to our profession. **D** r. Stuart Cullen took his residency training with Dr. Emery Rovenstine, but is a bit closer to the primary generation of Dr. Waters' trainees than many of the second generation. A native of Wisconsin and a 1933 graduate of the University of Wisconsin School of Medicine, who returned there for a year of surgical residency,

# William K. Hamilton

# STUART C. CULLEN, M.D.

he had a real exposure to the teachings and philosophies espoused by Dr. Waters.

Dr. Cullen's Medical School graduation took place in the depths of the economic depression. His attempt at general practice was not at all successful so he pursued the opportunities in anesthesia he had observed during his training years. He was one of several directed to Dr. Rovenstine's program by Dr. Waters to help develop the new program in New York.

As Dr. Cullen left Bellevue, he chose to pursue an academic career and turned to the University of Iowa, in a community not far removed from Madison, arriving in the fall of 1938. For many years a physician had been in charge of the Iowa University Hospital Anesthesia unit. As early as 1923, the hospital had issued Residency Training Certificates, but the training program had ceased prior to Cullen's arrival. Subsequent growth and development was a function Dr. Cullen's presence. The growth was rapid and impressive.

The accomplishments of this unit included very successful recruitment of students into the specialty, an active and productive research program (which was not common among university programs in that pre-NIH era), development of leaders in the academic community, and a highly respected and influential position in the Medical College Faculty and the University Hospital. Graduates of his program became chiefs at Indiana, Arkansas, Oklahoma, Kansas, Washington University in St. Louis, Colorado, Iowa, Vanderbilt, California at San Francisco, and Innsbruck, Austria. The latter was the first professorship in the German-speaking world.

Dr. Cullen also assumed an active role in the national and international anesthesia community as a member of the editorial board of the journal *Anesthesiology*, as a Second Vice President of the ASA, as director of the American Board of Anesthesiology, and as a developer and teacher in the International Program of Copenhagen. He was also a popular speaker on the national scene.

After twenty years at Iowa, Dr. Cullen accepted an offer to become Professor and Chair of the Department at the University of California San Francisco. He went to a unit of the Department of Surgery which had lost its accreditation as a residency training site, had little status in the School of Medicine or the University Hospital, and had almost no research resources or activities. Beginning in 1958 this was rapidly converted to a large successful department of anesthesia with productivity in research, academic training, and medical student recruitment. This resulted in such respect and influence that the anesthesia faculty had important positions throughout the school. Dr. Cullen was selected as Dean of the School of Medicine, and the Department

#### WILLIAM K. HAMILTON



L to R: Stuart C. Cullen, M.D. and William K. Hamilton, M.D. 1975. COURTESY OF THE AUTHOR

gained national and international respect. This occurred in only eight years.

The remarkable success in two universities, in widely differing situations, was accomplished by adherence to the simple straightforward principal of earning respect by high-level performance. He developed diligence in clinical practice, open mindedness in teaching at all levels, and had a close association with the basic sciences and widely based critically reviewed research. These qualities and occupations are all in the highest tradition of Dr. Ralph Waters.
**The set of the set of** 

## **Leonard Steiner**

## **RECOLLECTIONS OF JOHN ADRIANI, M.D.**

fascinated me. It was exotic and warm and welcoming to a provincial Wisconsinite like me.

I knew of Dr. Adriani from reading his text books while on Dr. Orth's rotation. I thought, "What if I could train with him? Unlikely, but what have I got to lose?" I walked from the French Quarter to Charity Hospital, asked for the Anesthesia Department, and was directed to a tiny office on the surgery floor. I introduced myself. He asked a few questions, looked me over, and told me he just had a cancellation and I could have the position. The whole "interview" took about five minutes. (I like to think that he was a good judge of character.)

#### **Charity Hospital**

Most of the anesthesia staff had breakfast at 6:30 a.m. in the Charity cafeteria with Adriani and his wife Irene. He would read the paper and comment on the lousy liberal politicians and the imminent destruction of our society. We never argued politics with him. (Come to think of it, we never argued about anything with him.) As I came to know him, I realized that his rhetoric was far removed from his actions in matters of social behavior.

We took the elevator to the surgical floor at about 6:50 a.m. so we could start getting ready for the first case by 7:00 a.m., Adriani would wait at the elevator door to serve notice that tardiness would be observed and not tolerated. He wanted no blame to fall on his department for late starts.

The surgeons were very conscious of the need for speedy inductions and rapid turnover times because of the Adriani rule that no elective case could be scheduled that could not be finished by 2:00 p.m. in order that the anesthesia staff could attend his lectures and classes at 2:00 p.m. on Mondays and Wednesdays. Adriani would lecture to the anesthesia residents and nurse anesthetists in a large amphitheatre. (Attendance was compulsory.) On Tuesdays and Thursdays he would teach the residents in a less formal classroom setting. On Fridays there would be written guizzes. (Though not formally graded, we were sure that he looked them over. We were certain that he knew exactly what was going on.)

#### Adriani as Educator

Adriani was a remarkable teacher because he had the ability to present difficult concepts (pulmonary physiology, for example) in simple, lucid terms. He was the master of analogy and metaphor as a simplifying tactic. Using a blackboard as his only prop, he would lecture to a mixed audience of doctors, medical students, nurses, and dentists, and yet, never talked down to anyone, nor over anyone's head. Although his textbooks demonstrate his clear thinking, they don't really reveal the same mastery as his lectures. As a resident I wondered why we were being treated like immature students. We were, after all, adults and doctors. Some of us, in fact, had been practicing physicians before entering the program. We thought we had matured beyond rigid schedules, compulsory attendance at lectures, and even written exams. However, we soon realized that his system worked—his innate knowledge of human nature guided him. We quickly learned to accept his didactic methods and ultimately knew that he was right. None of us feared the boards because, after all, we had been quizzed on things weekly.

#### Adriani as Administrator

Dr. Adriani was the most powerful and influential figure at this huge hospital, which provided free medical care to any resident of Louisiana. He was Professor and Chairman of the Department of Anesthesia and Pharma-

Adriani was remarkable because he had the ability to present difficult concepts in simple lucid terms. cology at Tulane and LSU medical schools, and Loyola Dental School. He was in charge of anesthesia services for these schools, plus a large independent surgical service. In addition,

he was Medical Director of Charity Hospital and also directed the large school of nurse anesthetists that trained at Charity.

Furthermore, Dr. Adriani was Director of the blood bank. His control of the blood bank gave him power he used as follows: All major elective surgery had to have banked blood allocated before it could be scheduled. Therefore, the surgical residents would recruit donors from the families of the surgery patients or else they could not operate. Needless to say, there was never a shortage of donor blood at Charity.

Although in many respects he could be considered a "czar" because of his power base, his reign was benign. He was not a tyrant; I never saw or heard of any abuse of power. Unlike most powerful people he did not have a great deal of charm or charisma. He was not physically imposing. He had no obvious political skills, nor was he especially good at small talk. As I look back, I now see that he was one of those rare successful leaders who achieved success and power by reason of sheer competence. He was so good at what he did! His scientific mind seemed to easily sort out the variables and make the right decisions without much vacillation. He was comfortable within himself.

#### **Miscellaneous Remembrances**

Although he did not tell jokes, he had a wry sense of humor. One example I recall was when he was looking at a holiday surgery schedule where only emergencies were supposed to be posted. He saw that two surgical residents were on the schedule as patients to have hernia repairs by a colleague. He remarked, "That's surgeons for you—when things get too slow they'll operate on each other."

Adriani was philosophically a political conservative appropriate to his position at Charity, which was a "deep South" segregated facility. The wards and the blood bank were segregated. There were bottles of "Black" blood and "White" blood. However, as a doctor he was color blind. I never saw or heard of him treating any one badly because of his skin color,

#### **Editorial Comment**

John Adriani was one of the first echelon of Rovenstine trainees, and therefore a grandson of Waters when considered on the Waters tree of professional lineage. In contrast to the Waters and Rovenstine methods of teaching through discussion and by example, Adriani organized the available knowledge for publication in books and lecture presentations.

nor would he tolerate inappropriate conduct by any of us. I recall him listening to the medical complaints of black orderlies and elevator operators. He would invite them to his office where he would arrange for appropriate care for them. I thought to myself that if he were talking to the Governor of Louisiana he would do it exactly the same way.

He spoke to me once about his position of power. "No matter how high you get in the scheme of things, there are always people who are in a position to control you. In my case, a lowly state legislator who allocates the Charity Hospital budget."

He enjoyed being a board examiner for the ABA. He claimed he was very easy. He said he passed anyone who knew there was a respiratory center in the brain and who knew what a ground fault interrupter was.

His reputation as an expert witness in medical malpractice was legendary. He was often called but seldom went. He would only testify for the defense of people he knew or cases that seemed egregiously unfair. He was so effective because of his credentials and his ability to convey seemingly difficult concepts to a lay jury in terms they easily understood. I recall two examples of his testimony. In the first, the plaintiff's attorney was trying to make a point about deviating from a standard or routine. Adriani countered, "Routine is all well and good, but sometimes we have to do things differently. For example, the other day, I was driving to Baton Rouge and I noticed my gas tank was on low. Now, routinely, I fill up at my corner station, but being halfway to Baton Rouge, I couldn't do that. I had to break my routine." The jury understood and the defendant won.

The second case had the attorney grilling him about the dose of adrenaline used in the case, implying that it had been excessive and caused damage. When asked what the "normal" dose was, Adriani answered, "I don't know." The lawyer protested, "But Dr. Adriani, are you not the professor of pharmacology at three schools and haven't you published papers on the subject? How could you not know the usual dose for a normal sized 30-year old patient?" Adriani responded, "But that's the whole point. You don't give adrenaline to 'normal' people." Again, the jury understood and the case ended in victory for the defendant.

#### Adriani as Scientist

Because of his background and position, Adriani was always besieged by drug companies who tried introducing new drugs for testing. He was somewhat reluctant to be an innovator. He said he would rather have someone else get the experience. He preferred the old standby drugs that had withstood "the test of time." He was particularly wary of new drugs with unfamiliar molecules, which he felt might not be easily handled by the liver. However, when halothane was introduced, he was willing to try it because it was non-explosive and had been widely tested by people he knew and trusted.

There is an important event in his history not generally known. I found out from a relative of my wife, who was a vice-president of a major drug company, that Adriani was being considered as director of the FDA and he had indicated that he was interested in the position. But his nomination was opposed by the drug industry who felt he would be too conservative in his approach to approving new drugs. Years later when thalidomide caused a scandal, I thought that because of its strange molecule, Adriani would never have approved it.

We residents would sometimes refer to him as the "Grey Ghost" because he would prowl the corridors of the OR suite and look in at what was going on inside the rooms. He seemed to see everything and know everything. He was tolerant of our mistakes as long as we followed the rules. He was aware of the learning curve. LEONARD STEINER

I was told he had a reputation for having a bad temper, but I never saw that. I think that his marriage to Irene changed him into a happier and calmer person. He was capable of draconian measures if he perceived that a resident or nurse anesthetist student was not up to the standards he set. I recall two instances of residents being dismissed from the program just weeks before finishing. He felt strongly that he did not want to be responsible for inferior performances of his graduates.

Dr. Adriani was the most productive man I have ever known and he did it all from his little office with a single secretary who typed his handwritten notes. He was a masterful clinician, scientist, author, administrator and teacher-educator. In my opinion, he was a giant of medicine. As anesthesiologists, we should all take pride in his accomplishments. I certainly am proud to have known him. ooking at Dr. Ralph Waters' legacy, one is immediately impressed that so many early "Aqualumni" anesthesia trainees went on to establish formal residency programs on their own. This was true of both Dr. Waters and Dr. Emery Rovenstine's programs, and this emphasis on academic training was planned and

## Roger L. Klein

# FREDERICK P. HAUGEN M.D., FATHER OF OREGON ANESTHESIOLOGY

encouraged by them.<sup>1</sup> Did these early pioneers have unique talents to face the frequently hostile challenges present in establishing this new branch of medical education, or were they just filling a newly created vacuum?

History suggests that they certainly had talent, and more important, perseverance. In *The Genesis of Contemporary American Anesthesiology*, edited by Volpitto and Vandam, several illustrious pioneers are referred to as the "activators" of the physician anesthesiology movement.<sup>2</sup> They include Drs. Stuart C. Cullen, John Adriani, and Perry Volpitto, among others. An argument could be made to include Dr. Fred Haugen with these "activators," as he was a contemporary of theirs. The justification for inclusion was Fred's major influence in spreading physician-administered anesthesia in the Pacific Northwest.

Frederick (Fred or Fritz) P. Haugen (1908-1987) was born in Stoughton, Wisconsin. The family moved to North Dakota, where he spent his early years through high school. As an accomplished pianist, he played the piano in a silent movie theater. He also set type for the family newspaper.<sup>3</sup> He attended Luther College in Iowa for one year before the family moved to Oregon. There he completed his undergraduate and medical school training at the University of Oregon. He interned at Emanuel Hospital in Portland. In early 1936 he moved his wife and infant son to New York City, where he intended to take an orthopedic residency. While waiting to start the program, he was steered toward the new anesthesiology residency program being started by Dr. Rovenstine at Bellevue Hospital.

Apparently, his initial attraction to anesthesia was due to an interest he had in pain management, as he related to his daughter after his retirement.<sup>3</sup> He started his residency with Dr. Rovenstine in July of 1936, and as he remarked in his Wood Library-Museum oral history tape, he received comprehensive anesthesia training, which included research and regional anesthesia.<sup>4</sup>

Was it always his intent to return to Oregon? He later remarked that the climate for physician anesthesia in Oregon was not the best. The chairman of the surgery department, though nationally known, held strong reactionary views toward anesthesia. Dr. Haugen later stated that he had decided to wait until that surgeon retired before he would return to the University of Oregon Medical School.<sup>5</sup>

Meanwhile, with Dr. Rovenstine's blessing, he went to Philadelphia in 1938 where he became Chief of Anesthesia services at Presbyterian Hospital.<sup>6</sup> He later had appointments on the staff of University of Pennsylvania

#### ROGER L. KLEIN

Medical School, Delaware County Hospital, and the Philadelphia Children's Hospital.

During the World War II years, he was one of only three or four anesthesiologists in the city. He had received a deferral due to what was considered civilian needs.

Dr. Haugen established a residency program at Presbyterian Hospital after attempts by two others had previously failed.<sup>6</sup> He trained a number of anesthesiologists during the next 10 years, including Drs. H. H. Stone, Benton D. King, and H. L. Price.<sup>7</sup> He later stated that during these years he was able to accumulate a modest nest egg that allowed him later to practice academic anesthesia.<sup>5</sup>

He was recruited to the University of Oregon Medical School in 1948 by Dr. W. H. Livingston, the new Chairman of the Department of Surgery. Dr. Haugen was apparently recruited because of the mutual interest in pain mechanisms that he shared with Dr. Livingston.<sup>8</sup> This shared interest would stimulate a very productive pain research program that will be mentioned in more detail below.

Dr. Haugen was apparently recruited because of the mutual interest in pain mechanisms that he shared with Dr. Livingston. The clinical teaching for all residency training at the University of Oregon Medical School at that time was almost universally conducted by physicians with private practices in the community hospitals. Funding

for the medical school was quite limited. The number of faculty was quite small. Teaching facilities were limited to a county hospital which had five operating rooms.

An anesthesia training program had been started by Dr. John Hutton who had come from the Mayo Clinic in 1938. The program trained both physicians and nurse anesthetists. One resident was taken per year. Training consisted primarily of the senior resident teaching the junior resident. Dr. Hutton had an active clinical practice in a community hospital and



Figure 1. Fredrick P. Haugen, M.D., Father of Oregon Anesthesiology

rarely supervised the residents at the County. He did conduct case discussion rounds in the evening. Residents would also rotate to the community hospitals to do cases with either Dr. Hutton or two other clinical faculty anesthesiologists.<sup>9</sup>

As the first fulltime salaried anesthesiologist, Dr. Haugen joined a medical staff that had very few fulltime faculty members (fig. 1.). He changed the structure of the residency program to one similar to that at Bellevue and Philadelphia Presbyterian Hospitals. He began to increase the number of residents, eventually reaching six per year. Medical student anesthesia teaching was initiated and he immediately started a pain clinic (the first on the West Coast).<sup>10</sup> Within two years he was able to recruit enough residents to drop the clinical nurse anesthesia programs. With these changes to the anesthesiology residency, he is recognized as establishing the first accredited anesthesiology training program on the West Coast.<sup>11</sup>

As previously stated, he immediately joined Dr. Livingston in an active bench research program studying pain mechanisms. During the next 10 years this partnership was to produce important work in pain perception and central nervous pain pathways. A sampling of their papers is listed in the references.<sup>12</sup>

He became the Chief Consultant in Anesthesia to the Portland Veterans Hospital in 1952, and the Portland Shriners Hospital in 1954. During the first eight years at Oregon, he was alone, the only anesthesiologist on the faculty and got very minimal assistance from community anesthesiologists. In his later years at Oregon, he assumed an unofficial but very influential role in the medical school administration.

He became an active member in the fledgling Oregon Society of Anesthesiology (OSA), and was its second delegate to the ASA in 1950.<sup>13</sup> He took a major leadership in a very active OSA educational program as the early minutes of the OSA testify.

Dr. Haugen was involved in both the ASA and the ABA in their formative years.

He was on the Board of Directors of the ASA from 1944-48, Business Editor of the journal *Anesthesiology* from 1946-48, and Second Vice President of the ASA in 1962. He was "one of a young ambitious group intent upon establishing a democratic constitution and bylaws for the ASA."<sup>6</sup>

His ABA activities include his certification in 1940, the second year it offered an examination. His diplomat number was 95. He was on the Board of Directors of the ABA from 1949-62, and served as the Chairman of the Examination Committee from 1952-58. He was on the Credentials and Residency Committee from 1960-62. He was Vice President in 1958-59 and President in 1960. As you can see, Fred's most involved, national anesthesiology organizational activity was with the ABA.

What role Dr. Haugen had with the examination committee and with the rest of the board's deliberations can only be conjectured. Issues, though, that the ABA examination committee was involved with during this time included contracting with the Educational Testing Service of Princeton, New Jersey to assist with development, administration, and analysis of the written examination, and discontinuing the survey examination. The board was also establishing and strengthening the residency program accreditation process, monitoring the performance of senior associate examiners, establishing a time limit of seven years for certification, and removed the 100% practice requirement for certification. It frequently discussed length of residency programs, licensure for foreign graduates, oral exam structure and grading, and the nomination process for ABA directorships.14

After Dr. Haugen retired, he authored the chapter on the history of the American Board of Anesthesiology in the previous mentioned book, *The Genesis of Contemporary American Anesthesiology* edited by Volpitto and Vandam.<sup>15</sup>

Dr. Haugen was a lifetime member of the Association of University Anesthetists from 1954 on. He served as a Director from 1959-61 and as President in 1960. He was the Chairman of the Anesthesia section of the AMA Committee on Operative Mortality in 1949-50, and a member of the Food and Drug Administration Committee on Anesthesia and Respiratory Drugs from 1966-68.

Dr. Haugen's accomplishments were many. Besides the "firsts" mentioned above we can also add that he trained over eighty anesthesiologists during his 22-year tenure at Oregon. He published over twenty-five scientific papers and book chapters with emphasis on pain mechanisms, nerve transmissions during hemorrhagic shock, and anesthesia teaching methods.

Perhaps his most important contribution, as has been alluded to, was his major influence in establishing physician-administered anesthesia as the primary means of anesthesia delivery in the Pacific Northwest. Within eight years after his arrival, nurse anesthesia training was on the way out. St. Vincent Hospital's School of Nurse Anesthesia had been established in 1909, claiming to be the first school of nurse anesthesia. It closed its doors in 1956. The minutes of the Portland St. Vincent Hospital Chronicles 1956, item 23 states, "Permission was asked (and granted), of the Provincial Council, to close the school of anesthesia. Changing educational trends in the field, as well as encroachment of medical anesthetists into the realm of nurse anesthesia, and financial losses influenced the local council to discontinue the school, in operation since 1909."13

For all of these accomplishments, Dr. Haugen received the highest honor of the ASA, the Distinguished Service Award for 1967.

He was certainly universally liked by his colleagues and his residents. They all felt that he was kind and unpretentious. These personal qualities appear to have allowed him to have the influence he had on the local and national scene. He was a practical man and that was his approach to anesthesia. As an example, in his oral history mentioned above, his interviewer, Dr. Burnell Brown, reminded him of the following anecdote. It seems that Dr. Brown had Dr. Haugen as a senior examiner at his oral board examination. The junior examiner had persistently questioned him about minute adrenergic mechanisms. When it was Fred's turn, he said, "Well, let's come out of that esoteric cloud. Tell me, how do you do a caudal?"<sup>4</sup> That was Fred's way.

Dr. Haugen retired in 1970, and moved to Arizona. He died in 1987.

I would like to come back to the original question I posed, as to whether these early pioneers were uniquely talented, or were just lucky to come first and fill a need.

I believe that the case has been made to include Fred as an "activator" in developing American Anesthesiology. His teaching and influence in establishing physician-administrated anesthesia, anesthesiology organizational activities, research, and the universal high regard in which he was held, make this so. This is especially true when you consider the very limited resources he had at his disposal. He was uniquely talented.

#### References

- 1. Stuart C. Cullen, "Emery A Rovenstine," in *The Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield IL: C. C. Thomas, 1982): 71-87.
- 2. PP Volpitto and LD Vandam, eds., *The Genesis of Contemporary American Anesthesiology* (Springfield IL: C. C. Thomas, 1982): table of contents, xv.
- 3. Diane Haugen Sherwood and David Haugen, personal communication.
- 4. Interview with Frederick P. Haugen, MD, by Burnell R. Brown, MD, 1982, John W. Pender Living History of Anesthesiology Collection, Wood Library-Museum of Anesthesiology, Park Ridge, IL.
- 5. Rex Underwood, MD (Resident and eventually Professor of Anesthesiology at the University of Oregon Medical School Division of Anesthesiology), personal communication.
- 6. "We Salute Frederick P. Haugen," Anesth & Analg 47:3 (1968): 283-284.
- 7. LD Vandam, "Robert D. Dripps," in *The Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield IL: C.C. Thomas, 1982): 143-159.
- 8. Clare G. Peterson, MD (Emeritus Professor of Surgery of the Department of Surgery, The Oregon Health Sciences University, Portland OR), personal communication.
- 9. Interview with Marjory Noble, MD (Anesthesiology Resident, 1940-1942, Oregon Medical School), by Linda Weimer (Medical History Librarian OHSU), 1998.
- 10. P Carlyle Green, MD (Dr. Haugen's first recruited resident at Oregon), personal communication.
- 11. William K. Hamilton, MD, personal communication to Wendell Stevens, MD.
- Frederick P. Haugen. "A Laboratory Investigation of Pain," Anesthesiology 14 (1953): 456-458; JM Brookhart and WK Livingston "Functional Characteristics of Afferent Fibers from the Tooth Pulp of the Cat," J Neurophysiology 16 (1953): 634-642; Frederick P. Haugen. "Recent Advances in the Neurophysiology of Pain," Anesthesiology 16 (1955): 490-494; R Melzack. "Responses Evoked at the Cortex by Tooth Stimulation," Am J Physiology 3 (September, 1957): 190.
- 13. Minutes of the Oregon Society of Anesthesiology, September 1956.
- 14. Results of research conducted by Frank Hughes, executive Vice President of the American Board of Anesthesiology, submitted to Wendel Stevens, MD and Roger Klein, MD, April 2002.
- 15. FP Haugen, "A History of the American Board Of Anesthesiology," in *The Genesis of Contemporary American Anesthesiology*, ed. PP Volpitto and LD Vandam (Springfield IL: C. C. Thomas, 1982): 212-221.

r. Benjamin Etsten, late Professor and Chairman of the Department of Anesthesiology, Tufts New England Medical Center Hospitals, spent some time in Wisconsin General Hospital with Dr. Ralph Waters as an exchange resident, although this is not widely known.<sup>1</sup> To those of us who were trained under Etsten,

### Naosuke Sugai

## BENJAMIN ETSTEN, M.D., AS A DISCIPLE OF RALPH WATERS, M.D.

however, this is well known, as Etsten occasionally talked about Waters with sincere admiration and respect. The author tried to ascertain Etsten's association with Ralph Waters through documents left around them.

#### Career of Benjamin E. Etsten, M.D.

Benjamin Etsten was born on May 24th, 1908 in Lawrence Massachusetts. He went to Tufts College, receiving a B.A. in 1932. His medical education was at University of St. Andrews, Dundee, Scotland, graduating in 1936 (fig. 1). He interned at Albany and Ellis Hospitals in New York and served as a resident in anesthesiology from 1938 to 1941, also at Albany Hospital, under F. A. D. Alexander,



Figure 1. Benjamin Etsten, M.D.

M.D., a disciple of Ralph Waters. In 1941, with the recommendation by Alexander, he became an exchange resident in anesthesiology at Wisconsin General Hospital under Ralph Waters. In his CV of 1948, Etsten states that he was an exchange resident at Wisconsin General Hospital in 1941.2 After a brief appointment at Saranac Lake General Hospital from 1942 until he moved to Tufts University in 1948, he held teaching positions at Albany Medical School. In 1952 he was appointed as Professor and Chairman of the Department of Anesthesiology, Tufts New England Medical Center Hospitals, built a fine clinical and research department and retired in 1973. He died on July 11, 1987, shortly after his beloved wife who had been a pediatrician. He was one of the eight founding members of the Association of University Anesthetists, and served as its president from 1967 to 1968.3

#### Documents on the association between Etsten and Waters

To be found in the Waters' letter file in the University of Wisconsin-Madison Archives at the Steenbock Library are letters of correspondence between Ralph Waters and his colleagues regarding Benjamin Etsten, and letters between Etsten and Waters: three letters of Etsten to Waters,<sup>4</sup> two letters of Waters to Etsten,<sup>5</sup> with one letter by Dr. Malcolm Hawk to Etsten<sup>6</sup> (written by order of Waters) and four letters of F. A. D. Alexander to Waters,<sup>7</sup> as well as two letters of Waters to Alexander mentioning Etsten.<sup>8</sup> Etsten's CV of 1948 is also in his file at the WLM.<sup>2</sup>

#### Communication among Waters, Alexander, and Etsten

Alexander wrote to Waters on Thursday, December 26, 1940, mainly to introduce Etsten to Waters. He is a remarkable letter writer and wrote this hand written letter of four pages mentioning his family in Canada and life there during the war. He writes,

> Benny Etsten expects to be in Madison on Sunday [December 29, 1940]. I am very grateful to you for taking him. He has looked forward to the possibility of going to Madison for a little while for months....Etsten is a good technician. He is scrupulously honest in his thinking and has a good mind. He's been, by far, the best scholar and 'student' of our group, and has a sincere interest in teaching and research.<sup>7</sup>

To this letter of Alexander, Waters responded on December 31, 1940. "Yesterday we asked the Dripps family and the Wangeman family for dinner, expecting that your Doctor Etsten would be with us. However, we had a very nice dinner anyway although we were sorry not to have him."<sup>8</sup> Etsten did not arrive in Madison on Sunday, December 29, but most likely he arrived there by early January, as evidenced in the next letter of Alexander to Waters dated January 30, 1941 in which he states:

> Etsten's letter to me and to the boys have been starry-eyed with enthusiasm for Wisconsin. I have long felt that he would profit greatly by an opportunity to come to you for a while and his exuberance thoroughly substantiates my

expectations. It has seemed to me that he possesses many potentialities as a researcher and I have felt guilty at having him here where there was a relatively small opportunity or stimulation for research.<sup>7</sup>

Through these letters of Alexander, one is struck by his sincerity, humbleness and eagerness to help Etsten to develop his career, although he is of the same age with Etsten. He concludes, "I have written Etsten that he is to stay as long as he wants and that if we need him badly we will call him home. It will be splendid that he is to have the opportunity of going up to the Clinic for a day or so."<sup>7</sup>

The situation at Albany, however, changed rapidly, as reported by Alexander to Waters on Friday, February

7, 1941. On Tuesday, February 4, a cyclopropane explosion occurred at the Albany Hospital during anesthesia for a 42 year-old lady with acute surgical abdomen, a metal oral airway injuring her pharynx with ensuing bleeding. In addition, two senior residents having left-Etsten to Wa-

Etsten taught Waters' philosophy, passed on to him through Alexander, as well as directly from Waters, to his followers and trained them to become physician teachers, including chairmen of anesthesiology in four national medical schools in Japan.

ters, and Gleason to Ivan Taylor in Philadelphia—the clinical load at Albany became heavier. Alexander writes, "It is exceedingly busy here and I have written Etsten asking him to come back before the fifteenth [Saturday]." Further, Etsten's several months-old daughter, living with his wife in Albany, became ill. Alexander adds, "We could get along as far as the clinical work is concerned without him, but his wife has had such a difficult time since he has been away that I feel he should really return."<sup>7</sup> Waters responded on February 10, "I hope you won't mind if I describe the occurrence to the fellows on the service because I think it likely to be extremely useful to them in the way of warning...I think Etsten is planning to leave at the end of this week."<sup>8</sup>

Thus, most likely Etsten stayed at Madison from early January to Saturday, February 15, 1941. Although the stay was short, Etsten was apparently much impressed with Waters and his department, and especially the scientific side of his department was new to Etsten. Etsten wrote his letter of thanks, written in blue ink, to Waters on March 16, 1941 stating, "My dear Dr. Waters, I wish to express my gratitude to you and the members of your department for your instruction and hospitality during my stay in Madison. The only regret I have was that I was not able to stay longer. However, I believe that I have enriched myself in many ways."<sup>4</sup> He further writes about the work he was doing with Harold Himwich, a pharmacologist at Albany, and F. A. D. Alexander on sensitivity of the newborn rats to barbiturates, the results of which were published later as his first research paper.9

## Waters' Philosophy through Alexander and Etsten

F. A. D. Alexander found in Etsten ability as a clinician, as well as an academic anes-

thesiologist, and did his best to send him to Waters' department for further study. Etsten stayed at Waters' department probably from January to February 15, 1941, approximately six weeks. Waters, responding to Alexander's wish, taught Etsten and treated him with kind hospitality in Madison.

Although Etsten's stay with Waters was short, it made a great impact on him. Etsten taught Waters' philosophy, passed on to him through Alexander, as well as directly from Waters, to his followers at Albany and Boston and trained them to become physician teachers. Many of them became leaders in anesthesiology at academic institutions and prestigious hospitals worldwide, including chairmen of anesthesiology in four national medical schools in Japan.

#### Acknowledgements

I should like to thank Dr. Lucien Morris for suggesting to me to speak about Dr. Etsten at Ralph Waters Jubilee Conference, Dr. Alex Evers to introducing me to the Wood Library-Museum, and Ms. Judith Robins and Mr. Bernie Schermetzler for finding materials about Etsten at the WLM and the University of Wisconsin-Madison Archives, respectively.

#### References

- 1. Lucien Morris, letter to Naosuke Sugai citing Etsten's CV in the American Board Directory, January 9, 2002.
- 2. Benjamin Etsten, CV, July 29, 1948, Etsten file, Wood Library-Museum of Anesthesiology, Park Ridge, IL.
- 3. EM Papper, "The origins of the Association of University Anesthesiologists," *Anesth & Analg* 74 (1992): 436-453.
- 4. Benjamin Etsten, letters to Ralph Waters, March 16, 1941, September 18, 1941, June 4, 1943, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 5. Ralph Waters, letters to Benjamin Etsten, September 24, 1941, May 14, 1943, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 6. Malcolm H. Hawk, letter to Ralph Waters, September 25, 1941, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- F. A. D. Alexander, letters to Ralph Waters, December 26, 1940, January 30, 1941, February 7, 1941, February 27, 1942, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 8. Ralph Waters, letters to F. A. D. Alexander, December 31, 1940, February 10, 1941, Ralph Waters Papers, University of Wisconsin-Madison Archives, Madison, WI.
- 9. BE Etsten, FAD Alexander, and HE Himwich, "Comparative toxicity of pentobarbital in the newborn and adult rat," *J Lab and Clinical Med* 28 (1943): 706.

he "Red Book" is well known to all those who have any interest in the life and work of Ralph Waters. The first edition of the Selected papers and addresses of Ralph Milton Waters, M.D. with a secondary title Commemorating the award of Honorary Degree, Doctor of Science, conferred June 12, 1957 at Western Reserve

## David J. Wilkinson

## THERE MAY BE MORE TO A BOOK THAN IS SEEN ON THE COVER

*University, Cleveland, Ohio* is an excellent reference source for the fundamental papers produced by Waters. The recognition of a book by its title can, however, be misleading, and there may be more contained within the book than the casual observer realises.

#### J. Alfred Lee

J. Alfred Lee was born in 1906 in Lancashire, his father was a local minister, and Alfred took up medical studies, qualifying in 1927 in Newcastle. In 1930 he moved to Southend-on-Sea as a general practitioner with sessions in anaesthesia at the local hospital. He took his D.A. some ten years later and, at the inception of the National Health Service in 1948, became a Consultant Anaesthetist at Southend Hospital. He had already achieved fame in his chosen profession at this early age. He had published a paper on serial spinal analgesia in the Lancet in 1943 (it is interesting to note in passing that Lee never used the term spinal anaesthesia in his life, he always referred to it as spinal analgesia!) and in 1947 he published the first edition of his Synopsis of Anaesthesia. This book was the result of a realisation of the gap in useful small texts on anaesthesia and would run to multiple further editions that are still in print today.

In 1949 he started the first outpatient Clinic in the U.K. and in 1955 he opened the first postoperative ward in a general hospital. His

political contributions were also increasing, some of the positions he held were as an examiner in Final FFARCS, Assistant Editor of Anaesthesia, President of the Anaesthetic Section of the Royal Society of Medicine (1959-60), and President of the Association of Anaesthetists of Great Britain and Ireland (1972-73). His portrait hangs on the stairs of 9 Bedford Square to this day and smiles at all who pass. Alfred retired because he had to in 1971 at the age of 65, but he continued to give anaesthetics in various locum capacities. (It is interesting to note that this is the year I qualified in medicine!) Subsequent international recognition of his contributions was noted by his award of the Carl Koller Gold Medal in 1984, the Gaston Labat Lecture for the American Society of Regional Anaesthesia in 1985, and the T.H. Seldon Distinguished lecturer of 1986.

I first met Lee in the late 1970s when my interest in the history of our speciality began to emerge. He was a very kind man who had immense personal charm and appeared to have time and interest in everyone he met. Always willing to provide help from his vast stores of knowledge, Lee was a great help and inspiration to me. He would listen to a lecture and say very little, but in the next day or two a short hand-written letter would arrive with a series of positive suggestions and/or corrections, with the final line of "no need to reply, yours aye, Alfred." He was a big-hearted and inspiring man.

#### The "Red Book" appears

In 1989 I received a phone call asking me to come and see him at his house in Essex. He told me that his angina was worsening and that he wanted me to have some of his books and papers. I attempted to refuse, but was firmly told that he knew what was going on and wanted me to have them. There were many books, pamphlets, old individual journals, a torn out sheet from the obituary page of the *British Medical Journal* for every anaesthetist who had died in recent times (that he insisted that I continue to collect, which I do but I am not sure why!?) and amongst them all the "Red Book."

I loaded up my car with these gifts, and Lee insisted that I promise him one further thing. He was adamant that he did not wish his books to lie untouched in some large library, but that they should be used and loved as he had used them. In turn I had to promise that when the time came that I felt my death was imminent, I was to do as he had done and pass on this repository to another younger enthusiast, who would use them in turn. I agreed. Lee died at home within the month at the age of 83, and I miss him still.

I am certain that I have not fully explored all of these gifts as yet, but the 'Red Book' struck me of immediate interest and I hunted through it avidly.

#### **Ralph Milton Waters**

Ralph Waters' biography has been reviewed many times by several authors and needs no further repetition at this time. He was born some twenty years before Lee and died aged 96, some ten years before him. I have no knowledge of whether they ever met and have no wish to form a close comparison between their very different careers, except in some unanswered questions. The "Red Book" is a fantastic historical resource with papers that encompass Waters' career from 1919 to 1946. The topics indicate his mastery of many fields, concise style of writing, acute observation of clinical and research detail, his innovative genius and his powers of persuasion on political topics. He also had an abiding love of the history of the

speciality and a great appreciation of John Snow. Here we find "Why the professional anaesthetist? 1919;" "High pressure chest inflation resuscitation 1920;" "Carbon dioxide filtration in inhalation anaesthesia 1924;" "Spinal anaesthesia;" "Closed endobronchial anaesthesia 1932;" "Cyclopropane 1934;" "History of endotracheal anaesthesia 1933;" "The teaching value of records;" "Sodium ethyl 1 methyl butyl thiobarbiturate

The "Red Book" is a fantastic historical resource, with papers that encompass Waters' career from 1919 to 1946. The topics indicate his mastery of many fields, concise style of writing, acute observation of clinical and research detail, plus his innovative genius and his powers of persuasion on political topics.

1936;" "Pain relief for children 1938;" and a paper on obstetrics of 1940. The new edition of this book, re-edited by David Lai and published by the Wood Library-Museum of Anesthesiology, makes this important volume available again to all.

#### Lee's copy of the "Red Book"

What else is contained, then, in the book Lee gave me? There are a variety of handwritten annotations by Lee within the margins of the book. These often refer to specific dates in Waters' career development, and were no doubt subsequently included in Lee's *Synopsis* of Anaesthesia. He also highlights Waters' predictions on thiopentone written in 1930. These all make very interesting reading. The book was sent to Lee by three of the great names of U.S. anaesthesia, whose signatures and joint message of good wishes appear on the front cover. These are Robert Hingson, Hamilton Davis, and Leslie Rendell-Baker. They wrote "To Dr. J. Alfred Lee, as a memento from Western Reserve Univ [sic] to a respected colleague," and it is dated September 13, 1960. Above this appears the pasted-in signature of Ralph Waters, and Lee has added his own address, and I have now added my bookplate. On the page outlining Waters' salient life points, Lee has added the dates and places of Waters' birth and death. The special "Red Book" is now even more special.

#### Letters

In addition to these annotations there are some letters and papers included within the book that are additions to the original printing. There is a "Memorial resolution of the Faculty of the University of Wisconsin on the death of Emeritus Professor Ralph Milton Waters," a double-sided sheet of A4 paper that reviews his life and contributions to his speciality. The memorial Committee comprised John T. Mendenhall, J. Leroy Sims, William P. Young and Betty J. Bamforth, Chairman. It makes fascinating reading.

There is also a letter from Darwin Waters, written to Lee on September 9, 1981. It appears to be a response to a letter from Lee asking for obituary notices about his father. Darwin writes:

> My father's obituary notices were few and rather on the brief side for the most part. I am certain he would have preferred even less; he tended to be overly modest in my opinion. If publicity might help the anesthesia profession, he would go along with it but otherwise he avoided it like the plague. I do not know if he attempted to abort any lengthy obituary notices but I would not be surprised if he had done that. In addition, I think that there were

very few left in the editorial offices of the journals who had ever met him.

There are three published obituaries. The first is rather sparse from the ASA Newsletter, dated February 1980, and bears out Darwin Waters' views. The second is undated and has no provenance, but looks like a newspaper obituary. It gives few extra insights into this great man, and is limited in depth. The last one is from Geoffrey Kaye in Melbourne, who was a long time friend of Waters. It gives a much fuller picture than any of the others. There are references to his work, his character, and his legacies, and there is a warmth that comes from the words of a true friend. He uses the delightful phrase that towards the end of his life Waters was "tired and willing to go."

Finally, there is a short letter from Robert Macintosh to Lee about Waters' obituaries. He highlights Kaye's comments with the words, "brief but charming note brings out something of the atmosphere which Ralph engendered." He adds, "I think R.W. is a case of perishing too late for a worthy obituary."

#### Final thoughts and enigmas

I will always be grateful that one of the great men of U.K. anaesthesia gave me part of his legacy to take forward, allowing others to gain glimpses of the past. I shall honour my promise to him to hand it on in turn. Men like Waters and Lee create, during their lifetimes, a legacy that can soon be lost to succeeding generations unless there are active steps taken to preserve its value. It is often very difficult for individuals to determine what is of value at the time, and efforts to preserve as much material as possible in archival repositories like the WLM and AAGBI will always bear fruit in the future. The "Red Book" has assisted with the legacy of Waters.

One of the truly unsolved enigmas of Waters' life was in his retirement. Why did he shun his chosen speciality for 30 years post retirement, with only one major sally into the limelight to São Paulo, Brazil, at the behest of Carlos Parsloe, to attend the Third World Congress in 1964? This was more a tribute of Carlos' persuasive efforts on Mrs. Waters than Ralph Waters' desire to contribute.

Lee spent his retirement within his speciality encouraging younger consultants, continuing to research and speak, and providing his profession with access to all that he had accumulated within his mind over his lifetime. Waters, by contrast, retired completely, grew oranges, and never talked about anaesthesia again. I do not write this to suggest that one was right and one was wrong, for, presumably, both were happy with their choices. But I wonder at the motivating forces behind the decision processes. Why did a man like Waters, who believed so passionately about developing teaching and training within his speciality, and who could have contributed so much more, stop so completely?

Finally, when one looks at the cover of any book it is important to remember that the contents may be greater than imagined by a cursory glance at a title written on the spine of the volume. It may also act as a catalyst to ask questions on aspects of anaesthesia that have not been developed to date. t is surely appropriate that this paper is being presented on 7th day of June, the day on which, in the year 1811, Simpson was born in the small town of Bathgate situated, at that time, on the main road between Edinburgh and Glasgow. At the age of fourteen he entered the University of Edinburgh and obtained his medical qualification

### James P. Payne

## THE USE AND ABUSE OF CHLOROFORM

in 1832, being among the last candidates to be examined in the Latin language; thereafter this became optional. Simpson began work in the Department of Pathology where the professor encouraged his interest in midwifery and he was appointed Lecturer in that subject in 1838, and elected to the Chair of Midwifery in 1840.

When news of the discovery of ether reached the U.K., James Simpson was among the first to use it in his obstetric practice. He employed it first on 19 January 1847, after which the mother made an excellent recovery, which encouraged him to use the drug freely. Nevertheless, he was dissatisfied because of the technical difficulties involved in its administration and the frequency of nausea and vomiting associated with its use. Accordingly, at the instigation of David Waldie, a student contemporary who, after qualifying as a doctor, switched to chemistry, began to experiment, let it be said, on himself and his friends with chloroform. Eventually, on 8 November, 1847 Simpson used chloroform to relieve the pains of childbirth on a doctor's wife who was greatly pleased with the new drug. Simpson was not slow to communicate his new discovery to his colleagues. He presented a paper to the Edinburgh Medico-Chirurgical Society on 10 November, a written pamphlet was published on 15th of that month, and his classic paper appeared in the Lancet a few days later.<sup>1</sup>

Simpson's success with chloroform was immediate and its advantages were so apparent that, with the ardent support of the Professor of Surgery, James Syrne, its use was extended to general surgery throughout the Royal Infirmary of Edinburgh. It soon surpassed ether in popularity, a rivalry that was to continue into the twentieth century and to polarise into the Edinburgh and London Schools of Anaesthesia.

Although the use of chloroform anaesthesia was readily accepted for surgical procedures, Simpson encountered problems in his use of chloroform to relieve the pain of childbirth. His advocacy of chloroform for this purpose stirred deep emotions and aroused bitter opposition, particularly among the clergy and the elders of the Established Church, none of whom was likely to suffer the pains of childbirth but who nevertheless accused Simpson of arrogance in attempting to thwart what had been ordained by God. In pursuit of their case they quoted the Biblical text "In sorrow shalt thou bring forth children" (Genesis 3:16). Simpson however also knew his bible and he retorted with the text, "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 instead thereof" (Genesis 2:21). This particular controversy was ended abruptly in 1853 when John Snow was summoned to Buckingham Palace to give Queen Victoria chloroform for the birth of Prince Leopold. When the Queen of England was willing to accept the benefits of chloroform, who would gainsay it? Some months later Snow was called to Lambeth Palace to administer chloroform to the daughter of the Archbishop of Canterbury during her confinement. Chloroform was now accepted in polite society and made complete in 1857 when Snow again administered chloroform to Queen Victoria, for the birth of Princess Beatrice.<sup>2</sup>

But chloroform was not without its problems. Within a few weeks of Simpson's introduction of the drug into anaesthesia, the first recorded death under chloroform had occurred. On 28 January 1848, a healthy fifteen year old girl, Hannah Greener, died suddenly on the operating table just as the surgeon was about to remove an in-growing toenail,<sup>3</sup> and a few days later a young drug warehouseman collapsed and died after inhaling chloroform from his handkerchief.<sup>4</sup> Simpson was convinced that the problem of sudden death under chloroform could be overcome by a proper attention to respiration and by the rapid induction of deep anaesthesia. John Snow was less convinced; he investigated the concentration of chloroform associated with cardiac arrest and demonstrated that such arrests occurred coincidentally with, or even before, respiratory failure, if the inhaled concentration reached 8-10%, and he set about designing a suitable vaporiser to deliver concentrations of chloroform that did not exceed 4%.

It is interesting that John Snow never had a death under chloroform anaesthesia during his whole professional career and that James Simpson had only one death under the drug towards the end of his long career, a death that could be attributed to the surgical management rather than to the anaesthetist. That might suggest that when sudden death did occur, it was more likely to be due to the anaesthetic management rather than to the drug.

It may seem strange to us today that more than sixty years were to pass before A. Goodman Levy was to carry out the definitive experiments that established ventricular fibrillation as the main cause of death under chloroform anaesthesia. It needs to be remembered however that during the period in question there were few specialist anaesthetists in practice and even fewer opportunities for clinical research, which tended to be epidemiological rather than fundamentally clinical. John Snow himself made his reputation as an epidemiologist who focused on the management of cholera, and Levy's original research was carried out on a series of animal experiments in basic sciences laboratories. For those interested, Levy's work on chloroform and the heart, over a ten-year period, is summarised in his monograph entitled "Chloroform Anaesthesia."5

During the years that followed, the use of chloroform came to be consolidated, particularly in Scotland, and by the outbreak of World War II it was in common use. Although, as the war progressed, the trend was away from chloroform to newer drugs, such as the barbiturates, trichloroethylene, and cyclopropane. However, some of us who were students during the war were prepared to challenge the accepted wisdom of that period, and the reasons were not hard to see. First, as war time students we were essentially self-taught, although we were given some rudimentary instruction. Second, chloroform was easy to use without specialised equipment, especially useful, for example, in domicilary midwifery. And third, for those of us studying in Edinburgh, there was, of course, in the background the prestige of Sir James Simpson and of the School itself.

The end of the Second World War brought substantial changes to the practice of anaesthesia in the United Kingdom, most significant perhaps being the introduction in 1948 of the National Health Service (NHS), which provided funds for full-time consultant appointments throughout the hospital system and further funds for anaesthetic apparatus and monitoring equipment, as well as training programmes. New techniques were developed, and intravenous induction of anaesthesia became wide spread, as did the use of neuromuscular blocking drugs and the associated control of respiration, which led to the development of various types of ventilators. Accurately calibrated vaporisers were introduced, as were blood-gas and respiratory analysers, and ECG and pulse monitors became routine for major surgery.

More important, perhaps, was exposure to developments elsewhere in the world. In particular, the monograph, edited by Ralph M. Waters in 1951<sup>6</sup> was a landmark publication that greatly excited those of us who believed in chloroform and encouraged us to become involved in further research with the added advantage of more sophisticated methods of analysis. As a result, we have learned to control the problems of inhalation induction by the use of intravenous barbiturates, we have learned to avoid the difficulties of adrenaline-both endogenous and exogenous, and we have learned to ensure adequate oxygenation and to prevent hypoxia by increasing the inspired oxygen concentration and ensuring adequate ventilation.

On that basis it can be argued that Waters' reassessment of chloroform in 1951, and his conclusion that chloroform did not deserve to be abandoned as a general anaesthetic, is as true today as it was in 1951. A further reason for the retention of chloroform as an anaesthetic is the great demand in many parts of the world for a safe, volatile inhalation, which is cheap, potent, non-explosive, and easily transported and stored. I submit that chloroform meets these criteria, and I would further submit that if the pharmaceutical industry could make money out of chloroform it would still be available.

On the subject of chloroform abuse, apart from its potential for addiction, the aphrodisiac properties of the drug soon became

well known.<sup>7</sup> It was used, particularly, to heighten sexual pleasure and to enhance performance in preference to other volatile anaesthetics because of the ease of administration, and because it is relatively easy to breathe. Unfortunately, the use of chloroform is not confined to consensual

Waters' reassessment of chloroform in 1951, and his conclusion that chloroform did not deserve to be abandoned as a general anaesthetic, is as true today as it was in 1951.

sex. During the last twenty years, as an expert witness, I have been summoned to testify in the criminal courts in cases where it was alleged that chloroform had been used to facilitate rape, both heterosexual and homosexual, as well as paedophiliac abuse and murder.<sup>8</sup> Predictably, none of these cases was straight forward and they were further complicated by the adversarial system in English Law, which sometimes tends to obscure rather than reveal the truth.

In the summary that I submitted for this meeting I predicted that we have not heard the last of chloroform abuse, but I had not anticipated that my prediction would be confirmed as soon as it was. During the week that I received confirmation of the acceptance of the submission, I was telephoned by a firm of solicitors in the Edinburgh area who sought my advice about a client who had been charged with murder.

By a strange coincidence the alleged murder took place in the small town of Broxburn, located just a few miles east of Bathgate, the birthplace of Sir James Y. Simpson. It was alleged that the accused crept into his partner's room after she had gone to sleep and applied a cloth soaked in chloroform to her nose and mouth until she was motionless. Thereafter, he dressed her, carried her out into the night at subzero temperatures, and left her under a hedge in a neighbour's garden.

Initially the victim's death was treated as accidental, caused by a combination of hypothermia and amphetamine, a drug that she apparently used regularly. However, in the course of the following months, her partner apparently boasted of how he had killed her to some friends, one of whom reported the matter to the police. An investigation was started and chloroform was found in the victim's blood and liver specimens, which had been retained. The accused came to trial; he was found guilty by a majority verdict and given a life sentence.

From the forensic aspect, the blood level of

chloroform was only 31mg/litre, which is not an anaesthetic level, whereas the concentration in the liver was exceptionally high at 1064 mg/kg,<sup>9</sup> coupled with the fact that at autopsy the lesser curvature of the stomach showed evidence of an acute haemorrhagic gastritis, and must raise the possibility that the chloroform was ingested and not inhaled.

And that is not the end! During the last week of May this year, it was reported by the British Press that two female television presenters, who shared a room in a friend's house during the Cannes Film Festival alleged that they had been chloroformed in their sleep and robbed of money and jewellery. It remains to be seen what develops in that case.

#### References

- 1. JY Simpson, "On a new Anaesthetic Agent, more efficient than sulphuric ether," *Lancet* 2 (1847): 549-550.
- 2. RS Atkinson, James Simpson and Chloroform (London: Priory Press Ltd., 1973): 73 76.
- 3. TN Meggison, "The fatal case of chloroform near Newcastle," *London Medical Gazette* XLI (1848): 254-255.
- 4. R Jamieson, "Accidental death from Chloroform," London Medical Gazette XLI (1848): 318-321.
- 5. AG Levy, Chloroform Anaesthesia (London: John Bale, Sons and Daniellson, 1922).
- 6. RM Waters, Chloroform: a study after 100 years (Madison: University of Wisconsin Press, 1951).
- 7. DW Buxton, Anaesthetics, Uses and Administration (London: HK Lewis, 1988): 149-150.
- 8. JP Payne, "The Criminal use of Chloroform," Anaesthesia 53, (1998): 685-690.
- 9. R. J. Flanagan, personal communication.

The first British medical clinical subspecialist anaesthetic organisation to be formed was the Neuroanaesthetists' Travelling Club in 1965.<sup>1</sup> First of all we need to look at the background of the development of specialties within anaesthesia. The establishment in the United Kingdom in 1948 of a National Health Service

## Jean Horton

## A HISTORY OF THE NEUROANAESTHESIA SOCIETY OF GREAT BRITAIN AND IRELAND

coincided with the growth in highly specialised fields of surgery and medicine. With the development of surgical specialties such as neurosurgery, plastic surgery, paediatric surgery, thoracic, and cardiac surgery, there was a need for anaesthetists who would devote all or most of their time in administering anaesthetics for one specialty.

It should be noted, or remembered, that neurosurgery or surgical neurology had already been developing in the United Kingdom before the Second World War (1939-1945). In the 1920s the pioneer North American neurosur-

geon, Harvey Cushing (1869-1939), trained three of the founders of British neurosurgery: Norman Dott of Edinburgh, Geoffrey Jefferson of Manchester, and Hugh Cairns of the London Hospital and Oxford. Cushing was also well aware of the importance of the anaesthetist in the neurosurgical team for he wrote: "Regardless of the drug to be employed, it is essential that it be administered by an expert, preferably by one who makes this *his* specialty."<sup>2</sup> Please note that in this context, *his* also refers to *her*.

In 1927, when Cairns returned to London



Figure 1. Left to right: Dr. Olive Jones, with Sir Robert and Lady Macintosh in their garden in the 1920s. after training with Cushing, he was determined to adopt the specialist team approach, which he had seen in Boston, and have his own anaesthetist and neuropathologist. He persuaded the Rockefeller Foundation to fund a fulltime anaesthetist to work with him at the London Hospital. The anaesthetist appointed was Dr. Olive Jones, who was probably not only the first woman neuroanaesthetist, but also pos-

He persuaded the Rockefeller Foundation to fund a fulltime anaesthetist to work with him at the London Hospital. The anaesthetist appointed was Dr. Olive Jones, who was probably not only the first woman neuroanaesthetist. but also possibly the first fulltime salaried specialist anaesthetist in London and the United Kingdom.

sibly the first fulltime salaried specialist anaesthetist in London and the United Kingdom. Olive Jones was one of the first European visitors to Ralph M. Waters' Department in Madison and spent a year, 1946–1947, with him<sup>3</sup> (fig. 1).

Before the appointed day in July 1948, when the National Health Service came into being, there had

been a serious risk that anaesthetists would not be given the rank and status of specialists or consultants, as they were to be known. However, due to the combined work of Dr. Archibald Marston, the first Dean of the then recently founded Faculty of Anaesthetists of the Royal College of Surgeons of England, and Sir Alfred (later Lord) Webb-Johnson, then President of the Royal College of Surgeons of England, anaesthesia was recognised and accepted as a specialty with equal status and pay to that of the surgeons and physicians.

By 1960 almost every university teaching hospital and regional hospital board had created a neurosurgical unit and certainly in Edinburgh and Glasgow the consultant (specialist) anaesthetists devoted all their time to neuroanaesthesia. It was then becoming apparent that there was a need for meetings where neuroanaesthetists could discuss problems and present work pertaining to their special interests. The scientific meetings of the Association of Anaesthetists of Great Britain and Ireland (AAGBI) and the regional anaesthetic societies did not now fulfill the specialised needs of neuroanaesthetists and the other subspecialist anaesthetists.

The first initiative to overcome this problem was made by Dr. Allan Brown, the senior consultant anaesthetist to the Department of Surgical Neurology in Edinburgh. In 1960 Dr. Allan Brown was Honorary Secretary of the Scottish Society of Anaesthetists. He suggested that discussion groups, initially of neurosurgical, thoracic, and paediatric anaesthetists be formed.

The neuroanaesthetists from the neurosurgical units in Scotland, Edinburgh, Glasgow, Aberdeen, and Dundee welcomed this idea and held successful meetings once or twice a year in their various units.

In 1964 Professor Andrew Hunter from the Manchester Neurosurgical Unit suggested that as there was a growing interest in anaesthesia for neurosurgery, that a Neurosurgical Anaesthetists' Society should be formed in the United Kingdom. Allan Brown informed Andrew Hunter of the success of the Scottish group and offered to put their experience at his disposal at a meeting that they would be holding in 1964 with the neuroanaesthetists in Newcastle, with whom they had close links because of Scottish connections. The neuroanaesthetists at this meeting suggested to Andrew Hunter that an informal group, in the nature of a travelling club, was preferable to a formal society. He agreed to invite the Scottish group to meet in Manchester in 1965, and would also invite the neurosurgical anaesthetists from England and Wales.

The advantages of an informal group were that it was more likely that work in progress would be presented and that papers would be given by neuroanaesthetists who would not have the opportunity or inclination in a more formal environment.

#### **The First Meeting**

Andrew Hunter accordingly arranged a meeting of neurosurgical anaesthetists, which was held in the Manchester Royal Infirmary on the afternoon of Saturday 18 September 1965. He also invited intending participants to submit papers for presentation.

Forty anaesthetists who had a special interest in neurosurgery were present. They represented twenty neurosurgical units. Olive Jones from Oxford who, as I have already mentioned, had visited Ralph Waters' department was present. At that time I was working with Allan Brown in Edinburgh.

The meeting took place in the afternoon and six papers were presented, reflecting current practice and some of the problems of neuroanaesthesia at that time.

Three of the papers made up a symposium on the use of hypothermia for intracranial aneurysm surgery. Jan Hewer from the Middlesex Hospital in London described his technique of hypothermia, which included the administration of a large quantity of intravenous alcohol in order to maintain cerebral, coronary, and cutaneous vasodilatation, without hypotension. Victor Campkin from Birmingham presented an innovative technique of hypothermia and circulatory arrest at  $30 - 31^{0^{\circ}}$  using an intracardiac pacemaker, and Noel McCleery from Sheffield described his method of surface cooling.

Dr. D. Potter, a trainee anaesthetist from Cambridge, showed how changes in the electrocardiogram could assist the surgeon in the correct insertion of a Pudenz shunt. Dr Allan Brown of Edinburgh described his successful and safe technique for the control of status epilepticus using a continuous infusion of a low dose of thiopentone, and Dr. R. I. Keen of Manchester demonstrated how the venous pressure could vary during controlled respiration.

Following discussion among all those present, it was agreed that meetings of this group should continue and maintain their informal format. The group would be known as the 'Neurosurgical Anaesthetists Travelling Club.' Dr. Jan Hewer agreed to organise a meeting to be held in the autumn of 1966 at the Middlesex Hospital in London. Offers for future meetings were received from Edinburgh for 1967 and Cardiff for 1968.

From the response to the first three meetings it was obvious that there was much interest and a need for such a group. At the business meeting held in Edinburgh in 1967 it was confirmed that the group be known as 'The Neurosurgical Anaesthetists Travelling Club,' and agreed that an annual meeting should be held in a neurosurgical unit in different parts of the United Kingdom.

Until 1993 the meetings of the Club retained their informal nature, with no officers or constitution, and there was no annual subscription. There was no charge or registration fee for these meetings, the expenses usually being covered by local sponsors and the generosity of hospital managers.

The membership list was confined to holders of permanent appointments in Great Britain and Ireland, and the list included neurosurgeons. This circulation list, updated in 1971 and 1975, was passed each year to the local organiser of a meeting. Overseas visitors were welcome to attend meetings, but their names were not included in the circulation list. As information technology progressed, at the meeting in Edinburgh in 1984, Dr. Dick Jenkinson of Edinburgh undertook to put the names and addresses on the circulation list into a database and he became the unofficial Honorary Secretary.

#### Joint Meetings with other Neuroanaesthesia Societies

Many members of NATC had already established relationships with international neuroanaesthetists at the WFSA World and European Congresses, and the meetings of the Intracranial Pressure and Cerebral Blood Flow Groups.

The first joint meeting of NATC with an overseas society was held in London in 1980 with the Society of Neurosurgical Anaesthesia and Neurological Supportive Care (SNANSC) of the USA, and since 1986 known as the Society of Neurosurgical Anaesthesia and Critical Care (SNACC). This meeting was held at the same time as a joint meeting of AAGBI with the American Society of Anaesthetists, just prior to the 7th World Congress of Anaesthesiologists in Hamburg. A meeting with SNACC was held in Williamsburg in 1988, prior to the 9th World Congress in Washington and again in London in 1992.

Other joint meetings have been held with Neuroanaesthesia Societies of Scandinavia and Finland, and with the German and Austrian Neuroanaesthetists.

#### The Relationship of the Specialist Anaesthetic Societies to the Association of Anaesthetists of Great Britain and Ireland (AAGBI)

After the 1965 Manchester meeting Andrew Hunter wrote to Dr. Peter Dinnick, the Honorary Secretary of the Association of Anesthetists of Great Britain and Ireland (AAGBI), to inform him of the neuroanaesthetists' meeting, pointing out that the papers presented were only suitable for a specialised audience and that the group proposed to remain informal and was not in any way a "break away" section from the Association of Anesthetists.

Before long other specialties began to found their own societies: The Pain Society (1967), The Obstetric Anaesthetists Association (1969), The Intensive Care Society (1970), and The Anaesthetic Research Society (1970). The officers of AAGBI became concerned at the number of new societies being formed, and in February 1971 called a meeting of representatives of these societies to discuss their relationship with AAGBI. By 1983 several other subspecialty groups had formed societies and AAGBI held another meeting with their representatives, and this has now become an annual event for the discussion of matters of mutual interest.

#### **Eponymous Awards**

#### The McDowall Lecture

After the untimely death of Professor Gordon McDowall in 1984, members of the Travelling Club endowed a biennial lecture to be given by a distinguished invited speaker.

#### The Harvey Granat Prize

Harvey Granat was a consultant anaesthetist with the Glasgow Neurosurgical Unit and one of the founder members of the Travelling Club. After his death his family founded a prize to be awarded for the best free paper or poster presentation by an anaesthetist-in-training at the annual meeting of the club (later the society).

#### The NATC becomes the NASGBI

The NATC continued to hold successful annual meetings, but in the early 1990s it was becoming apparent that as an informal group the Neurosurgical Anaesthetists Travelling Club was not being consulted by the government and other national bodies on matters of importance pertaining to neuroanaesthesia. This was because it was not a formal society with officers and a constitution, and had no one person as an official spokesman for neuroanaesthetists. Several members felt that the time had come and that it was now important for the NATC to become a formal society. A working party drew up a constitution, and in April 1993, at the meeting in Newcastle, the Neuroanaesthesia Society of Great Britain and Ireland was founded.

The Aims of the Neuroanaesthesia Society of Great Britain and Ireland are to promote and advance education in, and the study of, the art and science of neuroanaesthesia and intensive care by exchange of information among its members, to promote high standards of practice in the fields of neuroanaesthesia and neurointensive care, and to encourage research in the fields of neuroanaesthesia and intensive care.

Membership is open to all anaesthetists in Great Britain and Ireland who are involved with and interested in the care of neurosurgical, neuro-imaging, and/or neurointensive care patients. Associate membership is open to anyone who wishes to contribute to the aims of the Society but does not qualify for full membership. Trainee membership is open to any trainee who attends an Annual Scientific Meeting.

## The Journal of Neurosurgical Anesthesiology

The abstracts of papers presented at annual meetings are published in *The Journal* of Neurosurgical Anesthesiology, which was launched in 1989 by SNACC. It is also the official Journal of NASGBI as well as that of the Association de Neuro-Anésthesiologie et Réanimation de la langue Française, the Wissenschaflicher Arbeitskreis Neuroanästhesie der Deutschen Gesellschaft für Anästhesiologie und Intensivmedizin and the Arbeitsgemeinschaft Deutschsprachiger Neuroanäthesisten und Neurointensivmediziner.<sup>4</sup>

## Some of the Achievements of NASGBI since 1993

- Now, in 2002, the Society has some 273 members including a small number of overseas, retired, associate, and trainee members.
- Organisation of National and International Scientific Meetings.
- · Recommendations on transfer of head

injuries.

- Guidelines on standards for neuroanaesthesia services.
- Neurointensive care database
- Recommendations for training and revalidation in neuroanaesthesia and neurointensive care.
- Website. http://www.nasgbi.org.uk. The website includes a newsletter.

## The Scientific Programme of NASGBI for a meeting in Leeds in March 2002

It is of interest to look at the Scientific Programme of the most recent Annual Meeting of NASGBI, held in Leeds in March 2002 to see how the practice of neuroanaesthesia may have changed since 1965. The following subjects were on the programme:

- **Pituitary Disease**. Medical, Surgical, and Anaesthetic Management
- **Paediatric Anaesthesia**. Posterior Fossa Surgery. Congenital Craniofacial Surgery. Magnetic Resonance Imaging (MRI)
- Vasospasm. Diagnosis and Treatment. Interventional Radiology.
- Ischaemic Cerebrovascular Accident. Medical Treatment
- **Head Injury**. The evidence base for management.

The main difference in the organisation of the programmes nowadays is that most of the speakers are invited and the free presentations, which were such a valuable part of the original meetings, are often confined to poster sessions.

#### Conclusion

Neuroanaesthesia has come a long way since this statement in an anonymous editorial in the *British Journal of Anaesthesia* in 1965.

> However if the contribution of anaesthetists is firmly established, its basis remains largely empirical. There is little

precise knowledge of the numerous and inter-related ways in which anaesthetic agents influence surgical exposure of the brain. To extend this knowledge, and to participate in (initiate, even) the circumvention of those formidable anatomical and physiological obstacles which appear to bar the way to radical new progress in neurosurgery, is the challenge for the future.<sup>5</sup>

The Neurosurgical Anaesthetists Society of Great Britain and Ireland has moved with the times and, as it goes from strength to strength, it is hoped that the present and future members will always remember and appreciate the reasons and need for its formation.

#### Notes

Jean Horton was one of the founder members of the Neurosurgical Anaesthetists Travelling Club, and the material for this paper is based on personal reminiscences, the contents of the original minute book 1965-1979, regular attendance at meetings of the NATC and NASGBI and the current information on the website: http://www.nasgbi.org.uk.

#### References

- 1. TE Boulton, The Association of Anaesthetists of Great Britain and Ireland 1932-1992 and the Development of the Specialty of Anaesthesia (London: Association of Anaesthetists of Great Britain and Ireland, 1999): 534.
- H Cushing, "Technical methods of performing certain cranial operations," Surg Gynaecol Obstet 6 (1908): 227.
- 3. LE Morris, "Continuing influence of Ralph M Waters on Education in Anesthesiology," in *Anesthesia, Essays on its History*, ed. J Rupreht, et al. (Berlin, Heidelberg: Springer-Verlag, 1985).
- 4. MS Albin, "Celebrating Silver. The Genesis of a Neuroanesthesiology Society," *J Neurosurgical Anesth* 9 (1997): 296-307.
- 5. Editorial, Br J Anaesth 37 (1965).

he first meeting of the Association of Dental Anaesthetists was held almost exactly twenty-five years ago on 16 April 1977. Its history is fairly simple and straightforward, but the reasons for its foundation are important and the background will be supplied. General anaesthetics (GAs) for patients in dental offices or

## Adrian Padfield

## A HISTORY OF THE ASSOCIATION OF DENTAL ANAESTHETISTS (ADA)

surgeries (as called in the U.K.) in family dental practice have been virtually unregulated until the last decade of the last millennium. I feel Ralph Waters would have approved and supported the formation of the ADA from both the professional and ethical points of view. Not only were U.K. dental GA's unregulated, but the technique had changed little since Horace Wells was anaesthetized in 1844 by Gardner Quincy Colton, who re-established the method in the 1860's for dental extractions. One hundred years later the use of nitrous oxide alone, or with up to 20% oxygen, only started to fade out with the introduction of halothane. Dentists in the U.K. were properly regulated until 1921, but have always been independent of the medical profession, and even patronised anaesthetists as a younger specialty. When the British National Health Service (NHS) was introduced in 1948, only dentists were paid fees on an item of service basis, the rest being salaried. The most humane and efficient way of extracting teeth was under GA. This was especially true with children who became the majority of patients requiring extractions. From the financial point of view, GA also had advantage. More teeth could be extracted faster in more patients under GA (also attracting a higher fee), thus more money was earned, even when effective local anaesthesia, in the shape of lignocaine (lidocaine), became available.

Victor Goldman, who visited Madison in 1960, was the doyen of British dental anaesthetists. The year 1960 was busy for him: he also read a paper at the British Dental Association meeting in Edinburgh, Scotland, U.K., entitled 'Halothane in the Dental Surgery.' In it he described his simple halothane vaporiser (derived from the bowl of a mechanical fuel pump!) but he included the following table<sup>1</sup>:

#### Dental cases under General Anaesthesia 1952-58

National Health	
Service Cases	
School Dental Service	
(later Community Clinics)	
Additional cases (estimate	d)
[with the help of the	
Ministry of Health]	<u>4,900,000</u>
	(probably overestimated)
Approximate total	
for seven years	

This is over three million dental GAs annually, but for England and Wales only. It did not include Scotland, which probably boosts the figure to at least four million per year. I know this from analysing the numbers of GA fees paid by the Department of Health (DoH) to family dentists in England and Wales from the beginning of the NHS in 1948 through 1999. The numbers supplied for 1952-1958 give the same total as the top line of Goldman's table: 12.5 million. In 1976 a careful statistical sampling of 1 in 8 family dental practices in England and Wales by Dinsdale and Dixon<sup>2</sup> produced a figure of 1.2 million GAs as compared to 0.96 million paid for by the DoH. This larger number includes patients in community clinics and paying privately. None of the above included GAs provided for dental surgery in the outpatient departments of dental teaching hospitals, which I have collected since 1970. In both series the numbers decline steadily, and by the mid 1970s are reduced by about 30-50%. At the same time the number of dental undergraduates increased, so there was a decrease in the experience a student could gain at his teaching hospital. Figures from the Charles Clifford Dental Hospital in Sheffield vividly illustrate this:

	GAs	Students	Number
ad	ministered	per year	per student
1954	7190	2 x 20	120
1964	4140	2 x 40	52
1974	2474	2 x 50	25
1984	968	2 x 45	10
1994	1590	2 x 50	16

By the mid 1970s the days had long gone when a dental student could expect to anaesthetise 100 patients during his week or two in the 'Gas' department.

When I was an anaesthesia trainee in the 1960s, the Section of Anaesthetics of the Royal Society of Medicine (RSM) was *the* place to hear about new advances in anaesthesia. However, such was the pace of change that subspecialty societies and clubs started to evolve, most notably the Anaesthetic Research Society and the Neuroanaesthetists' Travelling Club. By the early 1970s, as the numbers of

dental GAs declined and the numbers of dental undergraduates increased, it was very difficult to teach students to give a simple GA in the weeks they spent in the 'Gas' room. The dental profession had an entrenched attitude and would not give up their right to administer GA. As early as 1957 a gentleman dentist named Drummond Jackson had formed a specialist dental anaesthetic group, which became known as the Society for the Advancement of Anaesthesia in Dentistry (SAAD). SAAD did not consist only of dentists but was supported by some notable physician anaesthetists. On the other hand, many other anaesthetists not involved in dental GA practice or undergraduate training were not interested in the difficulties, but felt GAs should only be administered by medically qualified anaesthetists. This was an

Olympian attitude because there were not enough medical anaesthetists to administer over 1 million dental GAs yearly. In fact, in 1967 one of the many reports<sup>3</sup> about dental GAs found that 55% of GAs were given by dentists (22% by the operator!). Of the 45% by doctors, over half were given by family practitioners, and only 15% by trained anaesthetists.

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This was the climate when in March 1976, Dr. T. M. Young of Manchester wrote to all the consultant anaesthetists he could identify who were involved in administering dental GAs and teaching dental students, inviting them to a meeting in November that year to discuss the problems and possibly form a society or association of dental anaesthetists. The meeting was held during the lunch interval of the Association of Anaesthetists of Great Britain and Ireland scientific meeting in London. Dr. Young, with some justification, felt that the rather esoteric nature of dental GAs in family practice was ignored by the Establishment, who had no interest in improving the conditions or, more importantly, the fees paid. As an example, the London County Council, which had established comprehensive medical and dental services before World War II, paid a fee of one guinea (=£1.05) per dental GA in the 1930s. This equated to at least £50 by the 1970s, but the actual fee paid was £2.50 upwards, depending on the number of teeth extracted! Part of the Minutes of the exploratory meeting included a list of topics discussed:

- 1. Training of dental students in anaesthesia, analgesia and sedation.
- 2. Need for facilities for postgraduate training of both dental and medical graduates.
- 3. Establishment of a Diploma in Dental Anaesthetics.
- 4. Role of an Association of Dental Anaesthetists in training and in the provision of a service.
- 5. Procurement of a sufficient body of fully trained dental anaesthetists to provide a service nationwide.
- 6. Financial implication of such a procurement.

It was resolved that an Association be formed with a limited membership. A Chief Officer and a Steering Committee were elected and charged with arranging an inaugural meeting and a roll of members was initiated.

The first meeting was appropriately held in Manchester, organized by Dr. Young. The second meeting was in Dublin under the aegis of the first President, Professor Gilmartin. From the beginning, two meetings have been held nearly every year. At first reported in *Anaesthesia* from 1983, ADA started to publish its own Proceedings with the help of grants from pharmaceutical companies. The first membership list published in July 1978 included 114 members and the fifth edition in May 1991 had about 340 members. The notice in the membership list, sent to prospective members described the Aims of the Association:

- 1. To further the art and science of anaesthesia for dentistry
- 2. To provide a forum for discussion of pertinent matters by its members

Membership was offered to registered medical and dental practitioners engaged in the practice of dental anaesthesia.

Some of the original topics had become submerged; no Diploma was instigated and 'analgesia and sedation' were omitted, a slip that led to the resignation of a number of dentists in the years before the banning of GA in dental surgeries in December 2001.<sup>4</sup> Over the years, ADA accepted overseas membership applications, most notably from the Netherlands where dentists and anaesthetists are particularly interested in sedation. In June 1998, when I was President of ADA, our Dutch colleagues hosted a superb meeting in Amsterdam.

Despite the demise of what had become an archaic form of GA, dependent for safety on the surgeon and anaesthetists' speed and dexterity, both of which had declined with reduced experience and practice, the ADA flourishes and celebrates its Silver Jubilee on 21 June 2002, with over 300 members.

#### References

- 1. V Goldman, "Halothane in the Dental surgery," Br Dent J 109 (1960): 259-263.
- 2. RCW Dinsdale and RA Dixon, "Anaesthetic Services to Dental Patients," *Br Dent J* 144 (1978): 271-279.
- 3. Report of a Joint Sub-Committee on Dental Anaesthesia, Central Health Services Council, Ministry of Health, HM Stationery Office, London, 1967.
- 4. "A Conscious Decision. A review of the use of general anaesthesia and conscious sedation in primary dental care," Department of Health, London, July 2000.

will review a medico-legal issue that occurred in my city in the U.K. in 1912, and its longer effect. Some of what I will be saying is fact, gained both from records and some personal recollections, and some must be conjecture and speculation concerning bad and good news.

## Ian McLellan

## LITIGATION AND POSTGRADUATE EDUCATION: THE CONCEPTION OF THE FACULTY OF ANAESTHETISTS

First, let me set the scene: Edwardian England, a still, stable, traditional era. At this time dentistry was not fully regulated and, as such, established non-qualified dentists could administer anaesthesia. During the latter part of the nineteenth century and the early part of the twentieth, a dentist in Leicester, Robert Marston, developed his technique for chloroform anaesthesia within his practice. He was an innovator, and his apparatus used the Venturi principle for the time in anaesthetic apparatus. His technique was to vaporise chloroform in a metal tank under pressure so that, unlike the bags so often seen as being used by Joseph Clover, the reservoir was enormous, allowing him to administer longer anaesthetics than used in medical practice. He was a successful businessman with a small factory that made dental and anaesthetic apparatus in conjunction with a local bicycle manufacturer. He had strong principles, some of which I believe we would not disagree on. Firstly, he believed, that the operator could not be the anaesthetist, so that in his practice one of his four sons, also dentists, operated while he gave the anaesthetic. Secondly, he believed that the concentration of the anaesthetic agent used had to be known, and that to give it in an uncontrolled fashion was inappropriate and led to some of the anaesthetic morbidity and mortality. Finally, he believed that as a dentist he gave many more anaesthetics than most doctors – in Leicester the interns at this time were more experienced than most doctors, and in his opinion provided a better quality of anaesthesia. He was a strong-minded man and obviously spread the word of his beliefs by publishing a number of books, pamphlets, and giving lectures. At this time there was a move on several occasions to get Parliament to pass a bill, which would only allow doctors to give anaesthesia. As you may imagine, to Robert Marston this was as a red rag to a bull, and he issued pamphlets opposing this proposed bill as well as challenging some of the leading anaesthetists of the day to almost competitive anaesthesia-a duel by any other name.

We do not know at that time what his relationship was with the medical professionals in Leicester, but I do not believe that it was easy.

In 1911 he anaesthetised a lady's companion, a live-in personal assistant, I suppose, for extraction of teeth. Following this the lady claimed that she developed pneumonia as a result of inhalation of part of a tooth or some debris, and that this was negligence due to his anaesthetic technique and the time it took. This case came to trial on the 11–13 June 1912 in front of Lord Colleridge and a jury. A question is, who funded her? At this trial, the divisions between the hospitals in Leicester were shown,

which has not changed some would say. The physicians from the Leicester Royal Infirmary acted for the plaintiff, and those from the Evington Poor Law Infirmary, now known as the Leicester General Hospital, acted for the defendant. Robert Marston lost this case and immediately hand wrote an enormous appeal document, which he then delivered on his horse, twenty miles away in the town of Oakham. He won on appeal, but the cost was close to an equivalent of a million and a half dollars today. This, I believe, came close to ruining him financially, and affected him emotionally. He handed the businesses over to his daughters, and from personal recollections of a doctor from the 1920s, he was not the man he had been, he was quiet and quite withdrawn. The family, I believe, had taken a huge financial loss from this.

In the earlier part of the first decade of the twentieth century, a dentist decided to retrain as a doctor and became a gynaecologist. During the First World War he changed to anaesthesia and became a leader in this field. He became, in 1942, Honorary Secretary of the Association of Anaesthetists and was a representative during 1943 at the Beveridge Conference, and then the Committee that arose from it, which developed the National Health Service. It was at this time that the Association of Anaesthetists' secretariat was at the Royal College of Surgeons of England in Lincolns Inn Fields, London. During 1944 the former dentist was involved with the post war teaching and planning, and was the initial person representing the Association of Anaesthetists on the Council of the Royal College of Surgeons. He became President of the Association, and in early 1945 there was discussion between him and the President of the Royal College of Surgeons, Sir Alfred Webb Johnson, over the formation of Faculties within the Royal College of Surgeons. From 1945 he was involved in the two areas of working with the Royal College of Surgeons and also with the development of the National Health Service where postgraduate teaching was part of the duties of the Consultant. The criteria for Consultants included approved training at approved sites with a higher degree. He continued to be the Association's representative on the Council of the Royal College of Surgeons, and in 1947 Sir Alfred Webb Johnson addressed a Council meeting of the Association, concerned with raising the standard of the D.A., and with the formation of the Faculty of Anaesthetists within the College. The President of the Association was on this sub-committee but now co-opted to the RCS council, rather than just being a representative. Also in this year was the formation of the two-part Diploma in Anaesthetics, and then, later, with the new Charter of the Royal College of Surgeons, a subcommittee was formed to consider the formation

of a Faculty of Anaesthetists. This reported in October that there should be a Faculty subcommittee and the Association representatives would be Faculty's subcommittee. By this time he was now Vice-President, and in 1948, on February 6 the Council of the Association and a special general meeting of the Association voted for application for the formation of the Faculty. He stated at this time that this has been interesting him for a number

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of years and was for the academic welfare of the specialty and a higher diploma of fellowship. By April 2, 1948 the Faculty was now constituted, and he was the first Dean. This man was Archibald Marston, nephew of Robert Marston. He was a quiet person who got on with things rather than being very visible. His relationship with his family in Leicester was not close, and was even competitive, but he was known as being affable. There are no records for this period but it is obvious that, from the first mention of the Faculty in 1945, until two years later, there are no records within the Council of the Association of Anaesthetists' minutes. Obviously things were going on behind the scenes. It is also obvious that when it did come about, it occurred with great speed, and, in my speculative opinion, this had been part of the background work that Archibald Marston had been carrying out for several years with Webb-Johnson. Speculating therefore, in my view, it is because of what happened to his uncle, an unqualified dentist in Leicester in the early part of the century, that he became interested in standards and education in anaesthesia. Such was the effect of this event in 1912 that it led indirectly to the formation of the Faculty of Anaesthetists, the Fellowship examination, and from then to the Royal College of Anaesthetists. R alph Waters described research as one component of professionalism. In this regard, obstetric anesthesia was one of the first components of our specialty to initiate a sustained program of research on scientific and clinical aspects of practice. Obstetricians, not anesthesiologists, carried out this work during

## **Donald Caton**

## THE ENTRANCE AND EARLY DEPARTURE OF SCIENCE FROM THE PRACTICE OF OBSTETRIC ANESTHESIA

the last decades of the nineteenth century.

The primary instigator of this research program was Adolph Gusserow (1836-1906), a German who held academic posts in Utrecht and Zurich before his appointment as Chair of Obstetrics at the University of Strasbourg. Gusserow's appointment to that post was, in part, an accident of politics. In the wake of its victory in the Franco-Prussian War, the German government, under Chancellor Bismark, sought to establish dominance over the newly won territory of Alsace-Lorraine. Part of this program involved replacing French Professors at the University with rising young German academics. Others joining Gusserow on the faculty were von Reclinghausen and Hoppe-Seyler.<sup>1</sup>

Felix Hoppe-Seyler's presence in Strasbourg was particularly important for early scientific studies of obstetrical anesthesia. A physician by training, Hoppe-Seyler studied obstetrics for a time before he began his career in physiological chemistry. It was in this latter field that he had the most impact. He founded the first journal of biochemistry and is recognized as one of the founders of that discipline. Before he moved to Strasbourg, Hoppe-Seyler had been on the medical faculty in Berlin. In fact, Adolph Gusserow attended his lectures as a student. Hoppe-Seyler's influence is apparent in Gusserow's work. Gusserow had a long-standing interest in fetal metabolism, a subject of considerable interest to physiologists during the last half of the nineteenth century. Specifically, he wished to know if fetal tissues carried out metabolic processes themselves, or if this was done for the fetus by maternal tissues. In part, the answer to this question lay in establishing the rapidity with which essential metabolites cross the placenta. In 1871 Gusserow published two long papers describing his observations and thoughts.<sup>2,3</sup>

Working with Gusserow on this project was a Swiss obstetrician, Paul Zweifel (1848-1927). As a student, Zweifel studied under Gusserow in Zurich, and he then accompanied him to Strasbourg. Like his teacher, Zweifel embarked on studies of fetal metabolism. He quickly published several papers that had important implications both for physiology and medicine.

In the first of these papers, Zweifel demonstrated a difference in the oxygen content of blood in the umbilical artery and vein of patients. For these experiments, he used a technique developed by Hoppe-Seyler, which used the change in light absorption spectra to demonstrate the oxygenation of hemoglobin. Zweifel's experiments demonstrated that oxygen crossed the placenta quickly, and that the fetus utilized it, points contested by physiologists for many years.<sup>4</sup> Zweifel then turned his attention to chloroform, the anesthetic introduced to medicine in

1847 by obstetrician James Young Simpson. Among After women who had received publication chloroform during labor, of these Zweifel had observed an inpapers, creased incidence of icterus neither physiologists neonatorum. Suspecting that nor clinicians this might be an effect of challenged chloroform he used a newly the developed biochemical asidea say to test for this compound that metabolic in the placenta. Finding it, he substrates concluded that chloroform and drugs administered to the mother quickly during labor rapidly crossed traverse the the placenta.5 placenta.

Critics challenged Zweifel's data, pointing out

that the chloroform that he detected might not have crossed the placenta, but might have simply been in maternal blood contaminating the surface of the placenta. With this, Zweifel restudied the problem, this time demonstrating chloroform in the blood and urine of neonates.<sup>6</sup> After publication of these papers, neither physiologists nor clinicians challenged the idea that metabolic substrates and drugs quickly traverse the placenta.

Both Zweifel and Gusserow went on to have illustrious and productive careers as educators.<sup>1,7</sup> Unquestionably, both men benefited from their association with Hoppe-Seyler, but they also had the wit to recognize the importance of biochemistry to their work as clinicians. With the onset of hostilities of World War I, serious studies of these problems stopped, not to be resumed for more than half a century. The work of these men, however, epitomized some of the aspects of professionalism that Ralph Waters sought to develop in anesthesiology.

#### References

- 1. D Caton, "Obstetric anesthesia and concepts of placental transport: A historical review of the nineteenth century," *Anesthesiology* 46 (1977): 132-137.
- 2. A Gusserow, "Zur Lehre vom Stoffwechsel des Foetus," Arch Gynaekol 3 (1871): 241-270.
- 3. A Gusserow, "Zur Lehre vom Stoffwechsel zwischen Mutter und Frucht," *Arch Gynaekol* 13 (1878): 56-72.
- 4. P Zweifel, "Die Respiration des Fötus," Arch Gynaekol 9 (1876): 291-305.
- 5. P Zweifel, "Einfluss der Chjloroformnarcose Kreissender auf den Fötus," *Berliner Klin Wochenschr* 11 (1874): 245-247.
- 6. P Zweifel, "Der Uebergang von Chloroform und Salicylsaüre in die Placenta, nebst Bemerkungen über den Icterus Neonatorum," Arch Gynaekol 12 (1877): 235-257.
- 7. A Döderlein, "Zum Gedächtnis P. Zweifels," Arch Gynaekol 131 (1927): I-VIII.
n 1980 Milton H. Alper, M.D., former chair at Boston Hospital for Women and an obstetric anesthesiologist, was named Chair of the Department of Anesthesia, Children's Hospital Medical Center in Boston, Massachusetts. Why this happened and the effects of this event provide an important background to the last twenty years

## David B. Waisel

## AN OBSTETRIC ANESTHESIOLOGIST IN A PEDIATRIC WORLD: MILTON H. ALPER, M.D.

of pediatric anesthesia and the evolution of the role of the anesthesia chair.

A third generation aqualumni, Milton H. Alper was born in 1930 in Lynn, Massachusetts and graduated cum laude from both Harvard College and Harvard Medical School. He did several years of surgery training and served in the military before starting his anesthesia residency in 1959 at Peter Bent Brigham Hospital. Following his residency in anesthesia, he became a research fellow in pharmacology for one year before practicing as an attending anesthesiologist.

In 1969 he became Anesthesiologist-in-Chief at Boston Hospital for Women where he developed a reputation as a developer of people and departments. When the Boston Hospital for Women merged with two other hospitals to become the Brigham and Women's Hospital, Alper unsuccessfully sought to be the new chair. Alper was in an awkward position; he didn't want to be the second man at BWH and he didn't want to leave Harvard, where he had spent his professional life. Fortuitously, at the same time Children's Hospital was searching for a chair to replace the storied Robert M. Smith, the longtime Chair of the Department of Anesthesia, author of the eponymous textbook and putative father of pediatric anesthesia in the United States. Children's Hospital had a

premier clinical practice but lagged in terms of academics. Indeed, Children's Hospital did not even have representation at the medical school level.

The search for a replacement for Dr. Smith ended with the stunning selection of Alper. Although the search committee records have not been located, we can attempt to piece together the committee's thinking. Alper did not garner significant research monies and he was markedly unknown in the pediatric community. But, Alper was an outstanding builder. He espoused academic values and, as the saying goes, "put his money where his mouth was." He had a presence at the medical school and was active in national governance and committees, particularly in obstetric anesthesia. In short, he was a manager, with all the best connotations of the word.

Alper began as chair on July 1, 1980. He set his agenda in his first Annual Report for the Department of Anesthesia. "The department is looking forward to major changes in the future with new responsibilities, particularly in pediatric intensive care and the recruitment of new faculty." He recruited individuals who were to become leaders in pediatric anesthesia. The ICU, a "new concept in patient care," grew and a transport team was established. One of the first pain management services in the United States was begun. In the ten years Alper was chair, the number of attending staff increased from twelve to thirty-one, and the department trained more than 150 pediatric anesthesiologists. Alper set the conditions that created a local, national, and international footprint for the department of anesthesia.

# What We Can Learn from Milton Alper, M.D.

The Alper story elucidates the oft unappreciated but ever increasing importance of managerial talent in academic chairs. Managerial talents are critical in balancing competing interests too numerous to name in this short essay. To pay homage to Alper and to learn about the characteristics of successful managers, it makes sense to use the Alper story to identify the critical characteristics of the successful manager.

Alper was humble. He knew struggle, failure, disappointment, and bootstrapping. Alper came from modest means. He lost his scholarship to Harvard after his first year because he did not take his education seriously enough; he rallied to regain his scholarship the following year. Even though he was a cum laude graduate of Harvard Medical School, non-meritorious reasons forced Alper into his second choice for residency. When the Boston Hospital for Women merged with the other hospitals to become the Brigham and Women's Hospital, Alper did not become the new chair. It is not unreasonable to suggest that Alper's humility may have shaped, perhaps, his strongest asset, his strength in working with people. He was kind and generous; he gave loans to people who needed it because he remembered when he too was in need. It is not unlikely that these characteristics, which earned his colleagues' loyalties and affections, arose in part from these experiences and his perspective of these experiences.

Alper had a vision. Alper had ability and vision. He fostered an atmosphere that permitted creation and development. He demanded that the department be a complete department, requiring quality clinical care, research, teaching, and participation in administration. His vision gave him a touchstone to use when weighing competing interests, such as financial demands or production pressures. Considered priorities permitted his values to have a seat at the table when in other circumstances they would have been lost in the shuffle.

Alper was organized. Being organized

allowed Alper to focus on the important issues and seek opportunities for his colleagues. His brilliant administrative mind resulted in his governance of a number of important committees, in particular the thirteen years he was secretary of the Executive Committee, Department of Anaesthesia, Harvard Medical School. His skill, and the respect his skill brought, strength-

Alper had ability and vision. He fostered an atmosphere that permitted creation and development. He demanded that the department be a complete department, requiring quality clinical care, research, teaching, and participation in administration.

ened the ties among departments and helped departments improve.

Alper was not about Alper. Perhaps most importantly, Alper did not seek to define a cult of self, where he would be the center of all things. He brought others in and made them a part of things. In this sense he built a department: when Alper came ill, the department kept running smoothly, not because he wasn't important, but because he had spent the ten previous years teaching, encouraging, and creating opportunities for his staff to develop the kind of team that could carry on by itself. Alper was cultured. He had outside interests and a worldly view, which may have helped him from "needing" to develop a cult of self (fig. 1). Alper viewed himself as an ordinary guy, nothing special, and the beneficiary of many helping hands. Thus, he liked to function as an elder statesman, guiding and offering suggestion to others, staying in the background and helping insert others into leadership positions.

### Conclusion

Alper died after only ten years at Children's Hospital. He had taken a small clinical practice and developed one of the most productive pediatric anesthesia departments in the United States, by identifying talented anesthesiologists and giving them the freedom and guidance to develop. He developed a department of professional anesthesiologists that continues to contribute to patient care, research, training, and administration. He chose to use his considerable talents to contribute through managerial skill and department development. I do not think it is hyperbole to suggest that in fifty years pediatric anesthesia may look upon Milton Alper as anesthesia now looks upon Ralph Waters.



Figure 1. Milton H. Alper, M.D. Photograph taken June 8, 1990, by Mr. Yousef Karsh in Ottawa, Canada.

he beginnings of pediatric cardiac anesthesia are intimately linked with the beginnings of pediatric cardiac surgery. In 1939 Dr. Robert E. Gross, at the Boston Children's Hospital, reported on the first successful "Surgical Ligation of a Patent Ductus Arteriosus."<sup>1</sup> The only reference to anesthesia was the use of cyclo-

## Merel H. Harmel

# THE BEGINNINGS OF PEDIATRIC CARDIAC ANESTHESIA: A MÉMOIRE



Merel H. Harmel, M.D. Aqualumnus

propane. There was no mention of the anesthetist or of the anesthetic management. This operation was the first and only pediatric cardiac procedure in the surgical armamentarium and the only pediatric cardiac anesthesia undertaken until Blalock and Taussig who, in 1945, published their paper on the "Surgical Treatment of Malformations of the Heart in Which There is Pulmonary Stenosis or Pulmonary Atresia."<sup>2</sup> In this instance, while neither the agents nor the anesthetic management were detailed, the anesthetist, Dr. Merel Harmel, was cited.

In 1946, following up on their experience at Hopkins, Harmel, and Lamont published their paper, "Anesthesia in the Treatment of Congenital Pulmonic Stenosis."3 Between 1939 and 1945 surgical ligation of the patent ductus was carried out by many surgeons in pediatric as well as general hospitals. During this period there were physician anesthetists who limited their practice to infants and children, Digby Leigh in Montreal, Margot Deming in Philadelphia, and Robert E. Smith in Boston, all in their respective pediatric hospitals. Anesthesia for infants and children was for most simply a part of the general anesthetic practice. The paper by Harmel and Lamont, which, for the first time, described the anesthetic management of infants and children for operations upon the heart and great vessels may, perhaps, be considered to herald the beginnings of pediatric cardiac anesthesia as an independent discipline.

As a witness to, and player in, this remarkable drama at The Johns Hopkins Hospital, I would like to tell the story of that exciting time as it relates to the particular experience surrounding the first Blalock-Taussig operation for the tetralogy of Fallot. If one is to understand how this came about it may be appropriate to describe the background, the relationships, and role of the principals: Dr. Alfred Blalock, Dr. Austin Lamont, Dr. Helen Taussig, Vivian Thomas, and myself in this historic event.

#### **Helen Taussig**

It all began with Helen Taussig who had been appointed by Dr. Edwards A. Park, the Chairman of Pediatrics at Hopkins, to take charge of the cardiac clinic. She was a compassionate, extraordinarily keen, and thoughtful physician. Her principle interest at that time was in rheumatic fever. With the advent of fluoroscopy, Dr. Park persuaded her to change her focus and to study congenital heart disease, which ultimately led to her interest in cyanotic children with the tetralogy of Fallot. She had observed that when the ductus arteriosis closed down in infants with tetralogy, their clinical condition worsened and their cyanosis visibly increased. She reasoned that construction of a left to right shunt acting as a "ductus" would bring relief.

Sometime before Blalock's arrival in Baltimore in 1941, she had traveled to Boston to consult with Dr. Robert Gross in an effort to interest him in constructing a ductus ateriosus. She contemplated a move to Boston to be near her father, who was ill. Gross, however, allowed a ductus could be created, but he had no interest and he advised her to go back to Baltimore where she was wanted; he did not believe she would be tolerated in Boston.

This was not the first rebuff Helen Taussig had received from the Harvard Medical Institutions. When she graduated from Berkeley in 1921 she was interested in a medical career and applied to Harvard Medical School. Harvard did not accept women in the medical school at that time and her father (a distinguished professor of economics at Harvard) suggested that she apply to the School of Public Health. While not refused admission, she was told that she could study there but would not be considered a candidate for a degree. She then entered the anatomy department at Boston University where she did exceptional work. Professor Begg, aware of her desire to study medicine, suggested that she apply to Johns Hopkins, where, since its inception, women were accepted on an equal basis with men. She promptly applied and was accepted. Helen Taussig remained at Hopkins for her entire career, revered as teacher, clinician, and mentor, dying in 1986 at the age of eighty-eight. One interesting aside, Dr. Taussig had a severe hearing loss, and though primitive amplified stethoscopes were available, she preferred to use her hands to detect cardiac murmurs. She was a formidable diagnostician and teacher and became, in the course of time, the dean of pediatric cardiologists.

### **Alfred Blalock**

The answer to Taussig's vision for alleviating cyanosis in "blue babies" was signaled by the arrival of Alred Blalock at Hopkins, although it would be three years before the Blalock-Taussig operation stunned the surgical world. The Chairmanship in Surgery at John Hopkins had been vacant since the retirement of Dean Lewis, following a stroke in 1939. Warfield Firor had been appointed acting chairman and served until Alfred Blalock arrived to take up the Chair in 1941. Blalock had been a medical student and surgical house officer at Hopkins, but was not reappointed to a senior resident post, and went to Vanderbilt to complete his training. Barney Brooks, the Chairman of Surgery at Vanderbilt, invited Blalock to join the faculty. In the ensuing vears he made fundamental and critically acclaimed contributions in experimental and clinical shock. Recognition of his outstanding accomplishments in research, in large measure, led to his return to Hopkins and his appointment as Professor and Chairman of the Department of Surgery. After arriving in Baltimore, Blalock found himself as the new professor in an environment in which some faculty and senior residents were not only hostile but were also critical of his surgical skills. This made for a difficult four years until the Blalock-Taussig operation brought him world renown and recognition of his superb creative genius coupled with his surgical skills.

### Vivian Thomas

While at Vanderbilt, Dr. Blalock had employed in his laboratory a young Afro-American named Vivian Thomas. This was during the depression years. Thomas, who had his heart set on studying medicine, did not have the resources to do so. Under Blalock he became a superb technical operator and carried out, with exquisite skill, the experimental procedures that Blalock conceived and devised. Thomas came with Blalock to Baltimore where he continued to work with him and helped set up surgical research in the Hunterian laboratory. His skills served residents, fellows, and faculty from the Department of Surgery who worked in the laboratory. His role in the laboratory training residents and fellows and his many contributions to the research in the Department of Surgery were formally recognized. In 1971 a portrait was commissioned by the "old hands"—former residents—to hang in the lobby of the Blalock Surgical Building, and Thomas was awarded an Honorary Doctor of Science by Johns Hopkins University.

### **Austin Lamont**

Sometime after his arrival at Hopkins, Dr. Blalock asked Austin Lamont to organize a Division of Anesthesia within the Department of Surgery. Austin graduated from Hopkins in medicine in 1934, following undergraduate years at Harvard and graduate work at Oxford University. After graduating from medical school, he remained in Baltimore to work in the surgical laboratories at Hopkins, and for the next several years pursued investigations on tetanus. Apparently, he did not engage in clinical training. In accepting the opportunity to organize the Division of Anesthesia in 1943, he wisely decided, with Dr. Blalock's concurrence, to spend a year training in clinical anesthesia before taking up his duties as Chief of the Division. The first six months of training with Ralph Waters (the doyen of anesthesia) in Madison, Wisconsin, followed by an additional six months in New York at Bellevue Hospital with Emery Rovenstine (who had been trained by Waters). In his wanderjahre he not only acquired splendid clinical skills but a profound appreciation of what an academic department should be. He returned to Baltimore full of plans and enthusiasm.

In 1942 I was a fourth year medical student and attended the first lecture that Dr. Blalock gave in surgery in which he stressed the need for physicians to enter the field of anesthesia. Given Dr. Blalock's recognition of the role of physicians in the emerging field of anesthesia, and early on establishing anesthesia as a new

division in his department, it is difficult to understand and explain the subsequent history of physician anesthesia at Hopkins during Blalock's tenure.

The efforts of Lamont and then Donald Proctor, an otolaryngologist whom Blalock appointed to succeed Lamont, did not receive the support and understanding necessary for developing an academic division of anesthesia within the Department of Surgery. This resulted in depressing frustration and

In accepting the opportunity to organize the Division of Anesthesia in 1943, he wisely decided, with Dr. Blalock's concurrence, to spend a year training in clinical anesthesia before taking up his duties as Chief of the Division.

culminated in Lamont's and then Proctor's resignation. In 1947 Lamont joined Robert Dripps at the University of Pennsylvania where he remained until his untimely death in 1964. Proctor, after five years as division chief in anesthesia, went into private practice for two years and then rejoined the Division of Otolaryngology at Hopkins. Donald Benson, trained at the University of Chicago, was then appointed as division chief. When Hopkins decided to elevate the division to an independent department, Benson, after eighteen years of service and devotion, expected to be offered the Chair. However, a search committee was formed and Benson simply became a candidate, albeit a strong one. Unhappy with this change of circumstance, he readily accepted an invitation to return to his alma mater where, coincidentally, the Chair at the University of Chicago was open. With the subsequent appointments of Eugene Nagel and then Mark Rogers, Anesthesia at Hopkins finally came into its own as one of the premier departments in the United States.

### **Merel Harmel**

Having graduated in the first accelerated class at Hopkins after the outbreak of World War II, I began my clinical training as a surgical intern in February 1943. However, because of a recurring intestinal ailment, a residency in surgery, particularly neurosurgery, in which I was then interested, was considered to be too physically taxing in a program in which there were no nights and no weekends off.

During my surgical internship I had spent one month in anesthesia with Lamont, as did all eleven surgical interns. Lamont was a challenging, superb teacher, and had become a friend and confidant. This led me to discuss with Lamont what other career paths might serve my interests. He offered me a residency in anesthesia. In his characteristic way he pointed out all the potential disadvantages that might lie ahead for physician anesthesia within the Hopkins surgical environment, and for me as a lone anesthesia resident. However, such was his charm and exciting the challenges he envisioned, that I readily accepted his invitation and became his first and the only resident to finish training during his tenure.

Lamont's experience in Wisconsin with Ralph Waters and Noel Gillespie had been so rewarding, he decided to send me to Madison for my first six months of training. He still faced many organizational issues in establishing the division, and felt I would be best served in my introduction to a career in anesthesia by beginning my training with Waters and Gillespie. I arrived in Madison on December 28, 1943 to begin my training. Because many of the staff were off to the wars, Dr. Waters was very active in the operating theater where the residents were intimately exposed to his remarkable person and skills. Noel Gillespie, whom Austin especially admired, took me under his wing and emphasized the rewards of rigor, high standards, and the pursuit of excellence. It was indeed a wonderful

introduction to anesthesia for which I shall be forever grateful.

When I returned to Hopkins in July to continue my training, Lamont promptly departed for a much-needed holiday. I was left in charge with the head of the nurse anesthetists, Ms. Olive Berger, whose skill and devotion to Dr. Blalock were later memorialized with a portrait now hanging in the Turner Auditorium with all the Hopkins "Greats." Before Austin's return from holiday, there were ten or eleven deaths on the table in which, fortunately, I had no role. As was often the practice at that time, a patient, who in the course of operation was thought to be dying or perhaps already dead, was hurriedly transferred to a gurney and rushed to his or her room to be pronounced dead there. Even though our society was not so litigious in 1944, death in the operating room automatically became a coroner's case, and it was far more desirable to have an autopsy performed by our own pathologists.

It was indeed a remarkable time for me as Austin's resident. I had my choice of cases, and Austin Lamont was a daily source of counsel, guidance, and inspiration. It was a warm and personal relationship between student and a wise, humorous, and compassionate mentor, for which I am forever grateful. Indeed, he was the most generous of men. With Lamont's encouragement, I had applied for and was awarded the first National Research Council Fellowship in Anesthesia to study the effect of stellate ganglion block on the cerebral circulation with Dr. Seymour Kety in the Department of Pharmacology at the University of Pennsylvania.

Unfortunately, the relationship between Blalock and Lamont had come to such a pass in 1946 that Lamont resigned and left to join Dr. Robert Dripps in the Department of Anesthesia at the University of Pennsylvania. After Lamont's departure, Dr Blalock asked me to stay in Baltimore and run the Division. This meant giving up the fellowship. I had sought counsel from Dripps and from Lamont, who was now in Philadelphia. They both persuaded me that, under the circumstances, I give up the fellowship and remain at Hopkins. I accepted their advice and was prepared to remain at Hopkins. However, shortly after my return, and before I had informed Dr. Blalock of my decision to stay, I was involved in the death of one of Dr. Blalock's patients who died on the table. He brought me to his dressing room, and in a highly charged and emotional state, he made it clear that my management of the case was unacceptable. (The patient was the daughter of one of Dr. Blalock's friends.) I was one of those "damned Waters anesthetists!" Obviously this was a reflection on his unhappy relationship with Austin Lamont. He was incensed that I had not informed him that I was going to supervise Ms. Berger administering cyclopropane to his patient when we should have used ether. I was crushed, and realized that, were I to remain, I might always be a whipping boy. It was a heart-rending experience. I decided then and there to take up the fellowship and go to Penn. Perhaps when I returned, the year away and a successful research project might enhance my stature and position. At the year's end, unfortunately, I had not completed my research, and asked Dr. Blalock if I might stay at Penn for another six months. He was not in favor of me being away any longer and proposed that I might periodically go to Penn to complete my studies. However, given the nature of my research, this did not seem feasible and I elected to stay at Penn. I was never asked to return to Hopkins during Dr. Blalock's tenure. However, some years later, Gene Nagel invited me to become a visiting professor in the department. Then in 1985, at the invitation of Dr. Mark Rogers, I spent a sabbatical as a visiting professor and have had a visiting professorial appointment at Hopkins since.

### The Blalock-Taussig Procedure

There are various accounts of how Taussig, Edwards Park. Professor and Chief of Pediatrics at Hopkins, and Blalock came to the opinion that a subclavian-pulmonary artery anastomosis might help "blue babies." Blalock characteristically took this concept to the laboratory. With Vivian Thomas, he tried various ways to produce cyanotic dogs, thus mimicking the tetralogy of Fallot, and then to create a subclavian-pulmonary artery shunt that he had employed in his hypertension studies at Vanderbilt. This effort to produce cyanotic dogs, while only partially successful, was still encouraging enough to stimulate Taussig and Blalock to find a suitable patient for operation. (This was in the days before informed consent and Institutional Review Boards.)

When Lamont became aware of Blalock's research and the proposed operation, I do not know. However, about two weeks before the operation was actually scheduled. Lamont mentioned to me that one day we might be faced with operations upon the heart and/or great vessels. Imagine my surprise, apprehension, and excitement when a short time before the actual operation was scheduled, he informed me that Dr. Blalock was proposing to operate upon a fifteen month old cyanotic infant with a tetralogy of Fallot, who weighed 4 kg. Lamont had refused to anesthetize the infant for some minor operation at an earlier date because he felt she would not survive. So the prospect of a major experimental procedure involving a thoracotomy would surely hasten the baby's death. Blalock, however, was determined to operate. To quote from Dr.William Longmire's memoire, Alfred Blalock His Life and Times: "Blalock's mind was made up, however. He had discussed the seriousness of the operation with the family, telling them the operation had never been attempted before and the chances were good that the child might die on the operating table."4

Lamont discussed the issues with me the day the operation was posted. He reiterated his concerns and feelings about the patient surviving the procedure and offered me the "opportunity" to anesthetize the baby. He would, of course, be with me in the operating room. He thought that the experience of anesthetizing this infant would not only be a challenge but most educational. I was just completing my 11th month of training.

In 1944 intubating infants was not a common practice; at Hopkins there were neither endotracheal tubes nor appropriate equipment for conducting endotracheal anesthesia in 4 kg infants. The anesthetic management of infants at that time at Hopkins was open drop ether via mask, or an ether hook placed in the mouth with ether vaporized from a blow bottle with oxygen. One could increase the ambient oxygen by delivering oxygen via a catheter. Furthermore, we thought to fashion an endotracheal tube from a large bore urethral catheter should it be necessary to attempt intubation.

To understand the issues we faced and the apprehension we experienced, I quote from Blalock and Taussig's classic paper in which they provide a detailed description of the first patient, Eileen Saxon.

> On June 24th Eileen Saxon was first admitted to the Harriet Lane Home. Physical exam showed that she was poorly nourished and poorly developed. She had a glassy stare, her lips were cyanotic, the heart was slightly enlarged and there was a harsh systolic murmur best heard along the left sternal border. The liver was at the costal margin. The baby was given oxygen and phenobarbital but remained very irritable and would become intensely cyanotic when taken out of the oxygen tent. During her three weeks stay in the hospital she gained 200gms and weighed 4.6 kg on discharge. She was sent home because it was felt that her condition was hopeless.

She was followed in the cardiac clinic for three months during which time she showed increasing cyanosis and failure to gain weight. She was readmitted on October 17th because of increasing spells of cyanosis, coma, and great vessel distension of head and body.

The weight on admission was 4.6 kg. The distension was so great that the possibility of subdural hygroma or hematoma was considered. Subdural tap was performed with the removal of 8oz. of clear fluid from the right side and a small amount of bloody fluid from the left.

The size of the heart as seen in the AP view was essentially the same as noted previously. There was still a harsh systolic murmur. In the anterior oblique position the heart appeared as a little round ball with a narrow aorta and a clear pulmonary window: this we believe is characteristic of a very severe tetralogy of Fallot with functional pulmonary atresia, that is, a pulmonary stenosis which is so extreme that the condition is not long compatible with life. It was questioned at the time whether in addition to the malformation of the heart she suffered from mental retardation.

During the next six weeks she refused most of her feedings, she lost weight, and just before operation she weighed 4.0 kg. The RBC, which had been 7,000,000 on admission, had fallen to 5,000,000. Cyanosis was proportionately less conspicuous, indeed, at times while lying quiet cyanosis was not visible. The clinical diagnosis was again tetralogy of Fallot, which was so severe the baby's condition was becoming critical.<sup>2</sup>

On the 29th of November, Eileen Saxon was brought to the operating room. She was anesthetized with open drop ether and oxygen was delivered by catheter under the mask. The only monitor was a finger on the carotid pulse. Dr. Blalock with Dr. William Longmire (later the Chairman of Surgery at UCLA) and Dr. Denton Cooley, the intern, assisting him performed a subclavian to pulmonary artery anastomosis in 1 hour and 45 minutes. Vivian Thomas, who had prepared special needles and sutures for the anastomosis was standing by at Dr. Blalock's elbow. Dr. Taussig was also in the room. When the subclavian and pulmonary arteries were clamped, the pulse became very slow and almost imperceptible. Breathing became shallower and shallower and her cyanosis deepened. The outlook appeared dismal, but she rallied and the operation continued. Toward the end of the operation we thought she might be obstructed and attempted unsuccessfully to intubate her with our makeshift urethral catheter. Positive pressure was applied with the smallest mask we possessed in an effort to re-expand her lung. At the end of the procedure there was, to all of us, a dramatic improvement in her color. The atmosphere was jubilant and electric. Against what seemed almost insuperable odds, she had miraculously survived and was returned to the ward. As might be expected her postoperative course was stormy. She suffered bilateral pneumothoraces, which required frequent aspiration, and subsequently experienced a tension pneumothorax. We thought she might have experienced interstitial pulmonary emphysema, possibly related to our attempts to reinflate the left lung at the close of operation. In spite of the severity and the life threatening nature of her complications, she recovered and was discharged almost two months to the date on 25 January 1945, improved! This was a tribute to the superb care she received from the pediatric staff.

Eight months later, Eileen Saxon was readmitted for operation on her right side, for it was thought that the anastomosis had closed down, and she was again deeply cyanotic and in critical condition. This time she was intubated under cyclopropane using the to-and-fro absorption technique. Sadly, she survived for only a few days after this operation. Indeed, intubation and to-and-fro cyclopropane became the technique and agent of choice for us in the majority of the Blalock-Taussig procedures.

In 1946 Dr. Lamont and I published our experience with the first 100 cases and 103 anesthetics in which twenty-three patients died. We felt that anesthesia may have played a role in ten of these deaths, but there were many other significant factors which may have contributed as well.3 Keats and others have cited this paper as a landmark, and in his inimitable way Keats observed, "the article is a pleasure to read in its ingenuousness, its candor right down to their inability to find the right size endotracheal tubes and connectors for infants, and its complete account of all their troubles. This article, which I found so rewarding in 1955 wouldn't have a chance of getting published today."5 It is also likely that in the present climate that this operation, if proposed today would probably not be approved by an IRB.

At the operation itself there was a tangible, palpable excitement in the air and the feeling that something historic was happening. The initial presentation by Blalock and Taussig to the Hopkins Medical and Surgical Association meeting was accompanied by a standing ovation. The dramatic success of the initial procedure, the "blue baby" turning pink caught the hearts and imagination of parents, surgeons, and the general populace. Surgeons from around the world came to see Blalock operate, and patients were referred from home and abroad. By 1946, when our article was published, we had completed over 200 operations.

Blalock made several triumphal tours in Europe where he received many honors for his remarkable contribution to the surgical treat-

ment of infant and pediatric heart disease and the brilliant demonstrations of his operative skill. The remarkable change in "blue babies" following operation was indeed dramatic. Dr. Taussig at this time did not share equally in the adulation and recognition to the same extent as Blalock. Whatever the reasons, an obvious cooling of their relationship developed. It was painful to witness the almost "veiled hostility" which came to characterize their interactions. Surely there was enough glory for both. It was sad, indeed, for those of us who admired them, for both were such superb physicians and human beings.

The ligation of the patent ductus arteriosus by Gross, five years before the Blalock-Taussig operation, clearly ushered in the surgical attack upon the great vessels and the heart. Either the time was not ripe or the drama so exciting to cause the furor and attention associated with the "blue baby" procedure. Blalock had been trying to approach the problem of coarctation of the aorta using a bypass technique, but was concerned, based on his animal studies, of severe neurological complications following clamping of the aorta. The successful surgical correction of coarctation by direct excision and anastomosis was solved by Clarence Crafoord of Sweden in 1945.<sup>6</sup> In 1946 Potts, of Chicago, introduced the aorta-to-pulmonary shunt for the tetralogy of Fallot. William McQuiston, his anesthesiologist, described his superb management of these patients with cyclopropane anesthesia.<sup>7</sup> McQuiston also introduced surface cooling to help metabolism and cyanosis. However, it was not until 1953 that Gibbon used a pump oxygenator successfully to usher in the great advances in cardiac surgery and anesthesia.<sup>8</sup> Gibbon's earlier attempt had been a failure related to a misdiagnosis. As a matter of fact, Clarence Dennis at the University of Minnesota was the first to use a heart-lung machine in humans; however, his patient did not survive the procedure.

So it was, that from 1939 to the 1950s operations on the heart and great vessels became a reality. While the anesthetic might be mentioned, neither the anesthesiologist nor the anesthetic management of these challenging operations was detailed. The paper by Harmel and Lamont in 1946 may be considered to herald the beginnings of pediatric cardiac anesthesia as a special endeavor. One cannot leave this arena without paying a final tribute to Dr. Helen Taussig, Dr. Alred Blalock, Vivian Thomas, and especially Eileen Saxon and her parents, without whose courage this exciting leap forward would not have been possible. MEREL H. HARMEL

### References

- 1. RE Gross and JP Hubbard, "Surgical Ligation of a Patent Ductus Arteriousus; Report of the First Successful Case," *JAMA* 112 (1939): 729-731.
- 2. A Blalock and HB Taussig, "The Surgical Treatment of Malformations of the Heart in which there is Pulmonary Stenosis or Pulmonary Atresia," *JAMA* 128 (1945): 189-202.
- 3. MH Harmel and A Lamont, "Anesthesia in the Surgical Treatment of Congenital Pulmonic Stenosis," *Anesthesiology* 7 (1946): 477-498.
- 4. WP Longmire, Alfred Blalock: His Life and Times, privately published by the author, 1991.
- 5. AS Keats, "The Rovenstine Lecture, 1983: Cardiovascular Anesthesia: Perceptions and Perspectives," *Anesthesiology* 60 (1984): 467-474.
- 6. C Crafoord and G Nylin, "Congenital Coarctation of the Aorta and its Surgical Treatment," *J Thoracic Surgery* 14 (1945): 334-361.
- 7. WO McQuiston, "Anesthetic Problems in Cardiac Surgery in Children," *Anesthesiology* 10 (1949): 590-600.
- 8. JH Gibbon, *Minnesota Medicine* (St. Paul: Minnesota State Medical Association, 1954): 137-171.
- 9. C Dennis, "Development of a Pump Oxygenator to Replace the Heart and Lungs: Applicable to Human Patients, and Application in One Case," *Annals of Surgery* 134 (1951): 709-721.

ediatric critical care medicine (PCCM), now a subspecialty of pediatrics, had multiple and interacting origins in several fields of medical science and practice, including anesthesiology. Cohorting infants, children, and adolescents for vital system surveillance and support in a pediatric intensive care unit (PICU) did not

## John J. Downes

# ORIGINS AND DEVELOPMENT OF PEDIATRIC CRITICAL CARE MEDICINE AND THE ROLE OF ANESTHESIOLOGISTS

emerge in Western Europe until 1955 and in North America over a decade later. The leaders of these initial efforts were, for the most part, pediatric anesthesiologists.<sup>1</sup>

The roots of PCCM can be found in the attempts to provide extended care beyond initial resuscitation to infants in the late nine-teenth and early twentieth centuries. Parisian obstetrician Pierre Budin in 1888, A. Yllpo in Helsinki in 1912, and Chicago pediatrician Julius Hess in 1922 established a center for pre-term infants to provide care as well as research.<sup>2</sup> These represent the first specialized care units for pediatric patients.

In Western Europe and North America from 1930 through 1955, in the first respiratory intensive care units, anesthesiologists and other physicians utilized tracheostomy and various negative pressure cuirass ventilators (the "iron lung") for infants and children, as well as adults, suffering from bulbar polio.

In 1952 Bjorn Ibsen and H. C. P. Lassen introduced positive pressure mechanical ventilation and modern respiratory care techniques to cope with devastating polio epidemics in Scandinavia.<sup>3</sup>

Shortly thereafter respiratory care units for adults with all forms of respiratory failure opened in Oxford, Cardiff, Copenhagen, and Stockholm. G. Haglund, a pediatric anesthesiologist, in 1955 established what we believe to be the world's first multidisciplinary physician directed pediatric intensive care unit (PICU) at the Children's Hospital in Göteborg, Sweden.<sup>4</sup>

In 1961 H. Feychting, also a pediatric anesthesiologist, founded the second PICU in Stockholm. This was followed in 1963 by PICUs developed by neonatologists J. Joly and G. Huault in Paris, and pediatric anesthesiologists I. McDonald and J. Stocks in Melbourne. In 1964 pediatric anesthesiologist,

G. Haglund, a pediatric anesthesiologist, in 1955 established what we believe to be the world's first multidisciplinary physician directed pediatric intensive care unit (PICU) at the Children's Hospital in Göteborg, Sweden.

G. J. Rees, opened a thirteen-bed medicalsurgical PICU complex in Liverpool.<sup>1</sup>

In North America following World War I advances began in the care of the sick newborn and in surgery for the infant and child with congenital anomalies. William Ladd founded the subspecialty of pediatric surgery at the Children's Hospital in Boston in 1919 with a focus on newborns with severe anomalies and infants with intestinal obstruction. His former trainee and colleague, Robert Gross, initiated the field of pediatric cardiac surgery in 1937 by successfully ligating a patent ductus arteriosus in a girl with advanced cardiac failure. Through the training and publications by Ladd and Gross, as well as that of other pioneers such as C. Everett Koop in Philadelphia, nationwide progress in surgery for infants and children resulted in demands for increasingly skilled and sophisticated pediatric anesthesia and postoperative care. Charles Robson at Toronto's Hospital for Sick Children in 1919, and Robert Smith at Boston's Children's Hospital in 1946, established the subspecialty of pediatric anesthesia in North America.<sup>1</sup> They and their trainees and successors began focusing not only on surgical anesthesia, but also on postoperative airway and ventilatory care in the early recovery rooms. Here and in the early neonatal intensive care units, the concepts of vital system surveillance and support for infants and children developed.

In North America Peter Safar, Director of Anesthesiology at Baltimore City Hospital, established in 1959 the first multidisciplinary intensive care unit for both adults and children.<sup>5</sup> In 1960 anesthesiologists Henrik Bendixen, Henning Pontoppidan, and Myron Laver developed the adult respiratory care unit at the Massachusetts General Hospital that laid the clinical research foundations for the evolution of critical care medicine as a field.<sup>6</sup>

Leonard Bachman and John Downes, pediatric anesthesiologists, established the first PICU in North American in 1967 at the Children's Hospital of Philadelphia.<sup>7</sup> Subsequent units opened in 1969 at the Children's Hospital in Pittsburgh under pediatric anesthesiologist Stephan Kampschulte, with the support of Peter Safar, then Chair of Anesthesiology at the University of Pittsburgh, and at the Yale-New Haven Medical Center, under pediatric anesthesiologist James Gilman and pediatric cardiologist Norman Talner. In 1971 PICUs were founded at Toronto's Hospital for Sick Children by pediatric anesthesiologist Alan Conn, and at the Massachusetts General Hospital by pediatric anesthesiologist David Todres and pediatric pulmonologist Daniel Shannon.<sup>1</sup>

These early units in Europe and North America trained a generation of pediatric critical care physicians, many of whom became directors of new units and training programs, as well as the leaders in the subspecialty's professional societies. In the United States, in preparation for such a career, many of these physicians completed residencies in both pediatrics and anesthesiology, followed by fellowship training in pediatric anesthesiology and critical care medicine.

In 1981 the Society of Critical Care Medicine founded a Section on Pediatric Critical Care, as did the American Academy of Pediatrics in 1984. In 1987 the American Board of Pediatrics established sub-board certification in pediatric critical care medicine and qualified fellowship training programs were approved by the American Council on Graduate Medical Education.<sup>1</sup>

Since 1987 the role of pediatric anesthesiologists in the field has diminished. Although, in the United States several major academic pediatric critical care complexes and their training programs are led by physicians with training in anesthesiology. However, anesthesiologists can take pride in the fact that certain of their predecessors persisted in applying the knowledge and skills acquired in providing anesthesia for pediatric surgery to successfully serve critically ill infants and children and establish units for their care. These efforts led to the eventual creation of the formal subspecialty of pediatric critical care medicine, a vital component of children's health care throughout the world.

### References

- 1. JJ Downes, "The historical evolution, current status, and prospective development of pediatric critical care," *Critical Care Clinics* 8 (1992): 1.
- 2. ME Avery, introduction to *Diseases of the Newborn*, 6<sup>th</sup> ed., ed. HW Taeusch, RA Ballard, and ME Avery (Philadelphia: Saunders, 1991): 1.
- 3. B Ibsen, "The anaesthetist's viewpoint on treatment of respiratory complications of poliomyelitis during the epidemic in Copenhagen," *Proceedings of the Royal Society of Medicine* 47 (1954): 72.
- 4. G Haglund, Proceedings of the Fourth Congress Scandinavian Society Anesthesiologists, Helsinkini, Finland, 1956: 59.
- 5. P Safar, et al, Anesthesia 16 (1961): 225.
- 6. HH Bendixen, et al, "Respiratory Care," Mosby (1965).
- 7. L Bachman, et al, "Organization and function of an intensive care unit in a children's hospital," *Anesth & Analg* 46:5 (1967): 570-574.

**T ntroduction:** In 1959 one of us (RJD) often met in the cafeteria of the Wisconsin General Hospital a tall, reserved gentleman eager to practice his French and his German. After a few weeks RJD discovered that the elderly man was Dr. Erwin R. Schmidt, the "Great White Father," and Chairman of Surgery. Only a few years later did

## Ray J. Defalque and A.J. Wright

## ERWIN R. SCHMIDT, M.D.: A PIONEER IN SURGERY AND ANESTHESIA

he find that this noted surgeon had also played a vital role in the history of anesthesia.

### A Brief Biological Sketch

Dr. Schmidt was born in Alma, Wisconsin, December 12, 1890 into a medical family of Swiss origin. His mother was the sister of the famous surgeon A. J. Ochsner. Dr. Schmidt received his M.D. from Washington University School of Medicine in 1916, interned at Barnes Hospital of St Louis, and in July 1917 started his surgical training under A. J. Ochsner at the Augustana Hospital of Chicago. He interrupted his training to serve as a surgeon in the U.S. Army, first at Fort Dodge, Iowa, then in Nantes, France. Major Schmidt left France and the Army in April 1919, and ten days after his return married M. A. Newlove, whom he had met when she was nursing supervisor at Fort Dodge. The Schmidts had four children. Their two sons became surgeons.

Dr. Schmidt resumed his surgical training at the Augustana Hospital (1919-21). From 1921 thru 1923 he was an exchange surgical assistant in Stockholm and Frankfurt, and visited numerous European surgical centers. Back in the U.S. in 1923, he did two years of private surgical practice in Billings, Montana, then returned to Augustana Hospital as attending surgeon (fig, 1). In 1926 Dr. Schmidt accepted Dean Bardeen's invitation to become Chairman of Surgery at the University of Wisconsin, a post he kept until his retirement in 1961. He initially spent months barnstorming across Wisconsin to obtain referrals while building his department into a world famous surgical center. In 1927 he invited Dr, Waters to Madison and gave him his friendship and support until the latter's retirement in 1949. He recruited dynamic young surgeons to head his surgical sections, which made Madison famous: thoracic and cardiac surgery, neurosurgery, and cancer chemotherapy.



Figure I. Erwin R. Schmidt, M.D. provided strong support for Ralph Waters and the specialty of Anesthesiology. UNIVERSITY OF WISCONSIN DEPARTMENT OF SURGERY ARCHIVES.

Dr. Schmidt worked twelve hours a day, six days a week and expected the same dedication from his staff. He was known for his affability, humility and kindness to his patients, as well as his outstanding manual skills, his attention to details and asepsis, his calm under stress, and his knowledge of the basic sciences. He was a "surgeon with hands, head, and heart."

As behooves a noted chairman, he was a member of numerous medical societies and the recipient of many honors and awards. He was a founder of the American Board of

	Surgery. r
Early in his career	monograp
Dr. Schmidt realized	German.
the importance of	short vac
good anesthesia	spent hi
for surgery. He	fishing
invited Dr. Waters	Dr. Col
to join him in 1927,	DI. 50
and helped him	on June
found the world's	His healt
first academic	declining
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anesthesia.	Iulv = 10
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Surgery. He wrote fifty monographs, several in German. His rare and short vacations were spent hunting and fishing.

Dr. Schmidt retired on June 30, 1961. His health had been declining over the previous months. On July 9, 1961, ten days after his retirement, he

died in his sleep at his summer house on St. Joseph Island, Ontario. He was 70. His funeral was held four days later at St. Andrew's Episcopal Church where he had long been a warden. He is buried at Forest Hill Cemetery in Madison.

# Dr. Schmidt's Contributions to Anesthesia

Early in his career Dr. Schmidt realized the importance of good anesthesia for surgery. He invited Dr, Waters to join him in 1927, and helped him found the world's first academic department of anesthesia. He also introduced him to Dr. C. D. Leake, the famous pharmacologist at the University of Wisconsin. Dr. Schmidt was the author and/or co-author with Dr. Waters of nine articles on anesthesia. His ideas, now taken for granted, may have sounded radical at the time:

- 1. Anesthesia, which had allowed surgery to make immense advances, had itself made little progress. Because ether was safe and potent, its administration had been relegated to "technicians" without interest in the basic sciences or in trying new anesthetics.
- 2. Things were now changing: New drugs and anesthetics, and advances in basic sciences demanded that anesthesia be given by highly trained physicians with a solid knowledge of physiology and pharmacology.
- 3. Because both the surgical act and anesthesia deeply influence the patient's physiology, surgeons and anesthesiologists must understand each other and cooperate closely during the operation.
- 4. The OR team must keep up with progress: New drugs and anesthetics, the role of  $O_2$  and  $CO_2$ , the metabolic response to surgery, and to the various planes of anesthesia.
- 5. The anesthesiologist's role must extend outside of the OR: Preoperative evaluation and preparation of the patient, management of pain with drugs and blocks, O<sub>2</sub> therapy throughout the hospital, and PACU management of pain, vomiting and respiratory problems.

### Conclusions

Like John C. Warren, a surgeon who was vital to the birth of anesthesia in 1846, Dr. Schmidt played a similar role in creating scientific anesthesia through his support of Dr. Waters. Dr. Schmidt was also a powerful political aid, facilitating and supporting Waters' efforts to establish the American Board of Anesthesiology. He thus richly deserves to be remembered during this Waters celebration. RAY J. DEFALQUE AND A.J. WRIGHT

### **Bibliography**

Schmidt, ER "Anesthesia and surgery," Am J Surg 34 (1936).

Schmidt, ER "Anesthesia and surgery," In Ochsner's System of Surgery. Around 1930.

Schmidt, ER. "Anesthesia and surgery," Surg Gynecol Obstet 63 (1936).

Schmidt, ER "Postoperative oxygen therapy," J Mich St Soc 29 (1939).

Schmidt, ER "The surgeon and modern anesthesia," Mississippi Valley Med J 70 (1947).

Schmidt, ER and Waters, RM "Anesthesia, anesthetic agents and surgery," Surgery 6 (1939).

Schmidt, ER and Waters, RM "Cyclopropane postoperative mortality in 2200 cases," Cur Res Anesth Analg 14 (1935).

Waters, RM and Schmidt, ER "Anesthesia and surgery," Ann Surg 105 (1937).

Waters, RM and Schmidt, ER "Cyclopropane anesthesia," JAMA 103 (1934).

he discovery of the anesthetic properties of ether and its use for the relief of pain has long been recognized as one of the most important advances in modern medicine. It is unfortunate that endless disputes arose regarding its discovery and who had priority concerning its first use. Crawford W. Long, William Thomas

## **Richard Eimas**

# A SIDELIGHT ON CRAWFORD W. LONG'S FIRST USE OF ETHER IN AMERICA

Green Morton, Charles T. Jackson, and Horace Wells have all had vocal and argumentative supporters in a controversy that raged for well over a century.

My paper today is not intended to report new knowledge about this controversy, rather, to present an insight into how the work of Long captivated the interest of the eminent physiologist, Arno B. Luckhardt, and led to the development of a lasting friendship between the Luckhardt and Long families. Although the story of Crawford Long's epoch making contribution is well known to this audience. I would like to review it in order to set the scene for the development of ethylene as an anesthetic agent by Luckhardt and, finally, to share three heretofore unknown letters tucked away in an important book by Luckhardt, and not rediscovered until many years after his death.

Today the physician and pharmacist, Crawford Williamson Long, is recognized as the first to use ether as an anesthetic agent to perform painless surgery. He was born on November 1, 1815, the son of James Long, a successful planter and merchant in Danielsville, Georgia.

Long entered Franklin College, now the University of Georgia, in 1829 at the age of only fourteen. He received a Master of Arts degree from Franklin College in 1835 and commenced studying medicine with George Grant, a physician in Jefferson, Georgia (some sixty miles northeast of Atlanta). In 1837 Long journeyed to Lexington, Kentucky, for a course of lectures at the Medical Department of Transylvania University, completing his medical studies at the University of Pennsylvania where he received his medical degree in 1839. For the next year and a half, he practiced in New York hospitals where he received a thorough grounding in surgery as he walked the wards and worked with patients suffering from a wide variety of ailments and injuries. In 1841 he returned to Jefferson and purchased the practice of his preceptor and mentor, Dr. Grant.

During the 1830s, inhaling "laughing gas" became a popular social pastime. As a medical student, Long had participated in these "frolics" and his Jefferson office became a gathering place for the young men of the area. Nitrous oxide was usually the agent of choice but, one night, Long had no nitrous oxide, so he substituted sulfuric ether for the young men to inhale. As he watched his guests, he saw a young man fall over a piece of furniture and thought that he might have broken his leg. The young man insisted he felt no pain and continued to enjoy the party. The next day, friends carried him in to have Long set his broken leg. Having noticed that participants of these frolics, when under the influence of ether, felt no pain even though they suffered cuts, bruises, and broken bones, Long developed a theory that ether could be used during surgical procedures to block the normal response to pain.

On March 30, 1842, Long was given the opportunity to try his theory. James Venable of Jefferson came to have a cyst removed from his neck and agreed to having ether. With witnesses present, Long removed the cyst while having the patient inhale sulfuric ether given on a towel during the procedure. Mr. Venable testified immediately after the surgery that he had felt no pain and did not remember the surgery.

By the time Long read about the public administration of anesthesia by William Thomas Green Morton during a surgical operation in Boston in October 1846, Long had performed at least six other operations using ether. He made no secret of his work and many other

By the time Long read about the public administration of anesthesia by William Thomas Green Morton during a surgical operation in Boston in October 1846, Long had performed at least six other operations using ether. physicians in the area were aware of his discovery and sometimes used ether themselves. Even so, Long took no immediate steps to publish his discovery. He continued to experiment until he was convinced of ether's anesthetic properties as well as its safety. In December 1849 he

finally published a scholarly article entitled "An Account of the First Use of Sulfuric Ether by Inhalation as an Anesthetic in Surgical Operations" in the *Southern Medical and Surgical Journal*.<sup>1</sup>

Long married Mary Caroline Swain a few months after the landmark operation. They re-

sided in a home next to his office in Jefferson where the first four of their twelve children were born. In 1850, in hopes of acquiring a larger practice, Long moved his family to Atlanta. After a year in Atlanta, the Longs were dissatisfied and moved to Athens to be closer to family and friends. In Athens, Long entered into a partnership with his physician brother and they practiced medicine and operated a drugstore. Throughout his medical career, Long continued to use ether anesthesia in his practice for minor and major surgeries, amputations, and childbirth. He died on June 16, 1878, while attending a patient.

Arno Benedict Luckhardt was born in Chicago, Illinois, on August 26, 1885. He attended the University of Chicago where he received a bachelor of science in 1906, masters of science in 1908 and a Ph.D. in 1911. The following year he completed his medical degree at Rush Medical College. Luckhardt served on the faculty of the University of Chicago during his academic career. For many years he was the William Beaumont Professor in physiology and served as President of the American Physiological Society from 1933 to 1934.

Luckhardt made an important contribution to the field of anesthesiology by identifying and applying ethylene as an effective anesthetic agent. He was by no means the first to study ethylene because it had been identified as early as 1779 and its chemical and physical properties established by 1781.

His contribution to the field of anesthesiology grew out of a deep interest in the history of anesthesia and the scientific community's effort to develop a more effective anesthetic for surgical procedures.

During the early months of 1908, carnation growers had noted severe losses in their shipments to Chicago florists. The growers noticed that once the carnations were placed in greenhouses, the flower buds with petals would fail to open and that the blossoms would become dormant. Two botanists from the Hull Botanical Laboratory, William Crocker and Lee Irving Knight, researched this phenomenon and determined that ethylene was responsible for damaging the carnations. They discovered that ethylene was formed from the illuminating gas used in the greenhouses and established an association between ethylene and the resulting damage to the plants. It was this link which interested Luckhardt and fellow physiologist R.C. Thompson because they wanted to determine if ethylene toxicity might also affect animals. By 1918 they had gathered experimental evidence which demonstrated that there was no toxicity to animals, but rather an analgesic and an anesthetic effect when an 80% ethylene/20% oxygen mixture was administered. World War I delayed publication of their work as well as subsequent research. It was not until 1922 that Luckhardt, working with the physiologist, J. Bailey Carter, completed additional experiments and published their research.

In their article, "The Physiologic Effects of Ethylene: A New Gas Anesthetic,"<sup>2</sup> Luckhardt and Carter reported their tests on the effects of varying concentrations of ethylene, nitrogen, hydrogen, nitrous oxide, and oxygen on various laboratory animals, as well as human subjects. Their results demonstrated that ethylene acted more quickly than nitrous oxide in experimental animals. In January 1923 they obtained similar results in human subjects, and on January 28, 1923, ethylene was used as a general surgical anesthetic for the first time.

Luckhardt was the first to be fully anesthetized by ethylene. He "was anesthetized for fully ten minutes, during which time he was pinched in the ear and the upper right arm. The soles of his feet were beaten with a Stillson wrench. Of none of these procedures had he any recollection. In the course of the following week a large 'black and blue area' developed on the upper arm at the place of greatest injury."<sup>2</sup>

Luckhardt and Carter concluded that there

were several advantages of ethylene over nitrous oxide when used in human subjects: anesthesia may be maintained in the absence of all signs of asphyxia, adverse effects on blood pressure, dyspnea, and with complete muscular relaxation. It could also be used in obstetrics and they also reported that rapid recovery occurred after prolonged administration with no evidence of after effects.

Luckhardt and Carter ended their report by stating:

These advantages would make possible its use in many persons and conditions in which nitrous oxide is specifically contraindicated, such as in children, in diabetic patients, in old age, in advanced arteriosclerosis, in high cerebral pressure, in operations on the brain, in major operations, and in obstetrics.<sup>2</sup>

As a result of their success and demonstrations in simple and uncomplicated cases, more extensive and prolonged operations were undertaken with similar success. By the end of 1923, ethylene had been used in some 800 surgical cases at the Presbyterian Hospital in Chicago. However, the two physiologists did take precautions to warn of the danger of using ethylene in a clinical setting, noting its inflammable and explosive nature, "we warn surgeons and anesthetists not to use the gas in the presence of an electric spark, the actual cautery or a free flame."<sup>3</sup>

Even though the use of ethylene was initially successful, there was controversy about its use, and Luckhardt and Dean Lewis responded with a report in *JAMA* in December 1923 entitled, "Clinical Experiences with Ethylene-Oxygen Anesthesia."<sup>4</sup> In it the authors stated: "Our attention was furthermore called to some earlier literature on ethylene, which we had overlooked in spite of what we considered a thorough search. These reasons have prompted us to issue this report."<sup>4</sup> In the article, they traced the early study of ethylene and addressed the controversy over whether it may have been used clinically in 1849. They also addressed another issue involving W. Easson Brown, a Canadian, who published a paper on the physiological effects of ethylene on mice, rabbits, cats, and dogs. Luckhardt and Lewis argued that while Brown was working only with laboratory animals, they were establishing the anesthetic and analgesic properties of the gas on human subjects. In the final analysis, Luckhardt's documented use of ethylene on human subjects in January 1923 ultimately stands as evidence for credit being given to Luckhardt for being the first to demonstrate the use of ethylene in clinical trials.

Luckhardt had a great interest in the history of medicine, physiology, and anesthesia. He collected many rare books and papers, among them, William Beaumont's Experiments and observations on the gastric juice and the physiology of digestion (Plattsburgh, 1833). Before he died in November 1957, he was advised to sell his library rather than give it to an institution, so that others could have the opportunity to get the same enjoyment from the books that he did while they were in his library. Before selling the collection, he set aside a small number of books for his family and friends. In the late 1970s, his family gave several of those few remaining books to the University of Iowa Libraries. Among them was a volume entitled, Statements supported by evidence, of William T. G. Morton, on his claim to the discovery of the anesthetic properties of ether (Washington, DC, 1853). The book is a compilation of the hearings and documents submitted to the select committee appointed by the Senate of the United States during the Second session of the Thirty-second Congress in January 1853. The volume was located by Everette Evans, a personal friend of Luckhardt, and given to him as a Christmas gift. Evans' notation to Luckhardt was hand inscribed on the flyleaf inside the front cover of the book: "Mr. Luckhardt, It is a pleasure for me to send you this 'find'—for it covers as the shade of one discoverer in anesthesia to another such discoverer. December 1931 Everette Evans." Even more noteworthy and important is the inscription on the endpaper on the back of the front cover: "Antiquarian Library, Worcester, MA. With respects of W.T.G. Morton, MD." The inscription is just above Luckhardt's unusual bookplate, depicting a bespectacled jackass seated in a chair while looking at a book.

Containing Morton's inscription, such a volume would have been a valued and treasured addition to Luckhardt's collection of rare medical texts. It was certainly a welcome addition to our collection. What was most unusual were the three personal letters, which Luckhardt had placed amongst the pages of the text. Among them were two letters from Mrs. Frances Long Taylor, Long's daughter, as well as another letter written by Emma M. Long, a sister of Frances Long Taylor.

The controversy regarding who should receive credit for the first clinical use of ether as a general anesthetic was a cause that involved Mrs. Frances Long Taylor for most of her adult life and included writing a book about her father's clinical use of ether and attempts to gain support among the scientific community to prove that the credit of the first clinical use of ether did indeed belong to her father.

Mrs. Frances Long Taylor called upon Luckhardt as a friend for support in her quest. In this letter dated January 5, 1928, Frances Long Taylor describes her father's first use of ether:

> My Dear Dr. Luckhardt: Thanks for your delightful letter bearing not only good wishes but the assurance that before long I may receive the photograph of Mrs. Luckhardt. It with yours will occupy a place in my sunny little writing room. My father was born on November 1, 1815 and performed his first ether op

eration on March 30, 1842 at the age of 26 years and five months lacking one day. I think I am correct in saying that the price for removing the tumor was originally \$20.00—but as an inducement to the young man to submit to the operation under ether merely a nominal charge was made. You will find this statement in my book. Wishing you and yours a prosperous and happy New Year.

Cordially yours, Frances Long Taylor<sup>5</sup>

The Luckhardt and Long families developed a close relationship over the years and, in this letter written in September 1929, Frances Long Taylor expresses some of her personal thoughts regarding their relationship:

> My thoughts have been dwelling upon you and Mrs. Luckhardt for days, and this morning several hours have been profitably spent in reading your letters and pondering upon their contents. Your photograph, which I consider very good lies before me, as does the little Kodak of Mrs. Luckhardt. I recall very pleasantly our chat during the dance. I wanted very much to see her and Chicago but my sister was hurrying to the Mayo's and we had only time for a very brief drive. I had other friends in the city but could not see them.<sup>6</sup>

Near the end of the letter, she writes:

For fifty-years I have had a hard fight to establish my Father's claims. I am greatly gratified that through you, Dr. McGuigain and Dr. Leake, the great Western Universities, Chicago, Illinois and Wisconsin are his advocates.<sup>6</sup>

From these personal letters written to him by Frances Long Taylor, one can develop a

sense of Luckhardt's special interest in the history of medicine and of his personal support and friendship with the Long family. Luckhardt must certainly have had an added interest in Frances Long Taylor's plight as he himself found his discovery of a clinically useful anesthetic embroiled in controversy.

The final letter, dated March 3, 1930, is from Emma M. Long, Frances Long Taylor's sister, and informs Luckhardt of her sister's death:

> Mrs. Frances Long Taylor died January eighth last. Many duties since that time have prevented my writing the sad news to you, and thanking you for the able paper read by you before the Chicago Library Club and which you sent to her.

> With your permission I shall retain that paper? No more interesting and powerfully expressed on the subject (anesthesia) has ever been written.<sup>7</sup>

Were it not for Luckhardt's interest in and knowledge of the history of anesthesia, one might wonder if he would have pursued his research with ethylene, because he had many other scientific interests demanding his attention. Clearly, ethylene's introduction as a general surgical anesthetic was significant at the time of its discovery. As Luckhardt determined, ethylene possessed many benefits over nitrous oxide and yet, by his own admission, ethylene was not a perfect surgical anesthetic, due in particular to its flammable and potentially explosive nature. Just as Long, Luckhardt faced controversy, and yet both of their contributions indirectly led to the development of improved anesthetics by providing the impetus to examine new agents and techniques for inducing surgical anesthesia.

### RICHARD EIMAS

### References

- 1. CW Long, "An account of the first use of sulphuric ether by inhalation as an anaesthetic in surgical operations," *Southern Medical and Surgical Journal* 5 (1849): 705-713.
- 2. AB Luckhardt and JB Carter, "Physiologic effects of ethylene; a new gas anesthetic," *JAMA* 80:11 (1923): 765-770.
- 3. AB Luckhardt and JB Carter, "Ethylene as a gas anesthetic," JAMA 80:20 (1923): 1442.
- 4. AB Luckhardt and D Lewis, "Clinical experiences with ethylene-oxygen anesthesia," *JAMA* 81:22 (1923): 1851-1857.
- 5. Francis Long Taylor, letter to Arno B. Luckhardt, January 5, 1928, Arno Benedict Luckhardt Papers, Knox College Special Collections and Archives, Galesburg, IL.
- 6. Francis Long Taylor, letter to Arno B. Luckhardt, September 2, 1929, Arno Benedict Luckhardt Papers, Knox College Special Collections and Archives, Galesburg, IL.
- 7. Emma Long, letter to Arno B. Luckhardt. March 3, 1930, Arno Benedict Luckhardt Papers, Knox College Special Collections and Archives, Galesburg, IL.

n the September 2001 ASA newsletter, Dr. Lucien Morris painstakingly draws the "Aqualumni Tree," tracing a majority of American anesthesiologists to the tutelage of Dr. Ralph Waters of Madison. One of the branches of this tree is the Galveston branch. I was intrigued by this since I believe that I am one of the last

## Bohdan J. Jarem

## THE WATERS TREE: THE GALVESTON BRANCH EXPANDED

remaining, full-time working anesthesiologists who was directly trained by original members of the Galveston branch, Dr. Harvey Slocum and Dr. Charles Robert Allen. I have also come into contact with at least a dozen other members represented on this tree and it is a pleasure to recognize them and their lineage.

First let me comment on the birth and flowering of American academic anesthesia, which occurred in the American Midwest rather than in the academic centers of the east. Many would think this strange and curious. Actually, there is nothing curious about this. Much of the development of American surgery included the great clinics of the Midwest, such as the Mayo and the Cleveland (Crile) Clinics. From Madison the disciples of Dr. Waters such as Dr. Rovenstine went east to New York. Robert Dripps at the great school of Philadelphia, Vandam at Peter Bent Brigham, and John Adriani at New Orleans, are all branches of the Waters tree. In fact, the majority of American academic anesthesia centers came from Madison, Wisconsin, either directly or indirectly.

In the late 1960s and early 1970s, I personally served my residency under Charles Robert Allen in Galveston, where Harvey Slocum was still an active and prominent attending. Dr. Allen was the chairman and John A. Jenicek, a protégé of Harvey Slocum, was also an attending. Dr. Gunter Corsessen and Dr. Billy Eggers had already passed through the department before my time. Drs. Joseph Gabel and Jim Arens arrived a few years later.

How did Dr. Harvey Slocum and Dr. Charles Allen, two young individuals from Madison, Wisconsin, come to an obscure Texas medical school such as Galveston? I find this a fascinating story and would like to share some of it with you. Harvey Slocum, who was an instructor in Madison, came to Galveston in May 1942, and Charles Robert Allen, who was a Ph.D. student, came in July 1942. It is interesting to read Dr. Allen's history of the department, from its birth in one room of approximately 60 sq. ft. with one wooden table in the basement of the basic science medical building, to 50,000 sq. ft. some twenty years later. The surgeon-in-chief (Dr. Singleton) was of the old school and performed almost all types of operations himself, or at least took credit for them.

From such humble beginnings, the department grew. Returning to Madison, Dr. Allen received the M.D. degree and subsequently completed his anesthesiology residency. He was then one of the two attending faculty members of the fledgling Galveston department. From the beginning the department was unique. It was totally autonomous and was separate from the Department of Surgery. A wide variety of procedures were performed, including stellate ganglion blocks on the cardiac ward for patients suffering from angina and infarction. As might be expected from disciples of Dr. Waters, cyclopropane was a mainstay of the anesthetic technique. The "to-and-fro" canister was a standard apparatus. Neurosurgical procedures were performed with ether separated from the surgeon's electrocautery by layers of neomycin soaked towels. Amazingly, no explosions or accidents were ever recorded.

Dr. Slocum remained chairman of the

From the beginning the department was unique. It was totally autonomous and was separate from the department of surgery. department until 1953, when he accepted a commission in the U.S. Army where he served for the next sixteen years. In his last command, he was commanding officer of an Army Hospital in Nuremberg, Germany. He returned to Galveston in 1969 and without

missing a beat, resumed his duties as a fulltime faculty member. Having devoted a large portion of his career to neurosurgical anesthesia at Walter Reed Army Medical Center and having made a close working relationship with the neurosurgeons there, Dr. Slocum performed most of the neurosurgical anesthesia at Galveston.

John Andrew Jenicek was a career Army anesthesiologist who had spent a considerable portion of his time at Walter Reed. While there he had been instrumental in planning and setting up the first intensive care unit. He had also developed an interest in pulmonary medicine and respiratory therapy. Upon completion of his term of active duty, Jenicek then joined the department in Galveston in 1968. He took over the responsibility for the intensive care unit and the recovery room areas. The ICU and recovery rooms were unique in several ways, not the least of which was their locations. They adjoined each other in an L-shaped manner. The nursing staff for both was interchangeable and cross-trained. The nurses worked directly under the Department of Anesthesiology and not under Nursing Services. This made staffing assignments and manpower requirements much simpler. The Department of Anesthesiology had overall control in both areas, and this has continued up to the present time.

In addition to his responsibilities in these two areas, John Jenicek also maintained an active role in the operating room; he was especially interested in ENT anesthesiology and in training allied health students, such as in pulmonary therapy. He continued to work well past the normal retirement age until health problems mandated his retirement. Others in the lineage of the Waters Tree, who later joined the department upon Dr. Allen's retirement and with whom I personally worked, were Joe Gabel, trained by Dr. Leroy Van Dam, and James Arens, trained under John Adriani. Dr. Arens is still actively practicing in Houston.

At the present time, the Galveston Department is headed by Dr. Donald Prough and continues to be successful. The intensive care unit remains under the authority of the Department of Anesthesiology—in an age when the role of the anesthesiologist as an intensivist appears to be diminishing across the country. This is no mean feat, and Drs. Jenicek, Arens and Prough are to be congratulated.

How does one measure the success of a teaching department? Partly by how well one fills the resident slots, how well the residents do on their in-service exams, how many pass the boards, and how desirable the residency is. In all of these categories, the Galveston department continues to rate very high. While not the largest department in the country or in the state of Texas, it continues to be very competitive. It has a rigorous, didactic program with daily lectures, and weekly or biweekly quizzes. The residents are constantly motivated to perform. Thus, they are well

prepared by the time they are ready to take their annual in-training exams and finally, their board examinations.

I would like to conclude this brief sketch of Drs. Slocum and Allen by rounding out their biographies. Dr. Slocum died in San Antonio, Texas in 1992. He is survived by his widow Mary and his son, Harvey C. Slocum Jr, who trained as a cardiac anesthetist. Dr. Allen passed away in 2000 at the age of 89. He was preceded in death by his son, Richard, an anesthesiologist in private practice. His widow, Rachel Hartin Allen, continues to live in the Hill Country of Texas, as does his son Bobby. His daughter Betsy is chief administrator for the Department of Anesthesiology and Critical Care at MD Anderson Cancer Center in Houston. It is a tribute to these men that their children each chose anesthesiology as their profession. his 95-page monograph was written by James E. Eckenhoff, B.S., M.D., FFARCS, Professor and Chairman of the Department of Anesthesia, Northwestern University. Published by J. B. Lippincott Company in 1966, it was presented to members of the American Society of Anesthesiologists as an educational service by McNeil

## David C. Lai

# A SUMMARY OF ANESTHESIA FROM COLONIAL TIMES: A HISTORY OF ANESTHESIA AT THE UNIVERSITY OF PENNSYLVANIA

Laboratories, Inc. Lippincott and McNeil Laboratories were both contacted in hopes of reprinting this remarkable little book on the occasion of the 75th anniversary of the arrival of Ralph Waters in Madison, Wisconsin. Unfortunately, the market for "history books" was deemed too small to warrant publication. Instead, thirty original copies of this book were made available to conference attendees as an historical service.

The goals of this paper are to show: 1. The influence of Ralph Waters on anesthesia at the University of Pennsylvania, 2. The importance of the people involved in this book, and 3. The wonderful figures and illustrations that make this book so enjoyable.

Anesthesia at the University of Pennsylvania is associated with Robert Dripps. This is made very clear in the front matters of the book. To begin, the dedication reads: "This History is Dedicated With Respect and Affection To a Man Who Has Placed All Anesthetists in His Debt – ROBERT D. DRIPPS." The American Society of Anesthesiologists concurred in 1965 by awarding him the Distinguished Service Award, the highest tribute the society can pay to an anesthesiologist for meritorious service and achievement. Next, Ralph Waters pays tribute to his former pupil in his passionate and eloquent Foreword: Over the past century, the attitude of the American medical profession and of surgeons, in particular, towards the pioneers in anesthesia offers an excellent example of what zoologists have called the "instinct of territorial command" and "the pecking order," characteristics which sociologists find also in humans.

This beautifully written and detailed history of the attempts to relieve pain at the University of Pennsylvania shows very clearly the struggle that has been necessary there and in so many other medical schools of this country. In all too many localities, the "territorial dominance" of the hospital and faculty organization has had to be overcome. At the same time, one has seen the serious frustrations and humiliations suffered by the pioneers during their efforts to bring better methods, drugs, and technics to the service of those patients who come to doctors for the relief of their suffering.

Efforts, such as these described at Pennsylvania, are overcoming the dominance of anesthesia by nonanesthetists. At the same time, these efforts have eliminated much of the severity of the "pecking" endured by the pioneers. The faculty, the hospital, the surgeon, and the general public from which our patients come, have all benefited in ways just beginning to be appreciated.

As a thorough, workmanlike, and welldocumented history of the Department of Anesthesia at the University of Pennsylvania, this monograph will long remain a model for other institutions to emulate. This history will serve as a well-deserved monument to the labor, enthusiasm, and ability of Robert Dripps, who deserves the highest praise, and of his associates.

Last, Dr. Eckenhoff further describes the importance of Dripps and the year 1965 in the Preface:

The University of Pennsylvania School of Medicine celebrated its Bicentennial Anniversary, the first Medical School in the United States so privileged, in 1965.

In this same year, Anesthesia at Pennsylvania gained recognition by being designated an autonomous University department, thus becoming the fifth departmental offspring of that course of instruction given by William Shippen, Professor of Anatomy and Surgery, from 1765 to 1805. And as the year closed, Robert L. and Grace S. McNeil made a bequest to the University that has led to the creation of the Robert D. Dripps Professorship of Anesthesia. For these reasons, it has seemed appropriate to take stock, to enumerate the contributions made to anesthesia by Pennsylvania and its faculty, and to document the founding of the present department and its achievements.

Ivan Taylor, the first anesthesiologist at the University of Pennsylvania in 1938, also trained with Waters at Madison. Dripps was able to spend nine months with Ralph Waters at the University of Wisconsin at Madison with a Commonwealth Fund Fellowship. When he returned in March of 1941, he continued training under Taylor. A year later, Dripps was appointed Director of the Department. Other Waters' residents joining Dripps at UPENN included Austin Lamont and Merel Harmel. If trainees of Waters are termed Aqualumni, then trainees of Dripps might be termed "Droplets." Famous Droplets include Margery Van N. Deming, John Severinghaus, James Eckenhoff, Leroy Vandam, and Selma Harrison Calmes.

Anesthesia From Colonial Times was written by James Eckenhoff, illustrated by Leroy Vandam, dedicated to Robert Dripps, and introduced by Ralph Waters. These four eminent anesthesiologists all received the ASA Distinguished Service Award: Ralph Milton Waters in 1946, Robert Dunning Dripps in 1965, Leroy David Vandam in 1977, and James Edward Eckenhoff in 1980.

The numerous figures accompanying each chapter are one of the great features of *Anesthesia From Colonial Times*. The captions are listed below as an index for future research.

- Figure 1. Portrait of JAMES WOODHOUSE, Professor of Chemistry 1795-1809, painted by Rembrandt Peale. (Reproduced with the permission of the College of Physicians, Philadelphia.)
- Figure 2. Photograph of the title page of W. P. C. Barton's Dissertation on Nitrous Oxide, published in 1808.
- Figure 3. Caricature published in 1808 satirizing the work and thoughts of W. P. C. Barton on Nitrous Oxide. (Reproduced with the permission of the Edgar Fahs Smith Memorial Collection, University of Pennsylvania.)
- Figure 4. Photograph of a card of admission to the lectures of Benjamin Rush, issued in December, 1800.

Figure 5. Operation Bell, 1791. A poignant

recollection of surgical procedures before the days of anesthesia. The caption reads: "Prior to the Discovery of Anaesthetics this Bell was rung before a Surgical Operation to summon attendants to hold the patient still." (Reproduced by the permission of Dr. C. P. Fox of the London Hospital, London, England.)

- Figure 6. Portrait of CRAWFORD W. LONG by Richard Lahey. The painting now hangs near the Medical Library in the Medical Laboratories on Hamilton Walk. (Reproduced by permission of the University of Pennsylvania.)
- Figure 7. Portrait of HORATIO C. WOOD by Thomas Eakins, painted in 1889. (Reproduced with the permission of the College of Physicians, Philadelphia.)
- Figure 8. A statuette of HORATIO C. WOOD by S. Murray, clearly indicating the character of the Professor in late life. (Reproduced with the permission of the College of Physicians, Philadelphia.)
- Figure 9. THE AGNEW CLINIC, painted by Thomas Eakins, 1889. The painting hangs above the entrance to the Medical Library in the Medical Laboratories on Hamilton Walk (Reproduced by permission of the University of Pennsylvania.)
- Figure 10. Reproduction of pulse curves from D. Hayes Agnew's Textbook on Surgery, demonstrating the safety of ether as compared with chloroform. The means by which these curves were obtained is unknown.
- Figure 11. Ether insufflation apparatus in use at the Hospital of the University of Pennsylvania in 1912. (Photographed from the International Clinics 2 (2nd series), 1912.)
- Figure 12. Medallion designed by Professor R Tait McKenzie, dedicated to the memory of Crawford W. Long on March 30, 1912. The memorial is located near the Medical Library in the Medical Laboratories on Hamilton Walk. (Reproduced by permission of

the University of Pennsylvania.)

- Figure 13. Photograph of diploma in Anesthetics granted to MARIE ROSE in 1909, the first nurse anesthetist in the State of Pennsylvania.
- Figure 14. IVAN B. TAYLOR, first anesthesiologist at the University of Pennsylvania, 1938. (Picture reproduced from the 1941 Scope.)
- Figure 15. Pictures of RICHARDS, SCHMIDT and COMROE reproduced from the 1941 Scope, that of RAVDIN from the 1940 Scope.
- Figure 16. Practical instruction in the administration of anesthetics at the Hospital of the University of Pennsylvania, 1965.
- Figure 17. Clinical investigation on the effect of narcotic analgesics in the Recovery Room of the Hospital of the University of Pennsylvania.
- Figure 18. Participation in Total Patient Care. Great emphasis has always been laid on the principle that the anesthetist is a physician with responsibilities outside as well as within the operating room.
- Figure 19. The Postanesthetic Recovery Room at the Hospital of the University of Pennsylvania under the direction of the Department of Anesthesia.
- Figure 20. Investigation on cerebral circulation and cerebral metabolism by members of the Department of Anesthesia under the direction of DR. HARRY WOLLMAN.
- Figure 21. Experiment in fundamental anesthetic research by PROFSSOR HENRY L. PRICE and Research Associate MARY L. PRICE. The department maintains its own animal research laboratories, where Dr. Price has conducted his research related to catecholamines and the effect of anesthetic agents on the circulation.
- Figure 22. Experiment in hyperbaric medicine by DR. JAMES DICKSON, formerly a member of the Department of Anesthesia.

These investigations are conducted in the Pharmacology Department, under the direction of PROFESSOR CHRISTIAN J. LAMBERTSEN, with residents and staff of the Anesthesia Department participating.

Figure 23. The Department of Anesthesia at Pennsylvania points with pride to having trained the first veterinarian anesthesiologist in the United States, DR. LAWRENCE R. SOMA. An anesthetic is pictured above in progress at the New Bolton Center, University of Pennsylvania. Dr. Soma's department at the Veterinary School maintains close liaison with the University's Anesthesia Department.

### PORTRAIT - ROBERT LINCOLN McNEIL OIL PAINTING BY LAZAR RADITZ

Leroy Vandam was well known for his artistic ability. An early example is found in *Anesthesia from Colonial Times*. The following drawings are found at the beginning of every chapter, between the chapter number and title. From left to right, the items represent:

- Chapter 1. Leroy's "safety" bellows for resuscitation (1827).
- Chapter 2. John Snow's chloroform inhaler.

- Chapter 3. Manner of holding syringe while injecting. After Labat.
- Chapter 4. Distribution of sensory branches of trigeminal nerve. After Labat.
- Chapter 5. Squire's inhaler for ether, first used on 21 December, 1846, by Robert Liston at University College Hospital, London.
- Chapter 6. W. T. G. Morton's ether inhaler (1846).
- Chapter 7. J. T. Clover filling reservoir bag (shown over his shoulder) of his chloroform apparatus with a mixture of 4% chloroform vapor in air (1862).
- Chapter 8. Hele's governor, to control the flow of nitrous oxide from the gas reservoir to the patient (1873).

In summary, Anesthesia From Colonial Times celebrates anesthesia at the University of Pennsylvania. Branches from the Dripps limb of the Waters Tree include Eckenhoff at Northwestern, and Vandam at the Peter Bent Brigham Hospital.

The author of this paper is of the fourth generation in Waters professional lineage, having trained under Ronald Gabel, a Vandam trainee, at Strong Memorial Hospital, the University of Rochester Medical Center. n order to understand how Waters influenced the development of anaesthesia in Britain, the British Commonwealth, and Europe, one must recall how anaesthesia was practised in the 1930s.<sup>1,2</sup>

## Keith Sykes

# HOW RALPH WATERS INFLUENCED THE DEVELOPMENT OF ANAESTHESIA IN THE BRITISH COMMONWEALTH AND IN EUROPE

### Anaesthesia in the 1930s

### **Great Britain**

In the 1930s there were a number of wellestablished teaching hospitals in London and the other major cities, but most of the other provincial areas were served by one of the traditional voluntary hospitals, most of which had been opened in the 18th and 19th centuries. During the 1930s, however, there was a significant expansion of municipal responsibility for health care. All of these institutions provided free treatment, though patients were encouraged to make a donation based on their own financial resources. The relatively small number of resident surgical, medical, obstetric, and anaesthetic staff were concentrated mainly in the largest hospitals, and in these, specialist care was provided by Consultants who undertook clinical sessions at the hospital without pay, in the hope that the general practitioners who referred cases to them at the hospital would also send them private cases. In the smaller hospitals the same sessional arrangements existed, but the Consultants were essentially general practitioners who had undergone some extra training in the speciality.

Private patients would be operated upon

in dedicated areas in the voluntary hospitals, in small private hospitals, or in the patient's home. Private practice was very competitive and practitioners who had learnt their craft by hard experience were often reluctant to pass on their knowledge to junior doctors, who might later compete for the available private work. Since there were no organised training programmes, the only way specialists could learn their trade was by taking poorly paid resident posts and by private study.

The total number of operations performed was much less than today, and the range of surgical operations was limited. Orthopaedic, abdominal and ear, nose, and throat operations were routinely performed, but there were few neurosurgical or thoracic surgical centres. In the larger cities there were a few specialist anaesthetists who devoted all their time to anaesthesia and who were able to generate a satisfactory income from private work, but the majority of anaesthetists had to augment their income with general practice because the anaesthetist's fee seldom exceeded 5% of the surgeon's fee. A further problem was that in private practice the surgeon might ask the patient's own general practitioner to assist at the operation or to give the anaesthetic, thus

depriving the surgeon's regular anaesthetist of the fee. Furthermore, if the general practitioner-anaesthetist was not available when the surgeon wanted to operate, the surgeon would call for a house-surgeon or house-physician and, if neither of these were free, he would ask a medical student or nurse to give the anaesthetic.

Many operations and obstetric procedures were carried out in the home with open-drop anaesthetics provided by the general practitioner. My own grandmother was subjected to a mastectomy on the kitchen table and was given a chloroform anaesthetic by her general practitioner. Many years later John Gillies, of induced hypotension fame, told me that he had been a general practitioner in the small Yorkshire town in which she lived, and that it was he who had given the anaesthetic! I also have unhappy personal memories of ethyl chloride and chloroform inductions for tonsillectomy and an abdominal emergency. In hospital practice ether was usually administered with nitrous oxide and oxygen from a Boyle's machine. There were also some 2-3 million anaesthetics per year for extractions in the dental chair, the most commonly used agents being nitrous oxide/air, nitrous oxide/oxygen, ethyl chloride, or divinyl ether.

#### Australia, New Zealand and Canada

In these Dominions the general picture was somewhat similar, but because the relatively small populations were scattered over a large area, there was an even greater reliance on the general practitioner for all branches of medical care. Again, the relatively few specialists practised mainly in the larger cities.

In less well-developed colonies such as India or Malaya, the Colonial Medical Service usually provided a high standard of care, and this was often supplemented by doctors and nurses working in Mission hospitals.

### Europe

The situation was entirely different in Europe. There were no physician anaesthetists, so surgeons operated under local, regional or spinal anaesthesia, which they administered themselves. When the operation could not be carried out with such techniques, the surgery was usually performed under ether anaesthesia administered by a nurse using a Schimmelbusch mask or an Ombredanne inhaler. It was the continued dominance of the surgeon-anaesthetist in the post-war years that delayed the development of anaesthetic departments in many European countries, especially in France and Germany.

As Joseph Blomfield's editorials in the British Journal of Anaesthesia record, a number of anaesthetists were very concerned about conditions in Britain, and this led H. W. Featherstone, W. Howard Jones, and a number of others to create the Association of Anaesthetists in 1932. This, in turn, led to the establishment of the Diploma in Anaesthetics in 1935. These very significant events show that there was an expanding group of anaesthetists who were eager for change and keen to try out new ideas.

### **Communication routes**

Although Waters only crossed the Atlantic Ocean on two occasions, there is little doubt that he had a significant influence on the development of anaesthesia, not only in Britain and the British Commonwealth, but also in many countries of Europe.

There are five routes by which his influence may have been spread:

First: Waters' publications in medical journals;

Second: the personal visits of a number of Commonwealth and European anaesthetists to the Madison Department;

Third: Waters' visits to Europe;

Fourth: the teaching programme in the Nuffield Department in Oxford; and

Fifth: overseas travel by the first Nuffield Professor of Anaesthetics, Robert Macintosh.

### Waters' Publications

Waters recorded his delight at discovering The Quarterly Supplement of Anesthesia and Analgesia appended to the October 1914 issue of the American Journal of Surgery, because this, for the first time, provided a method of communication between the anaesthetists who were practising across the North American continent.<sup>3</sup> Although English anaesthetists could read reports of the meetings of the Section of Anaesthetics of the Royal Society of Medicine in the Proceedings of that Society, the first journal to be devoted entirely to anaesthesia was Current Researches in Anesthesia and Analgesia, the journal of the National Anesthesia Research Society, which had been founded in 1919. Current Researches was first published in 1922, and this was followed by the appearance of the British Journal of Anaesthesia in 1923. It is significant that the first Editor of the British Journal, which was not sponsored by any official anaesthetic organisation, was an expatriate American anaesthetist, Hyman Morris Cohen. He held both American and British qualifications and had settled in Manchester after marriage to an English lady. Cohen was probably familiar with the struggle of F. H. McMechan and others to advance the status of the speciality in America, and in his first editorial Cohen advocated the formation of a British Society of Anaesthetists with broadly similar aims. Cohen died suddenly in 1929, and the next Editor, Joseph Blomfield, continued the same editorial policy. These two journals, which were first published just when England and America were beginning to recover from the ravages of the First World War, probably played an important role in stimulating the transatlantic exchange of ideas in the 1930s. However, we have to remember that there were few anaesthetic specialists, and even fewer medical libraries in the United Kingdom at that time, so Waters' papers would probably only have been read by a relatively small number of practising anaesthetists.

### Visitors to Madison

### United Kingdom

Although there are several reports of visits by British anaesthetists to the United States in the 1920s and 1930s,<sup>4,5</sup> the only references to the Madison department that I have been able to find are by W. Stanley Sykes. He published two papers in the British Journal of Anaesthesia in 1935,6 and contributed further observations in the discussion at the Royal Society of Medicine in 1937. He was very impressed by the Waters ethic, and in the 1937 report of that visit he stated: "For efficient organisation, teaching, and research, and for boundless enthusiasm and faith in the future of our craft, it would be difficult to find a better place than Madison, Wisconsin, where Ralph Waters is the Head of the Department."7

It is obvious that he felt that Waters' concept of the practice of anaesthesia is what every anaesthetist should strive for. When Sykes returned to his post in Leeds after internment as a prisoner of war in World War II, he was so shocked by the low professional standards of care in his hospital that he threatened to resign unless they were improved. He was, however, unable to convince the highly conservative and unenlightened local medical aristocracy that change was needed and, in disgust, retired from clinical anaesthesia. Fortunately, his resignation ultimately proved to be of major benefit to our subject for it enabled him to write his classic work, "Essays on the first 100 vears of Anaesthesia."

His sense of humour is well illustrated by the comment below the illustration of the ether vaporising bottle, designed by the pompous surgeon Lawson Tait. The illustration shows that the bottle containing the ether was heated by a spirit lamp. In the caption Sykes comments, "It is not stated how long this machine was in use before it blew up!"<sup>8</sup>

From the many complimentary remarks that Magill made about Waters, both in his 1966 Ralph M. Waters lecture<sup>9</sup> and on other occasions, I imagine that he and Waters must have met in the 1930s. However, I have not been able to find any documentary evidence that Magill actually visited Madison.

We do know, however, that Robert Macintosh, the first Professor in Oxford, visited Madison twice in the 1930s. Macintosh first visited Madison around 1933, when he was in private practice as a dental anaesthetist in London. He said that he originally hoped to complete a research project in the laboratory during a few weeks stay, but soon realised that this was impossible and directed his attention to the clinical work and departmental organisation instead.<sup>10</sup> He made a second visit in 1937 after being appointed to the Chair in Oxford. The latter visit lasted only a few days, but he then spent a further six weeks with E.A. Rovenstine, who had moved from Waters' department to head the anaesthetic department at Bellevue Hospital, New York University. At the end of the 1937 visit, Macintosh gave a lecture in Boston in which he compared British and American anaesthetic practice. He described his earlier visit to Waters and, in discussing his plans for the new department in Oxford, he said, "I spent three weeks with him investigating his methods, and I considered them so good, and the results so gratifying, that I propose to incorporate as many of his ideas as are practicable."

Macintosh often commented that he had modelled his department on Waters' precepts with the emphasis on a high standard of clinical practice and education. But, whereas, Waters had been welcomed by Erwin Schmidt, Professor of Surgery, and the heads of the basic science departments in the University of Wisconsin, many scientists in the University of Oxford were bit-

terly opposed to the formation of a Postgraduate Medical School and refused to co-operate with Macintosh when he was appointed in 1937. For this reason Macintosh recruited basic scientists such as S. F. Suffolk, S. L. Cowan, C. L. G. Pratt, and H. G. Epstein, and brought them into his own department to undertake research. As we all know, this close cooperation

Macintosh described his earlier visit to Waters and. in discussing his plans for the new department in Oxford, he said, "I spent three weeks with him investigating his methods, and I considered them so good, and the results so gratifying, that I propose to incorporate as many of his ideas as are practicable."

with Epstein eventually resulted, not only in a new series of Oxford vaporizers, but also in the recognition that physics should be a basic component of any anaesthetic training programme. This emphasis on physics is still one of the features which characterises British anaesthetic training to this day.

The main personal characteristic which both Waters and Macintosh shared was their intellectual honesty. One example of this is the question of preventable anaesthetic complications and deaths. While Waters always devoted one of the weekly meetings to a critical examination of the problems encountered in his department, Macintosh tended to discuss untoward events more informally, but equally ruthlessly, over a sandwich lunch. Richard Foregger described the scene in his "Report from England," published in Anesthesiology in 1944:

The day's work starts at 9:00 a.m. and continues until the lists are finished, usu-

ally by 6:00 p.m. It is the custom to take a full, leisurely hour for luncheon and to have time for coffee in the morning and always for tea in the late afternoon. These considerations, strange to me at first, are almost religiously adhered to and, I find, are conducive to more vigorous and less fatiguing concentration on the job in hand.<sup>11</sup>

Since Macintosh was the only Professor of anaesthetics in the United Kingdom, and during the war became Adviser in Anaesthetics to the Royal Air Force and the Royal Navy, he began to accumulate a large number of reports of complications and deaths during anaesthesia. Many of these were obviously avoidable, so he initiated a campaign to break down the professional secrecy surrounding anaesthetic deaths, which, at that time, were often concealed by attributing the death to such mythical entities as "status lymphaticus."

In 1943 W. W. Mushin was appointed First Assistant in the department, and in 1944 Macintosh and Mushin wrote a research proposal, which would have enabled Mushin to make an analysis of the main causes of complications and deaths due to anaesthesia. However, since the study required the collection of data on a national scale, the cooperation of the Association of Anaesthetists was sought. Unfortunately, the President and Council unanimously refused to cooperate. In 1948 Macintosh gave a paper to the Section of Anaesthetics of the Royal Society of Medicine entitled, "Deaths during anaesthesia." He produced a number of case reports that clearly illustrated that many anaesthetic complications and deaths were preventable, and he ended his presentation with a withering critique of the ineffectual Coroner's inquest system. Perhaps it was not surprising that the Editor of the Proceedings refused to publish the paper, though this was a most unusual event. Macintosh retaliated by sending a similar paper to the British Journal of Anaesthesia, which published it in the January 1949 issue<sup>12</sup> and followed it up with a powerful editorial supporting Macintosh in July of that year.<sup>13</sup> The result was that in 1949 the Association of Anaesthetists set up a Committee of Investigation into anaesthetic deaths, that finally reported in 1956.<sup>14</sup>

Another English visitor, who was very influential in passing on the Waters ethos was Michael Nosworthy. He visited Waters in 1938 to learn about the administration of cyclopropane and shortly afterwards visited Stockholm where he was instrumental in persuading Torsten Gordh to undertake training with Waters.<sup>15,16,17</sup> Nosworthy was very impressed, not only with the organisation of the Madison department, but also with Waters' skill as an anaesthetist.<sup>18</sup> In his description of the visit he says, "Waters was an artist, able to keep patients at just that depth of anaesthesia at which the surgical stimulus produced some respiratory drive." But, he then went on to doubt whether the degree of muscular relaxation would have satisfied British surgeons!

During and immediately after the war a number of overseas anaesthetists who were serving in the Armed Forces in Europe spent short periods in the Oxford department. One of these was Lucien Morris. In a letter to me he commented that when he subsequently joined Waters' department as a resident, he was surprised by the similarity in philosophy between the two departments. It was only later that he learnt of Macintosh's visits to Madison.

After the war, connections between the two departments were strengthened by a number of exchanges of personnel. Macintosh sent several of his assistants to spend short periods in Madison. These included Frank Boston, Edgar Pask, and W. W. Mushin. The visit was particularly important for Pask because he had just been appointed to the newly created Readership in Anaesthetics at the University of Newcastle, but had not received very much clinical experience before he was transferred
into the Royal Air Force to undertake fundamental physiological research on survival during the war. One of the projects with which he was involved was the design and testing of improved lifejackets for the Royal Air Force. To test these designs, Pask asked Macintosh to anaesthetise him with ether so that he could be immersed in a swimming pool to test how the lifejackets would perform on an unconscious airman. As Macintosh later said of him, "He must have been the only person to have gathered the material for his M.D. thesis while under a deep ether anaesthetic!"

Another visitor was Olive Jones. She had first visited the United States in the 1930s when she was anaesthetising for the neurosurgeon Sir Hugh Cairns at the London Hospital, and she had moved to Oxford when Cairns became the first Professor of Surgery in the new Medical School. In 1947-48 she spent six months in Madison anaesthetising for all types of surgery. In 1947 Rovenstine spent several weeks teaching in Oxford. In 1948 the Canadian anaesthetist, Alexander Miller MacKay, who had worked for three years in Oxford, moved to Madison to join Noel Gillespie, Sidney Orth, Simpson Burke, and Lucien Morris in the running of the Madison department after Waters retired. There was thus a close association between the personnel in the two departments which lasted for over a decade.

Macintosh and Waters wrote to each other frequently during the war and post war period, but, unfortunately, Macintosh did not save any of Waters' letters to him.

#### Australia

There were many other visitors to Madison. One of the first Australian anaesthetists to visit was Geoffrey Kaye. He visited Madison in 1930 and formed a life-long friendship with Waters. Their correspondence has been admirably documented by Gwen Wilson and Lucien Morris.<sup>19</sup> Many other Australians followed Geoffrey Kaye's lead: amongst these were Gilbert Troup, Gilbert Brown, Stuart Marshall, and Henry (Harry) Daly to name but a few. It is obvious that all the visitors were immediately struck by Waters' quiet but forceful personality, his intellectual honesty, and the effective manner in which he ran the department. They were also impressed by the high standard of patient care, by the patient record system, and by the educational benefit derived from the frank discussion of problems and mistakes.

#### Canada

Because of the geographical proximity of the two countries, it is not surprising that a Canadian anaesthetist, Harold Randall Griffith, should have been one of the first visitors to Madison.<sup>20</sup>

Griffith was born in Montreal in 1894 and died in 1985. He interrupted his medical studies in 1914 to serve in the sixth Canadian Field Ambulance in the First World War and was awarded the Military Medal for gallantry at the battle of Vimy Ridge. In 1917 he heard that medical students were being employed as doctors on the smaller British warships and spent a year as a Probationary Surgeon Sub-Lieutenant on "HMS Lapwing" in the Royal Navy. During the Second World War he served as a Wing Commander in the Royal Canadian Air Force and thus had the rare distinction of having served in all three services.

In 1918 Griffith returned to Montreal to complete his medical training and lived in the Homeopathic Hospital, where his father was Medical Director. During this period he undertook duties which varied from scrubbing floors to giving anaesthetics, and by 1922 he was able to present a paper describing his first 400 anaesthetics. Griffith qualified from McGill University in the same year and, after spending a year studying homeopathic medicine at the Hahnemann Medical College in Philadelphia, he joined his father's general practice and became the anaesthetist to the Homeopathic Hospital in Montreal. He succeeded his father as Medical Director of the hospital (now renamed the Queen Elizabeth Hospital) in 1936 and retired in 1966.

Griffith was a superb clinical anaesthetist. Early in his career a grossly overweight patient died from a laryngeal spasm during ether anaesthesia, and this stimulated Griffith to master tracheal intubation, first under ether anaesthesia, and later under nitrous oxide or ethylene anaesthesia. In 1928 he presented a paper describing his four-year experience with ethylene at the joint meeting of the Eastern and Canadian Societies of Anaesthetists in Boston. Waters was present at the meeting and introduced himself. Later, he proposed Griffith for membership of the Anesthetists' Travel Club, an organisation that aimed to reduce the isolation felt by these relatively few early pioneers of specialist anaesthesia. Frank McMechan, who founded the International Anesthesia Research Society, and Wesley Bourne, later to become the first Professor of Anesthesia at McGill University, were also members of this club, and the four became firm friends, though Waters later disagreed with McMechan's approach to the employment of nurse anaesthetists; Water's view being that nurses had to be employed until there were enough physicians to replace them, while McMechan felt that specialist anesthesiologists should not be associated with nurse anesthetists at all.

The Travel Club held its first meetings in Rochester, Minnesota in 1929, and in Madison in 1930. It was the demonstration of cyclopropane at the 1933 meeting in Madison which encouraged Griffith to administer the drug on October 30, 1933. Griffith thus became the first person to administer cyclopropane to a patient in Canada, and he continued to advocate its use until he stopped giving anaesthetics in 1966. In later life Griffith said that it was his familiarity with tracheal intubation with a cuffed tube and the use of controlled ventilation with cyclopropane (all techniques that he had learnt from Waters) that gave him the confidence to use curare on humans in 1942.

Griffith and Waters had much in common. They both believed in physician-based anaesthesia and were both concerned with standards of anaesthetic care. Griffith was well aware of the mercenary practices of many of his contemporaries and was openly critical of the employment of nurse anaesthetists for economic reasons. He was an intensely honest man who continually sought to determine the cause of any anaesthetic complication and he, like his good friend Robert Macintosh at Oxford, campaigned for honest reporting of anaesthetic complications and deaths so that anaesthetists might learn from the mistakes of others.

Like Waters, Griffith played a major role in postgraduate teaching. At the beginning of the Second World War Griffith, Wesley Bourne, and Digby Leigh initiated a series of three month postgraduate courses in anaesthesia for members of the armed forces, and these later led to the well known Monday evening meetings which became one of the highlights of the Montreal training programme.

Griffith was also unstinting in his support of organisations designed to further the progress of anaesthesia. In 1943 he became the first President of the Canadian Anaesthetist's Society, in 1946 a Vice-President of the American Society of Anesthesiologists, and in 1948 President of the International Anesthesia Research Society. From 1951 to 1955 he was deeply involved in the foundation of the World Federation of Societies of Anaesthesiology and was elected President of the new organisation in 1955. Griffith's description of the warm reception and lavish hospitality that members of the interim committee received when they toured Europe in 1953 indicates just how much he was respected by the anaesthetic community at that time.<sup>21</sup>

#### Sweden

This was another country that benefited directly from the training offered in Waters' department.<sup>15,16,17</sup> Torsten Gordh, who was at that time a trainee surgeon, met Michael Nosworthy when the latter was visiting Stockholm in 1938 and asked how he could train as an anaesthetist. Nosworthy said to him, "If you go to England you will watch; in the U.S. you will work." Nosworthy recommended him to Waters and he spent sixteen months working in the department, and then visited other major departments in North America. He returned to Stockholm on the steamship Drottningholm, arriving in Stockholm on April 8, 1940, one day before the German invasion of Norway and Denmark. Gordh subsequently sent his three assistants, Olle Friborg, Erik Nilsson, and Karl-Gustav Dhuner, to Madison for training. Nilsson and Dhuner were there at the same time as Carlos Parsloe.<sup>22</sup> These four Swedish anaesthetists had an immense influence on the development of anaesthesia throughout Scandinavia and other parts of the world, and in 1947 Waters was decorated with the Order of Vasa in recognition of his role in the evolution of Swedish anaesthesia.

#### Waters' visits to Europe

In July 1936 Waters addressed the British Medical Association meeting in Oxford on "The present status of cyclopropane"<sup>23</sup> and gave a memorable demonstration of its use in Oxford using the simplest equipment.<sup>24</sup> He then spent some time travelling around Britain and the Continent and undertaking research on two of his heroes, John Snow and Friedrich Sertürner, the German apothecary who isolated morphine from opium in 1803-06. Waters subsequently demonstrated the use of cyclopropane in some of the London teaching hospitals.<sup>25</sup> In October he addressed the Section of Anaesthetics at the Royal Society of Medicine on "Carbon dioxide absorption from anaesthetic atmospheres."26 He prefaced his lecture with the sentence, "The greatest anaesthetist was an Englishman–John Snow," a statement that baffled most of his audience who were not aware of the contributions made by our first scientific anaesthetist. Waters' lectures and demonstrations and his quiet but dominant personality had made a great impression on British anaesthetists. At that meeting he was elected as an Honorary Member of the Section of Anaesthetics. In 1944 he became the fourth recipient of the Henry Hill Hickman Medal of the Royal Society of Medicine, and in 1948 he was elected to the Honorary Fellowship of the new Faculty of Anaesthetists of the Royal College of Surgeons.

#### 1950

Even though Waters had retired, he returned to Europe in 1950 with his pupil Stuart Cullen to initiate teaching on the World Health Organisation anaesthesia course in Copenhagen. He also paid a brief visit to Sweden to see Torsten Gordh.

The WHO courses incorporated many of Waters' ideas and had a major influence on the development of anaesthesia not only in Europe, but also in many other parts of the world. They lasted a year and were held each year from 1950 until 1973. During this period 317 Danish doctors and some 423 doctors from 71 other countries were given theoretical and practical training in anaesthesia and intensive care.<sup>27</sup> Bjørn Ibsen, who was the anaesthetist who introduced intermittent positive pressure ventilation with a Waters cannister as a method of treating severe bulbospinal poliomyelitis in the 1952 Copenhagen epidemic, remembers Waters saying, "First learn to give good anaesthesia. Then teach and teach, and when you are finally established, do research."28 This philosophy was somewhat at variance with that existing in Copenhagen at the time. It is apparent from Ibsen's description of the courses that morbidity and mortality meetings were an important component of the teaching,

thereby copying a tradition that was always admired by visitors to Madison. Waters and Cullen were followed by a succession of major international figures that taught for varying periods of time.

A large proportion of Copenhagen trainees subsequently held important posts in their own countries and would thus have helped to spread the Waters tradition around the world. Even though they might not have encountered Waters in person, they would have inevitably imbibed some of the Madison ethos.

# The Nuffield Department of Anaesthetics, Oxford

Finally, I would like to discuss the role of the Nuffield Department of Anaesthetics in Oxford, and in particular the role of its first professor, Sir Robert Macintosh.

Macintosh was born in New Zealand in 1897. He spent part of his childhood in Argentina, but returned to New Zealand when he was thirteen years old. In December 1915 he travelled to Britain and was commissioned in the Royal Scots Fusiliers. After a short period in France he was transferred to the Royal Flying Corps, for which he had originally volunteered. He was mentioned in dispatches, but was shot down behind enemy lines on May 26, 1917 and taken prisoner. There followed a remarkable series of attempted escapes from various prisoner of war camps, which have been documented in H. E. Hervey's paperback Penguin book entitled *Cagebirds* (1940).

After the war Macintosh entered Guy's Hospital Medical School, qualifying in 1924. Whilst studying for the Fellowship of the Edinburgh College of Surgeons, which he obtained in 1927, he undertook anaesthetic sessions in Guy's Hospital Dental School. His skills were soon recognised and within a few years he and several partners had developed a large and highly successful dental anaesthetic practice in the Harley Street area. In those days coal gas was supplied by the Mayfair Gas, Light and Coke Company and Macintosh's competitors referred to the anaesthetic practice disparagingly as the "Mayfair gas, fight and choke company."

The story of Lord Nuffield's battle with the University to create a chair in anaesthetics has been told many times, so I will just say that the Nuffield Department was founded in 1937 and soon became a major influence on the development of anaesthesia in the United Kingdom and elsewhere.<sup>29,30</sup> However, Lord Nuffield's original concept of Postgraduate Medical School designed to stimulate research and teaching in medicine, surgery, obstetrics and gynaecology, orthopaedic surgery, and anaesthetics was discarded when, at the onset of war, clinical medical students were evacuated from the London teaching hospitals and sent to the Radcliffe Infirmary for clinical training, for the University immediately grasped the opportunity of creating an integrated pre-clinical and clinical school in Oxford. Macintosh was extremely loyal to Nuffield and fiercely opposed this development throughout his life, refusing to wear his gown on University occasions to show his respect for Lord Nuffield's concept.

So, how did the Nuffield department become such an important centre for the development of anaesthesia? There were three main features that I should like to consider: first, the two-week refresher courses for civilian and service anaesthetists run during the war; second, the visits of trainees from other countries; third, Macintosh's lecture tours when he demonstrated simple techniques of anaesthesia throughout the world.

#### **Training in the Department**

As we have already noted, Macintosh always said that he had organised the department on the Waters model, though local opposition to the formation of a clinical medical school had forced him to modify Waters' concepts. A further difference between British and Ameri-

can departments is that in North America, the anaesthetic department is usually responsible for both the academic programme and the provision of the clinical service, so the Chairman can, within reason, dictate both clinical and academic policy. In Britain, however, the clinical service has traditionally been provided by clinicians whose primary responsibility is to the hospital and not to the university. The members of the academic department are paid by the university and undertake honorary clinical sessions, but the Professor has no formal control over the clinical activities of the department. Thus the clinicians may choose not to participate in the academic programme. Macintosh met these difficulties when he arrived in Oxford, but gradually managed to build up a cadre of Oxford-trained Consultants who supported the academic activities. However, this took some years to accomplish.

Macintosh was firmly committed to simple, safe techniques of anaesthesia and made the clinical service and teaching in the operating room his highest priority. When war broke out, many of the younger anaesthetists were conscripted for war service, so in 1940 he instituted twice-yearly short revision courses for anaesthetists. These were attended by up to twenty trainees, lasted for two weeks, and consisted of lectures, tutorials and practical demonstrations in the operating room. The courses continued until 1951 and were attended initially mainly by British doctors, and some doctors serving in allied forces resident in Britain, but after the war many of the participants were from Europe, and the British Commonwealth.

Participants in these courses included Otto Mollestad from Norway, Ernst Trier Morch from Denmark (and, later, Chicago), J. Van der Walle from Belgium, James Robertson from Edinburgh, Ronald Stephen from Canada, Lucien Morris from the USA, Ritsema van Eck from Holland, Werner Hügin from Switzerland, Philip Bromage from the U.K., Henning Ruben from Denmark, Lopes Soares from Portugal, and P. V. Savolainen from Finland. A number of these doctors also gained clinical experience in the operating rooms. Other anaesthetists such as Barney Sircar, who had undergone residency training with Dr Waters, were taken on as assistants in the Oxford department and so were partly responsible for teaching on the courses.

In 1938 Lord Nuffield had provided finance to initiate a series of Nuffield Dominion Scholarships. This scheme was designed to enable the brightest Commonwealth doctors to travel to England for specialist postgraduate training. Those spending time in the Nuffield department of Anaesthetics included Lorna Bray, 1946-1947, Royal Melbourne Hospital: E. J. Hocking, 1951-1952, Perth; R. R. Clark, 1952-1953, St Vincent's Hospital, Melbourne; I. H. Macdonald, 1953-1954, Royal Children's Hospital, Melbourne; H. D. O'Brien, 1956-1957, St Vincent's Hospital, Melbourne; A. B. Bull, 1954-1956, University of Capetown; W.vd. M. Lambrechts, 1958-1960, University of Capetown; J. I. Clayton, 1959-1961, Dunedin, New Zealand; and C. McK. Holmes, 1963-1964, Dunedin, New Zealand. These doctors subsequently became key figures in the development of anaesthesia in their own countries. They not only used their newly gained expertise to increase standards of anaesthesia in their own country, but also encouraged their juniors to widen their horizons by a period of training abroad.

#### Macintosh's travels

After the war Macintosh received many invitations to lecture and demonstrate anaesthetic techniques. Wherever he went, he taught simple but safe techniques of anaesthesia, often based on the Oxford ether vaporiser.

For example, his extensive travel diaries<sup>31</sup> reveal that he gave fourteen lecture/ demonstrations in Spain in 1946 and spent a month similarly employed in Finland, Denmark and Sweden in 1948. He made several trips to South America, Australia and New Zealand, lectured in East and West Germany, and spent three weeks demonstrating in Russia and Poland in 1956. This led to a return visit by three distinguished Russian Surgeons, I. S. Zhorof, V. I. Pshenichikov, and B. A. Petrov, who came to study our anaesthetic services in 1958. A year later we were told that some1500 Russian doctors were being trained in anaesthesia!

Macintosh visited many other countries, including Africa, China and Japan and during this period it was rare to find an anaesthetist in any position of authority who had not heard of the Oxford vaporiser and Macintosh laryngoscope. I, myself was taught how to use the Oxford vaporizer by Felix Freund, an Argentinian anaesthetist working with me in Boston, Massachusetts, who had, in turn, been taught by Macintosh in South America!

But Macintosh's visits were also of great importance in the medico-political field, for he managed to persuade many conservative medical establishment figures that physicianbased anaesthesia could make a significant impact on modern medical practice. His success may be attributed to three main factors. First, he had an impressive personality. He had a fine physique and excelled at sports. He had an excellent command of English, was fluent in Spanish and German, and he had displayed great courage in multiple attempted escapes from prisoner-of-war camps in Germany in the First World War. Second, Macintosh's demonstration anaesthetics and his in-depth knowledge of anatomy, physiology, physics, and medicine, showed the local surgeons that operating conditions could be greatly improved by a properly trained anaesthetist. He also convinced them that operative mortality could be significantly reduced, and that good pre- and postoperative care was an essential component of the surgical experience. Third, the fact that Macintosh headed an academic department in the University of Oxford carried the clear message that anaesthesia now had to be considered as an academic subject worthy of further study. When European surgeons learnt that British anaesthetists had to undergo a training programme, which was of equal duration to the training programmes for medicine and surgery (about eight years at that time), and that they also had to pass examinations which were equivalent in standard to those sat by any other speciality, they began to realise that change in their own communities could only be effected by the creation of academic departments and the development of proper training programmes.

One example of Macintosh's diplomacy is the creation of the First Chair in Anaesthetics at Innsbruck in Austria. Macintosh had met Bruno Haid (who had been a resident with Stuart Cullen in Iowa City) while learning to ski in Seefeld. Haid persuaded Macintosh to address the Medical Faculty and other local dignitaries in 1958, and this speech set off a train of events, which culminated in the creation of the first Austrian Chair of Anaesthetics in Innsbruck in 1959.<sup>32</sup>

This was the first chair in the German speaking area of Europe, though other European Chairs had been established in the University of Amsterdam (Prof. Doreen Vermeulen-Cranch, 1958), and the University of Louvain, Belgium (Prof. J. M. Van de Walle, 1958). Professor J. M. Van de Walle had worked in the Nuffield Department, and he told me personally how Macintosh had written to provide strong support for the establishment of his Chair. I think that it is highly likely that Macintosh's eloquence and diplomacy during his many travels may have influenced the establishment of a number of other academic departments throughout the world.

#### Conclusion

In conclusion, I hope that this review has provided some insight into the way in which Waters' ideals spread to England, to Europe, and to the British Commonwealth. I have cited Macintosh, Magill, Griffith, and Gordh as four leaders who have publicly proclaimed their debt to Ralph Waters. But, there are many more of us who never had the good fortune to meet the man, yet have been influenced by his ideals. I have also ignored the second and third generation visitors who have absorbed the Waters ethic by working in the departments run by the aqualumni. It is unfortunate that, with the demise of the Waters canister, fewer of our trainees will know how much their training has been influenced by Waters' ideas. I would, therefore, like to congratulate Lucien Morris and all the others concerned with the organisation of this meeting for providing this opportunity to celebrate the anniversary of the foundation of an academic department, which has had an immeasurable influence on the development of anaesthesia worldwide.

#### References

- 1. TB Boulton, The Association of Anaesthetists of Great Britain and Ireland 1932-1992 and the Development of the Specialty of Anaesthesia (London: Association of Anaesthetists, 1999).
- 2. DH Lukis, *Problems of anaesthesia in general practice* (London: Hodder and Stoughton Ltd., 1935).
- 3. RM Waters, "The development of anesthesiology in the United States. Personal observations 1913-1946," J Hist Med Allied Sci 1 (1946): 595-606.
- 4. CF Hadfield, "H. Edmund G.Boyle," Br J Anaesth 22 (1950): 107-117.
- 5. EJ Chambers, "The story of a journey in search of information," Br J Anaesth 5 (1928): 158-167.
- 6. WS Sykes, "Anaesthesia-its present and future," Br J Anaesth 13 (1935): 28-31 and 41-53.
- 7. RR Macintosh, et al., "Discussion: Impressions of anaesthesia in USA and Canada," *Proc Roy Soc Med* 30 (1937): 937-944.
- 8. WS Sykes, "Essays on the First 100 years of Anaesthesia, Vol 1," plateV111, opposite page 13.
- 9. I Magill, "The heritages of the past are the privileges of the future," *Anesthesiology* 28 (1967): 202-208.
- 10. RR Macintosh, "Ralph M.Waters Memorial Lecture," Anaesthesia 25 (1970): 4-13.
- 11. RA Foregger, "Report from England: The Nuffield Department of Anaesthetics," *Anesthesiology* 5 (1944): 81-4.
- 12. RR Macintosh, "Deaths under anaesthetics," Br J Anaesth 21 (1949): 107-136.
- 13. Editorial, Br J Anaesth 21 (1949): 161-162.
- 14. G Edwards, et al., "Deaths associated with anaesthesia," Anaesthesia 11 (1956): 194-220.
- 15. T Gordh, "The development of anaesthesiology in Sweden," *Acta Anaesthiologica Scand* 19 (1975): 344-348.
- 16. T Gordh, "How anaesthesiology came to Sweden," *Acta Anaesthesiologica Scand* 42 supplement 113 (1988): 34-38.
- 17. T Gordh, "Ralph M.Waters and Swedish anesthesiology," J Clin Anesth 6 (1994): 221-226.
- 18. MD Nosworthy, "Anaesthesia for chest surgery, with special reference to controlled respiration," *Proc Roy Soc Med* 34 (1940-1): 479-506.
- 19. G Wilson and L Morris, "'My dear dogfish'- a correspondence between Ralph M.Waters (1883-1979) and Geoffrey Kaye (1903-1986)," in *The History of Anaesthesia*, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989).

#### Keith Sykes

- 20. K Sykes "Harold Griffith Memorial Lecture: The Griffith Legacy," *Can J Anaesth* 40 (1993): 165-174.
- 21. HR Griffith, "Plans for a world federation of anaesthesiologists," in "Harold Griffith: his life and legacy," by JR Maltby and DAE Shephard, Can J Anaesth 39:1 supplement (1992): 88-91.
- 22. C Parsloe, "Ralph Milton Waters: his influence on the world and me," *American Society of Anesthesiologists Newsletter* 65 (2001): 17-18.
- 23. RM Waters, "Present status of cyclopropane," Br Med J ii (1936): 1013-1017.
- 24. NA Gillespie, "Ralph Milton Waters: a brief biography," Br J Anaesth 21 (1948-9): 197-214.
- 25. "Dr Ralph M.Waters' visit to London," Br J Anaesth 14 (1936-7): 35-36.
- 26. RM Waters, "Carbon dioxide absorption from anaesthetic atmospheres," *Proc Roy Soc Med* 30 (1936): 11-22.
- 27. O Secher, "The Anaesthesiology Centre Copenhagen," in Anaesthesia Essays on its History, ed. J Rupreht, et al. (Berlin: Springer–Verlag, 1985): 321-334.
- 28. B Ibsen, "From anaesthesia to anaesthesiology. Personal experiences in Copenhagen during the past 25 years," *Acta Anaesthesiologica Scand* supplement 61 (1975): 18-20.
- 29. R Bryce-Smith, JV Mitchell, and J Parkhouse, *The Nuffield Department of Anaesthetics, Oxford* 1937-62 (Oxford: University Press, 1963).
- 30. JA Beinart, *History of the Nuffield Department of Anaesthetics, Oxford 1937-1987* (Oxford: University Press, 1987).
- 31. Sir Robert R. Macintosh, Travel diary of visit to Boston, MA, June 1937, Sir R. R. Macintosh papers, PP/RRM/C.1, Wellcome Library for the History and Understanding of Medicine, London.
- 32. G Putz, "Geschichte der Univ.-klinik für Anaesthesie und Algemeine Intensivmedizin Innsbruck," in 30 Jahre Universitätsklinik für Anaesthesie und Algemeine Intensivmedizin der Medinischen Fakultät der Leopold-Franzens-Universität Innsbruck 1959-1989: 100.

n 30th May 1966, Professor Edgar Pask died in Newcastle upon Tyne, England, at the age of 53. His colleague Guy Horton wrote to those close to him with the sad news, and Ralph Waters sent the following reply:

### Gary R. Enever

### RALPH WATERS AND EDGAR PASK

#### Dear Dr Horton,

I do appreciate your letting me know of Gar Pask's death.

What a tragedy and why is it that old has-beens like myself are allowed to stay on while useful ones like Pask must go? I used to wonder if "playing guinea pig" as he did during the war gave him any physiological damage? I hope not.

Again thank you for letting me know.

Ralph W.

Edgar Pask was born in Lancashire in 1912. After doing extremely well at school he went up to Downing College, Cambridge, to study medicine. He finished his clinical training at the London Hospital, and qualified in 1933. Pask had shown an aptitude for applied physiology and pharmacology whilst at Cambridge, and was drawn to anaesthesia. He took up a post as Robert Macintosh's first assistant in the Nuffield Department in Oxford prior to the Second World War – Britain's first academic department, modeled on Waters' department in Madison.

With hostilities, he joined the Royal Air Force (RAF) as a doctor, and under the direction of Macintosh spent most of the next five years conducting a series of extreme experiments on himself. The experiments were designed to answer vital questions that related to the survival of aircrew after parachuting from a stricken aircraft, especially into the sea. Notably, he studied the physiological effects of bailing out at high altitude, of ventilating an apnoeic victim and the problem of designing a self-righting lifejacket for unconscious aircrew. His efforts are described with incredible understatement in his M.D. thesis to Cambridge University.

For the descent experiments, Pask acted as the subject for a total of seven of the sixteen "descents," including the first four. Experimental subjects breathed a gas mixture calculated to contain the same concentrations of oxygen present during a simulated parachute descent. Profound hypoxia was experienced during all the descents. The degree of respiratory stimulation required gas flows of 100 litres a minute to prevent re-breathing in the apparatus used.

The ventilation experiments required Pask to be anaesthetised with ether, intubated with a cuffed endotracheal tube, and attached to a smoked drum spirometer. The anaesthesia was deepened to the point of apnoea, and then the known methods of artificial ventilation were tried, and the lung volumes achieved recorded. The main stipulation was that the method finally chosen as the best had to be applicable to certain circumstances. The method had to be applied by non-medically trained rescue crew, between the decks of a speeding rescue launch.

#### GARY R. ENEVER



Figure 1. The etherized Pask is lowered into the pool during a lifejacket experiment. Note the nasal intubation with a Magill tube.



Figure 2. An unsuccessful experiment shows Pask face down in the pool. He was admitted to hospital after each of these experiments.

Eve's rocking board method was finally chosen, with the victim face down and the board moved through a total of 60 degrees—all the decks would allow. Of anaesthetic interest, Pask was given curare during some of these experiments to create apnoea without such a deep anaesthetic.

The most well known experiments involved the again anaesthetised Pask being used to test the floatation qualities of a variety of lifejackets. Attached to a co-axial circuit of their own design, the unconscious Pask was floated in a swimming pool, breathing through a cuffed naso-tracheal tube (fig. 1).

Many lifejackets and immersion suits were shown to hold the victim upside down in the water, leading to drowning (fig. 2). During these experiments, Pask undoubtedly aspirated water from the pool, and was often ill afterwards. This was not helped by his addiction to cigarettes, almost a universal

problem during the war. For Pask's selfless bravery and determination, he was awarded the Order of the British Empire by the King in 1944, and the John Snow Medal by the Association of Anaesthetists in 1946.

When Pask left the RAF, he came to the University of Wisconsin to visit Ralph Waters' Department in 1947. (Lucien Morris mentioned during the meeting that Pask slept on the living room couch at the Morris home during his visit to Madison.) It

The ideals he espoused were those of professionalism, research. teaching, and compassion. He was a Professor who appeared at the shoulder of his junior at night to lend a hand. He also took leading roles in the management of his hospital and the building of a new medical school.

is impossible to quantify the influence that Waters had on the 34-year old Pask. However, when he took up his post as Head of the Anaesthetic Department in Newcastle later the same year, the ideals he espoused were those of professionalism, research, teaching, and compassion. He was a Professor who appeared at the shoulder of his junior at night to lend a hand. He also took leading roles in the management of his hospital and the building of a new medical school.

Pask is remembered for his work on artificial ventilation and ventilators, monitoring, and, of course, lifejackets. He was renowned for his lectures, both in the U.K. and in America, and made many friends in Montreal, especially Harold Griffith. Pask's old mentor, Professor Macintosh, wrote of him after his death: "In my opinion he was the best brain in our specialty—and I have yet to meet anyone more reliable and considerate."

#### Bibiography

Anaesthesia 32 (1977): 843-844. (At the inception of the Pask medal)

Bryce-Smith R, Mitchell JV. The Nuffield Department of Anaesthetics, Oxford 1937-1962. Oxford, University Press, 1963.

Obituary of Edgar Pask, Lancet, June 1966: 1330-1331.

Pask, Edgar. MD Thesis. University of Cambridge, 1946.

we dish anesthesiology is greatly indebted to the preeminent American anesthesiologist and first professor of anesthesiology in the world, Ralph M. Waters. It was in part because of the influence and teaching of this great pioneer that modern anesthesiology became firmly established in Sweden. Approximately sixty

### Torsten Gordh, Sr. and Torsten Gordh, Jr.

# RALPH M. WATERS AND SWEDISH ANESTHESIOLOGY



Torsten Gordh, Sr., M.D. Aqualumnus

residents were trained by Dr. Waters. Many of them later became chairmen of their own university departments of anesthesia, and preached and practiced the Waters' gospel of professionalism in academic anesthesiology. Among these were four Swedes: Torsten Gordh (born 1907, resident in Madison 1938-39, chairman at Karolinska Hospital, Stockholm), Olle Friberg (1912-1979, resident in Madison 1945-46, chairman at Sabbatsbergs Hospital, Stockholm), Eric Nilsson (born 1915, resident in Madison 1946-47, chairman at the University of Lund), and Karl Gustaf Dhuner (1915-1984, resident in Madison

1947-48, chairman in Gothenburg). Through these Swedish pioneers and their numerous disciples, Waters had a profound influence on the development of Swedish anesthesiology.

Waters had a profound influence on the development of Swedish Anesthesiology.

The efforts of Dr. Waters have been duely



Figure 1. Torsten Gordh, Jr. with his father, Torsten Gordh, Sr., former Professor of Anesthesiology at the Karolinska Hospital. recognized in Sweden. In 1947 he became the first honorary member of the Swedish Society of Anaesthesiologists. In the same year, he received the Order of Vasa from the King Gustaf V of Sweden, in appreciation for his contributions to the developement of anesthesiology in Sweden. Both Dr. Waters and his university greatly appreciated those honors.

After Dr. Waters' death, 19 December 1979, Dr. Gordh senior wrote in an obituary published in the Swedish newspapers, "Ralph Waters was one of the great pioneers in anesthesiology, and a highly appreciated teacher and scholar. I hope that his spirit, with its wisdom and common sense, will remain in and continue to guide Swedish anesthesiology."

At the meeting, 6-8 June 2002, on Ralph Waters and Professionalism in Anesthesiology, Professor Torsten Gordh reported his personal memories from his contacts with Ralph Waters by means of a video greeting, now kept in the Wood Library-Museum. ong Kong is situated on the coast of S.E. China in what is termed S.A.R. (Special Administrative Region). Contrary to the popular belief it was not a "barren rock" at the time of the occupation by the British in 1841. There is evidence that it was inhabited by Chinese people, predominantly of the fishing community,

### Z. Lett

# HONG KONG ANAESTHESIOLOGY AND RALPH M. WATERS M.D.: WHAT WERE THE CONNECTIONS?

since ancient times. Hong Kong became a "colony" in 1843 and at that time health conditions were rather poor. twenty-four percent of the garrison force died of fever, as did ten percent of European residents.

Medical and Health Services were initiated in 1843. The medical officers were called "colonial surgeons" and their duties included—on top of the usual chores—also being "Meteorological reporters" to the Government. It seemed they were overworked, as in the span of four years five of them were exhausted and needed replacement.

Medical Education was put on a firmer basis by the establishment of the "Hong Kong College of Medicine for the Chinese" (sic) in 1887, with Sir Patrick Manson (generally considered being the "Father of Tropical Medicine") as first Dean. Dr. Sun Yat Sen usually credited with being the "Founder of Modern China" graduated from this College in 1892. Later, in 1905, the term "for the Chinese" was dropped.

Anaesthesia. Pain is as old as life. The term anaesthesia is said to have been coined by Oliver Wendell Holmes. It would be reasonable to assume that as far as anaesthesia is concerned, the situation in Hong Kong resembled that in China, although nearly all the medical (including anaesthetic) records were lost during the ravages of the Second World War (with Hong Kong being occupied by the Japanese, 1941-1945). Some diligent searching revealed that ether and chloroform were used as main anaesthetic agents. However, immediately following the Second World War, the standard of anaesthetic practice left a lot to be desired.

Anaesthesia as a specialty received a boost when the then Director of Medical and Health Services, Dr. K. C. Yeo, managed to persuade the Government to create a post of specialist anaesthetist—which brought me on the scene. With Dr. H. P. L. Ozorio (who had complained of being "a voice crying in the wilderness"), Dr. George Thomas, a surgeon and administrator, and a small number of other doctors including Dr. (later Professor) G. B. Ong, we succeeded in forming the Society of Anaesthetists of Hong Kong (SAHK) in 1954.

Hong Kong in those days was a smallish town, compared to the bustling metropolis into which it has grown. One of the principal tasks of the SAHK was to establish contact with prominent individuals (and institutions) abroad to try to have them visit Hong Kong (for talks, seminars) and/or facilitate secondments for doctors from Hong Kong to their institutions. The Faculties of Anaesthetists of various Royal Colleges of Surgeons (particularly the Australasian), Associations and Societies of Anaesthetists and many individuals responded with enthusiasm. The SAHK was affiliated to the WFSA in 1995.

Dr. Ralph M. Waters. Although Dr. Waters never visited Hong Kong, his influence and that of a number of his distinguished disciples was bound to make its impression felt also here. Thus the by-laws and statutes of the SAHK as formulated in 1954 mirror the thoughts of that great man.

Visitors to Hong Kong. Amongst these, too numerous for all to be mentioned here were from America: Professor John J. Bonica. Professor B. Brandstater, Professor Harold Carron, Dr. Norman Catron, Dr. John S. L. Chen, Professor John B. Dillon, Professor Ted Dobkin, Professor Deryck Duncalf, Professor Francis F. Foldes, Professor Raymond B. Fink, Professor Ake Grenvik, Professor Duncan Holaday, Professor Allen Hyman, Professor Ronald Katz, Dr. Barbara Lipton, Dr. Stephen Martin, Professor Lucien Morris, Professor Jack Moyers, Professor Louis Orkin, Professor E. "Manny" Papper, Professor Paul Radnay, Professor E. A. Rovenstine, Professor Peter Safar, Professor Rick Siker, Dr. Steven Steen, Professor Ron Stephen, Dr. Alf Tung, Professor Robert Virtue, Gerald Wolf, Gordon Wvant, and others.

From the U.K. and Ireland: Dr. Aileen Adams, Dr. John Alexander, Dr. John Beard, Dr. Gerry Black, Dr. Tom B. Boulton, Dr. Maurice Burrows, Dr. Geoffery Burton, Professor Sir Donald Campbell, Professor John Dundee, Professor Stanley A. Feldman, Dr. Archibald Gaeley, Professor T. C. Gray, Dr. John H. Hever, Dr. Douglas D. C. Howat, Professor Padraic Keane, Dr. Henington-Kiff, Dr. J. A. Alfred Lee, Dr. Brian Lewis, Dr. Harold Love, Professor Sir Robert R. Macintosh, Dr. Ruth Mansfield, Professor Denis Melrose, Professor D. Moriarty, Professor W. W. Mushin, Sir Geoffrey Organe, Dr. W. M. Rollason, Professor Michael Rosen, Professor Andrew H. Hornton, Professor M. D. Vickers, Jean Horton, Professor Sir Keith Sykes, Sir Gordon Robson, and others.

Most of them would have had Dr. Ralph Waters' visions and philosophy and thoughts—on linear and geometric progression of anaesthesia—in mind and yet Sir Robert Macintosh—in his Waters Memorial lecture published in *Anaesthesia*, January 1970 made a strong plea for simplicity.<sup>10</sup> He argued that anaesthesia and patients may benefit from less sophisticated methods. He even advocated the use of air, instead of oxygen, and presented a lucid case for simplification.

**Caution**. I can certify to that. After graduating from University College Hospital, London in 1942, and collecting my diploma from Oxford in 1943, I got commissioned as a Medical Officer in the Royal Army Medical Corps. I was sent to Burma where we found ourselves in the jungle, surrounded by the

Japanese. Although, as a Field Ambulance Unit we were supposed to evacuate all our sick and wouded, unfortunately we were unable to do so, and for three months or more we had to take care of our sick and seriously wounded

Sir Robert Macintosh–in his Waters Memorial Lecture published in Anaesthesia, January 1970 made a strong plea for simplicity.

there and then! All we had was thiopentone (just being introduced into anaesthetic practice), a Schimmelbush Mask, and ACE mixture (alcohol 1 pt, chloroform 2 pts, ether 3 pts). No oxygen, no means of positive pressure ventilation.

If we lived always in peaceful times, the more sophistication—the more advanced anaesthesia—or so it seemed. Alas, times are by no means tranquil, and no one can foretell if, or when, matters will resolve. Under these circumstances it would be appropriate if anaesthesia would pay more attention to the equipment as devised by one of the founders of the Hong Kong College of Anaesthetists, Brig. Gen. Ivan Houghton, who, as needed during the Falkland campaign, introduced anaesthesia equipment that can be all carried by one person, and also the "Triservice Anaesthetic apparatus." I feel confident that Dr. Waters, with his insight, understanding and wisdom would have nodded his approval.

#### Which is the paper?

As may be recalled, Hong Kong was occupied by the British in 1841 and became a British "colony" in 1843. It remained as such until July 1997 (with only the period 1941-45 under Japanese occupation during the Second World War) when it was handed back to China.

Many valuable records (including medical) got destroyed or lost during the ravages of the Second World War (1939-45), and the loss of anaesthetic records was no exception. Nevertheless, some information was retrieved.<sup>1,2</sup> In common with other similar locations, the standard of anaesthetic practice prevailing at the time in Hong Kong left a lot to be desired.<sup>3</sup> There was also a great shortage of physicians practicing or even interested in anaesthesia. apart from one-local graduate, Dr. Ozorio.<sup>4</sup> The situation took a turn for the better when, in 1954, the authorities ---then the Hong Kong Government-decided to create a post of "Specialist Anaesthetist." This was advertised locally and internationally, and led to the appointment of Dr. Lett from the United Kingdom to this newly created post, the responsibilities of which also included being Honorary Clinical Lecturer in Anesthesia for The University of Hong Kong. Shortly after, Drs. Ozorio and Lett, aided by a number of colleagues interested in anaesthesia (including many surgeons), established The Society of Anaesthetists of Hong Kong (SAHK). This Society became the focal point of activities, which were widely reported in Anaesthesia, the official journal of the Association of Anaesthetists of Great Britain and Ireland (1954-1983). Some of the Editors of Anaesthesia (Drs. John Beard, Tom Boulton, J. Alfred Lee and Michael Rosen) and others were particularly helpful. Among the Society's chief concerns was the establishment and maintenance of contacts and ties with fraternal bodies abroad. Hong Kong, then being a British colony, enjoyed affiliations with the Faculties of Anaesthetists of the various Royal Colleges of Surgeons, the Association of Anaesthestists of Great Britain and Ireland as well as kindred societies in the USA, Canada, Australia and Europe. The SAHK was affiliated to the World Federation Societies of Anaesthesiologists (WFSA) in 1955 and proved an important stepping stone, together with University Departments of Anaesthesia and CC of the Chinese University (Professor Andrew Thornton, Jean Horton, Cindy Aun, and later Teik E. Oh, et al). In 1983 the University Department at the (older) University of Hong Kong (Professor Ross B. Holland, Doug Jones, later Joseph Yang), in 1989 the Hong Kong College of Anaesthesiologists with Dr. Michael Moles (now deceased) in 1989 and the Hong Kong Academy of Medicine (of which all the Colleges including of Anaesthesiologists are members) in 1993. The evolution of anaesthesia and CC in Hong Kong has been documented under Reference 9.

A number of these visitors were in their time presidents or secretaries of the WFSA and/or presidents or high-ranking officers of their specific national associations of anesthesiology and critical care (CC).

Visiting experts (encouraged by the president and members of the SAHK) started to arrive and help overcome local education problems. Amongst the visitors was a sizable contingent from "The New World," too numerous to be mentioned here.

It is the purpose of this presentation to suggest just how the teachings and philosophy of the great Dr. Ralph Waters may have influenced the evolution of anaesthesia in Hong Kong.<sup>5.6,7.8.9</sup>

#### References

- 1. Z Lett, "Anaesthesia in Hong Kong. Past and Present," pre-printed paper in *Proceedings of the 46 General Scientific Meeting of The Royal Australasian College of Surgeons 1973*, Singapore.
- 2. Z Lett, "The history of anaesthesia in Hong Kong," in *The History of Anaesthesia*, ed. RE Atkinson (London, N.Y.: Boulton, Royal Societies of Medical Sciences Ltd., International Congress and Symposium Series 137, 1984): 156-158.
- 3. GB Ong, (Tan Sri) Valedictory University of Hong Kong, 1983 University of Hong Kong Gazette 31: 26-27.
- 4. HPL Ozorio, "Hong Kong," in *Nuffield Department of Anaesthesia Jubilee*, ed. B Smith, Oxford, 1962.
- DAE Shephard, "Anaesthesia and Intensive Care in Hong Kong," Canadian Journal (April 1998): 385.
- 6. CNT Aun, "Anaesthesia and Intensive Care in Hong Kong," Br J Anaesth 80 (1998): 703-705.
- 7. NT Cass, Anaesthesia and Intensive Care Vol. 26: No. 2 (April 1998).
- 8. DJ Saunders, Anaesthesia 53 (1998): 1138-1140.
- 9. Z Lett and RJW Lo, *Anaesthesia and Intensive Care in Hong Kong*, (The University of Hong Kong, Centre of Asian Studies, 1997).
- 10. RR Macintosh, "Ralph M. Waters Memorial Lecture," Anaesthesia 25 (1970): 3-13.

**D** r. Jone J. Wu is one of the pioneer Chinese anesthesiologists with Waters' "roots," who made a great impact on modern Chinese anesthesiology. Back to the late 1940s, during the old regime before the Communist revolution, Wu embarked for America for further training through government endorsement and support to advance

### Guangming Zhang, Zhanggang Xue and Hao Jiang

# JONE J. WU, M.D., PIONEER CHINESE ANESTHESIOLOGIST WITH WATERS' ROOTS



Jone J. Wu, M.D. Aqualumnus



Figure 1. Aqualumni Reunion Meeting 1948, Ralph Waters and the residents from the University of Wisconsin. Dr. Jone J. Wu is the first person on the left in the front row. L to R. Front Row: Jone Wu, Milton Davis, Ronald Simpson, Ralph Waters, Virginia Apgar, Sidney Orth, Ann Bardeen. 2nd Row: Rosalind Wilhelm, Noel Gillespie, Dar Waters, Simpson Burke, Robert Wylde, Student or Intern—name not known, Will Bennett, Ivan Taylor, Jane Moir. Back Row: Bryce Ozanne, Wm. Cassels, Paul Yordy, Allen Conroy, Ferd Jacobson, Norma Bowles, Karl Dhuner, Lucien Morris, W. Gilmore, L. Hogan, Carlos Parsloe. Photograph courtesy of the Wood Library-Museum of Anesthesiology

Chinese anesthesia. His path converged in Midwestern America. He studied anesthesiology at the University of Wisconsin in Madison with Ralph Milton Waters from September 1, 1947, until August 31, 1949 (fig. 1). During this period Wu exposed himself to Waters' famous dictum "To teach other doctors to go out and teach." After completing his training in Madison, Wu spent another clinical year at the University of Utah.

Dr. Jone J. Wu was born in 1912 in a Venice-like town in the south of China, which is a cradle of artists, intellectuals and scientists. He was a 1938 graduate of the National Shanghai Medical College (now Fudan Shanghai Medical College). After graduation Wu pursued a career as an instructor in pharmacology at his alma mater for almost a decade.

Fudan Shanghai Medical College can be traced back to 1920s, when the China Medical Board looked to Shanghai to establish another medical school. A charter had been secured from the State University of New York Board of Regents in April 1913. However,

In 1954 Wu published the first Chinese-language anesthesia text, with a second, expanded edition appearing in 1959. World War I forced the board to abandon this project. The land remained in the hands of the Rockefeller Foundation until 1934, when its ownership was transferred to the Chinese government. The sale of this parcel

of land in the city allowed for the purchase of another piece of land in Feng Lin Chiao, where the National Shanghai Medical College was built, and a substantial endowment fund was established using proceeds from the sale of the original land in the city. Thus, the Rockefeller Foundation was instrumental in the establishment of a medical education system based on models from the United States.

In 1950 Wu returned to China and the National Shanghai Medical College, and was then



Figure 2. Dr. Jone J. Wu. Photograph taken in 2002.

appointed Lecturer of Pharmacology at this state-run institution. He was later appointed an Associate Professor of Pharmacology and Anesthesiology. As a medical practitioner with a dedicated professionalism, he began to build the specialty of anesthesiology around the precepts he had learned in Madison. By 1954 Wu founded the first independent academic department of anesthesiology in China, which clinically served the six teaching hospitals affiliated with the medical school. By 1956 he was appointed as a full professor, a title he held for three decades until his retirement in 1986. He is credited with having elevated the national standard of anesthesia in clinical training, research, and education. It is commonly acknowledged that Wu was responsible for the development of anesthesiology in the south of China, extending to the far southwest region of the country.

Wu's career is notable in two areas. First, he combined his basic scientific interest in pharmacology with his clinical interest in anesthesiology. He published articles in both fields, with more than 100 articles in the peerreviewed literature, including ten in English. In 1954 Wu published the first Chinese-language anesthesia text, with a second, expanded edition appearing in 1959. Reminiscent of the teaching of Waters, Wu required an anesthesiologist to have a strong basic science background, specifically with the mastery of the essentials in pharmacology, physiology, and biochemistry. Clinically, he thought the anesthesiologist must be prepared to treat the effects of surgical trauma and any complications that might ensue. Wu established the first blood bank in China and helped to develop the first Chinese ventilator. He was instrumental in establishing postgraduate training in anesthesiology and, like Waters, personally trained more than 150 residents.

At the time of his retirement, Wu reflected on the influence Waters and his teaching had on his career. Waters' leadership by example, his inquisitiveness, his hands-on practice, his scientific mind, and his application of basic science to everyday clinical concerns inspired Wu. In Wu's opinion, Waters elevated the specialty of anesthesiology to an advanced level in medicine through the association of scientific research and its application to clinical medicine. Waters described the inquisitive attribute of an anesthesiologist as his valuable sixth sense. Wu incorporated Waters' principles and ideals for anesthesiology and tried to instill these principles in his trainees.

Dr. Jone J. Wu (fig. 2) is now 91 years old, and he cannot attend Waters' Conference in person. But still, he would like to take this opportunity to express his sincere wishes. The following is Wu's message to the Waters Conference:

> To my dear colleagues and dear Sir: I am one of the favorable students of Ralph Waters. May I take the chance to pay my respect to my favorable teacher in Anesthesiology, Professor Ralph M. Waters. I was working in Pharmacology for eight years, and then had the chance to learn Anesthesiology. I learned how to utilize the basic medical sciences such as pharmacology, physiology, and biochemistry. Cyclopropane was the best agent at that time, together with other supplements and muscular relaxants. I learned the new ways to monitoring the functions of circulation, hepatic and renal functions together at the same time.

> I left Wisconsin two months before his retirement and went to Salt Lake City, and then return to China. We kept corresponds three to four times every year before his death.

#### **Bibliography**

Sim, P, Du, B, and Bacon, DR. "Pioneer Chinese anesthesiologists: American influences," Anesthesiology 93:1 (2000): 256-264. n the occasion of the celebration of the 75th Anniversary of the first academic Department of Anesthesiology by Ralph Waters at the University of Wisconsin in Madison, we have composed a brief but particularly interesting review of the enormous influence that the learning environment and responsible professionalism

### J. Antonio Aldrete

# IMPACT OF RALPH WATERS IN THE DEVELOPMENT OF ACADEMIC ANESTHESIA IN LATIN AMERICA

created by this pioneer anesthesiologist and some of his immediate disciples had on the formation of the earlier teaching programs in our specialty "South of the Border," as it is commonly said.

Already one of the many distinguished Waters' disciples, Carlos P. Parsloe from Brazil has described the manner how in mid twentieth century resident applications and interviews were conducted.1 Personal communications were simple, mostly by mail, very rarely by phone, and not uncommonly by giving the letter to a friend that was about to embark on a trip, so he/she could either deposit it in the U.S. Mail or hand carry it, personally, to its destination. Travel was costly and rudimentary; it was done mostly by ship or train, when available. There were no matching programs so the time needed to apply and get approved to do a residency in the United States could have been lengthy though the process was simpler. Some colleagues already practicing anesthesia spent from six to twelve months in a "fellowship," while others could only afford to pay a visit for a few days or several weeks. Nevertheless, all came intrigued by the exposure to a group of outstanding individuals that were turning "anestetizers" (as they were called in some Latin American countries) into excellent practitioners and teachers of a new and challenging

medical specialty. They were attracted by the possibility of acquiring the necessary tools and skills to realize their ultimate dream of forming a similar consortium within each of their own hospitals or universities.

So to Madison they came, excited, full of anticipation, while having certain hesitation and concern whether they could speak the English language well enough to communicate, how their medical backgrounds would stand before medical students, residents, and faculty of one of the best medical schools in the USA. We hear that there were many interesting and perhaps embarrassing situations, but the academic atmosphere that included diverse components from everywhere was secure and tolerant of differences and strange accents, making it easy to adapt to it and blend in.

Important sources for this paper include my colleagues:

RODOLFO F. JASCHEK, M.D., Editor, *Revista Argentina de Anestesiologia*, Buenos Aires, Argentina; VICENTE GARCIA OLI-VERA, M.D., Director Emeritus, Clinica de Dolor, Hospital General de Mexico; JORGE URZUA, M.D., Depto de Anestesiologia, Universidad Catolica, Santiago de Chile; and CARLOS P. PARSLOE, M.D., Hospital Samaritano, São Paulo, S.P. Brazil.

Having noted some of the obstacles in communication, traveling, and adaptation, it should be pointed out that there was an unusual set of circumstances at the time (1930s and 1940s) as the USA was undergoing an economic depression that also affected most other countries, as well as the tremendous inconveniences and limitations that prevailed during the Second World War. Nevertheless, they journeyed with the intention to acquire knowledge, experience, information, and, most importantly, the norms and procedures of how to relate to other medical disciplines at an academic level, how to conduct investigational activities, how to set up didactic activities that would promote learning and improve patient care, not to mention how to conduct ones self in order to harmonize in the political interactions of a medical school, a hospital, and the community. Their aim was to see Waters and to learn from him, so they came.

A peculiar phenomenon took place, and making the role of these individuals that came to "the Fountain, to be touched by Waters" more relevant. For example, all took with them a "To-and-Fro" system when they returned to their countries (fig. 1), which soon replaced the antiquated French Ombredanne apparatus (fig. 2) used to administer ether, chloroform, or vinyl ether, as well as mixtures of the same that allowed considerable  $CO_2$  rebreathing. Within months of their return to their country of origin cyclopropane anesthesia was introduced and became popular. Soon thereafter, other anesthetic apparatus used to administer nitrous oxide and ethylene without soda lime canisters (fig. 3) were substituted by Kinetometer machines with soda lime canisters, ball bearing flow meters and simple vaporizers (fig. 4). Thereafter, newer, more sophisticated Ohio machines (fig. 5) were used for the next fifty years; please notice the chain to "anchor" the machine to the concrete floor to prevent guerrillas from stealing it. So the technical improvement in anesthesia care came as the visiting "Aqualumni" returned from North America.

#### Argentina

The country though further south, nevertheless, at the time was economically resourceful with a well-established system of education.

To the best of our knowledge it was Leslie Cooper (1909-1965) (fig. 6) from Buenos Aires who first came to visit Ralph Waters in both 1933 and 1934. Upon his return introduced he the "To-and-Fro" system in 1934 and gave the first

A peculiar phenomenon took place and makes the role of these individuals that came to "The Foundain, to be touched by Waters" more relevant. For example, all took with them a "To-and-Fro" system when they returned to their countries.

cyclopropane anesthetics in 1935. Then Roberto Owen Elder (1904–1969) (fig. 7) traveled to Wisconsin on a scholarship provided by a surgeon from Casilda province of Santa Fe to take a fellowship. He was followed by Federico Wright (1898–1951) (fig. 8) also from Buenos Aires who took a fellowship in Madison in 1938. All of them eventually settled in Buenos Aires.<sup>2</sup>

Another well known Argentinean was Jose Delorme (fig. 9) who visited on two occasions, although the specific dates are not known. He wrote on endotracheal anesthesia in 1938.<sup>3</sup> Juan Armando Nesi (1909–2001) (fig. 10) participated in a meeting in 1939 where E. A. Rovenstine was the leading invited speaker. At Rovenstine's insistence, Nesi visited New York and Madison several times in the 1940s and 1950s. He adopted the same methodology on how to develop a teaching program, first in Buenos Aires, where he became Director of the training program at the University of Buenos Aires in 1953, and then in Caracas, Venezuela,

#### J. ANTONIO ALDRETE



Figure 1. Left – The To-and-Fro system. Figure 2. Below – The ombredanne apparatus.







Figure 3. Left – The anesthetic apparatus without the soda lime canister. Figure 4. Above – The Kinemeter anesthetic machine with the soda lime canister.



Figure 5. The Ohio anesthetic machine was anchored to the floor with a chain.



Figure 8. Federico Wright, M.D.

Figure 9. Jose C. Delorme, M.D.



Figure 14. Vicente Garcia Olivera, M.D.



as of 1963, when he migrated with his family at the invitation of Carlos Rivas Larrazabal (himself an E. Papper ex-resident) to help him develop the WFSA training Center in Anesthesiology at the University of Caracas. Nesi was in charge of the academic activities and Dolly, his wife, kept an impeccable departmental library. He also established optimal standards for resident teaching, which influenced hundreds of anesthesiologists in Latin America.<sup>4</sup> E. A. Rovenstine also published an article on "Endotracheal anesthesia" in the Anales de Cirugia de Rosario 1938.<sup>5</sup>

Interesting Event: At the invitation of Drs. Cooper, Elder, and Wright, in 1939 Dr. E. A. Rovenstine attended a national meeting in anesthesia held in the city of Rosario as featured speaker.<sup>6</sup> Clinical demonstrations were held in the morning, and lectures in the afternoon. On the first day, the visiting professor was to demonstrate an inhalation induction. He began using 50%  $C_3H_6$  in oxygen, within one minute sudden cardiac arrest occurred, all efforts to resuscitate the patient failed. As it would be expected, Rovenstine was obviously upset. On the second day an intravenous induction with thiopental was planned and executed flawlessly, though the invited guest was naturally uncomfortable and left the OR soon thereafter.<sup>2</sup> The scheduled case for the third day was supposed to be a brief demonstration of inhalation anesthesia for dentists and dental students with N<sub>2</sub>0-O<sub>2</sub> and cyclopropane. Noticing some hesitation in Rovenstine, Robert Elder, who had visited Madison, in a show of trust and support offered himself as a subject. Dr. Rovenstine was reluctant but Elder persuaded him and the demonstration was masterfully executed. Thereafter all demonstrations of general anesthesia and nerve blocks were conducted with great expertise and dexterity. C<sub>3</sub>H<sub>6</sub> became popular in Argentina until the late 1940s when intravenous procaine was adopted and became the most popular anesthetic technique.<sup>2</sup> This incident confirms that

It is well known that while in Madison Ralph Waters was not keen on traveling, and

complications happen when least expected. But, most importantly, it made evident the trust that had developed among the trainees and the faculty in Madison, as well as demonstrating Rovenstine's enormous professionalism, even in the face of adverse and strange circumstances. Moreover, his medical integrity and investigative determination might have prompted the research study that culminated with the publication by Burstein et al.,<sup>7</sup> which addressed precisely this problem. The Argentinean Society of Anesthesiologists felt such admiration for his humanity and willingness to teach, even when the procedure did not go as planned, that in the Acta #7 of the First Assembly of Anesthesiologists of Buenos Aires, held on 28 December 1945, Ralph M. Waters and Emery A. Rovenstine were named Honorary Members in "recognition for their professional merits and their contribution to Argentinean Anesthesiologists."

#### Brazil

In 1943 Luis Rodrigues Alves (fig. 11), who was already practicing anesthesia in São Paulo spent one month in Rochester, MN, and one month in Madison, WI. Upon his return, he brought ideas and techniques from these centers. Eventually, Dr. Rodriguez Alves became President of the Brazilian Society of Anesthesiologists in 1953.9 Carlos Parsloe, who was a resident in Madison from 1946 to 1948, already has described some of his impressions of this experience.<sup>1</sup> Eventually, he also became President of the São Paulo Brazilian Society of Anesthesiologists in 1973 (fig. 12) and of the World Federation of Societies of Anesthesiologists in 1984. In 1948 Jose Adolfo de Basto Lima, from Recife in the State of Pernambuco, served as a fellow in Waters' department, and later on, in the 1950s, Sergio Paes Leme from Rio de Janeiro took his anesthesia residency with S. Orth in Madison.8

even less after his retirement. Nevertheless, many Latin American colleagues personally remember meeting him in São Paulo when he attended the 3rd World Congress of Anesthesiologists as "Special Invited Guest Speaker" in 1964.<sup>8</sup>

#### Chile

Some information is available indicating that Ernesto Frias, in about 1937, spent one year working in the United States. Although it is probable that Dr. Frias would have visited Dr. Waters' program in Madison, it is more certain that he spent much time in New York City with Rovenstine. Upon his return to Santiago, he introduced the "To-and-Fro" system and cyclopropane anesthesia. In addition, he helped design, in conjunction with the Foregger company, a portable anesthesia machine that could be taken from hospital to hospital, as it was commonly done. It is said that a similar model was used in the battlefields during World War II and in many small surgical clinics in Latin America. Frias trained, on a oneon-one basis, dozens of anesthesiologists in his practice. One of them, Luis Cabrera started a teaching program at the University of Chile in 1962 and a second program at the Catholic University in 1967.<sup>10</sup> The first resident in the former was German Massa, and in the latter Hector Lacassie.

**Interesting Event:** In 1963 what apparently was the largest explosion from anesthetic gases took place in the Manuel Arriaran Hospital of Santiago.<sup>11</sup> This was a French pavilion type of structure where two patients were being operated upon simultaneously under cyclopropane anesthesia. The surgical teams had each a surgeon, an assistant resident and an instrument nurse, plus a circulating nurse. One anesthetic was being given by Dr. Mario Torres Kay who was, at the time, President of the Chilean Society of Anesthesiology. The other was being administered by Dr. Ana Maria Jurisic, a young resident married to a pediatrician and

who had a baby daughter. The concentrations of C<sub>3</sub>H<sub>6</sub> used were between 20 and 30% in oxygen. There was a question of having overloaded a  $C_3H_6$  tank with oxygen, which had previously been filled from a G tank. There was also the possibility that one of the surgical teams decided to use the cautery, against the anesthesiologist's recommendation. The explosion was a true conflagration, as one of the cylinders was propelled as a missile perforating the walls of the OR, killing instantly the two patients, two of the surgeons and Dr. Jurisic. Dr. Torres was critically injured and died some days later. The rest of the personnel were severely injured. The use of cyclopropane was then forbidden in Chile. It is of interest to note that one of Dr. Torres' sons, and the only daughter of Dr. Jurisic, studied medicine and are now practicing anesthesiologists.

#### Colombia

Although it is likely that some other Colombian anesthesiologists were in Madison, we have only been able to confirm that Naciancenio Valencia of Medellin,<sup>12</sup> trained with Perry Volpitto in the early 1950s. He has personally taught the concepts and techniques that he learned in Augusta, GA, to dozens of anesthesiologists that trained in his hospital.

#### Cuba

According to Parsloe,<sup>1</sup> about the time that Miguel Martinez-Curbelo, who had first catheterized the lumbar epidural space,<sup>13</sup> visited with John Lundy at the Mayo Clinic in the years 1947 and 1948; he also visited Madison, demonstrating his technique. Few know that earlier he had also proposed to do a supraclavicular block with patients sitting up to have a better access to the brachial plexus (fig.13).<sup>14</sup>

#### Mexico

In 1933 Federico Wollbrechaussen visited Ralph Waters' department. Upon his return to Mexico City in 1934, he introduced closed system anesthesia using the "To-and-Fro" system and began using cyclopropane as soon as he was able to get it there, in 1935. He taught the application of these two innovations, as well as some other techniques he had learned in Madison, to a large number of other practitioners.<sup>15</sup> Benjamin Bandera, already practicing anesthesia in Mexico City, spent several months in Madison in 1936,<sup>16</sup> and so did Francisco Cid Fierro in 1937.<sup>17</sup> Both returned home experienced on closed system and on the application of C<sub>3</sub>H<sub>6</sub> anesthesia, publishing their respective experiences in 1938. Vicente Garcia Olivera (1918-) traveled to New York City in early 1945, where he spent six months working under E. A. Rovenstine. Apparently, while he was there Ralph Waters visited and in turn invited him to visit his department, which he did and was able to observe an academic department in full action, in spite of the conditions prevailing during the Second World War.18

Upon his return to Mexico City, he established the first Pain Clinic where he worked and taught numerous pain management specialists until his recent retirement as Director Emeritus in 1999 (fig. 14).

Luis Perez Tamayo trained at Metropolitan Hospital in New York City from 1953 to 1955. He visited Bellevue Hospital numerous times and attended all the Monday night sessions conducted by Rovenstine.<sup>19</sup> He became Editor of the Revista Mexicana de Anestesiologia, and Director of Anestesia at La Raza Hospital. He trained thousands of residents under the classical Waters tradition of discipline and professionalism, requiring that all residents conduct an investigational study before graduation. For the last twenty-one years, he has presided over the Consejo Mexicano de Anestesiologia, a certifying organization equivalent to the American Board of Anesthesiology that establishes the qualifications and credentials of Anesthesia specialists.

#### **Puerto Rico**

Although the local Society of Anesthesiologists is a component of the American Society of Anesthesiologists, this country is mentioned because, in its institutions, many Latin American physicians from other countries have trained here, and thus have been influenced by anesthesiologists trained by Waters' pupils. In so doing, the tradition has been transmitted through this venue. Among the notable colleagues having this lineage one finds Ernesto Colon Yordan who was R. Dripps' resident and later trained many colleagues in Ponce. Jose Luis Jimenez-Velez, who was Chairman of the Department of Anesthesiology at the University of Puerto Rico and later Dean of the Medical School, trained under Rovenstine. So did Miguel Colon Morales, founder of the Latin American Museum of Anesthesiology. E. M. Papper trained Nydia de Jesus, Freddie Gonzalez, Alberto Lugo, and Antonio Gonzalez-Rios. Nydia de Jesus occupied, at one time, the Chairmanship of the Department and later was also elected Dean of the Medical School.20

#### Venezuela

Carlos Rivas Larrazabal trained in New York City under E. M. Papper. In the 1950s he returned to Caracas to head the Department of Anesthesia at the Hospital of the University of Caracas. In 1963 his group was awarded one of the five training centers sponsored by the WFSA with senior and notable teachers from different countries coming to spend weeks or months demonstrating their techniques and participating in conferences, much as it was in Madison. He surrounded himself with capable, enthusiastic faculty members, among them Juan Armando Nesi and Jaime Wikinski from Argentina who enhanced the academic aspects of the department.<sup>4,21</sup> Among their trainees were notables as Edgar Martinez Aguirre, David Steinberg, Sofonias Zapata, and also many others from outside of Venezuela.

#### Commentary

One of the proposals that came out of this reunion was the suggestion to expand the original genealogic tree of the Waters legacy as presented by Lucien Morris, <sup>22</sup> replacing some of the leaves for derivate branches. For example, representing de Jesus, Jimenez Velez, Rivas, and Willock as branches from the Papper trunk, since they have grown in numbers. The Virtue leaf can have Jerry Groenert and J. A. Aldrete side branches, and from the latter, leaves noted as William O. Witt, James Diaz, Franciso Romo, J. Ernesto Rojas, and Pedro Cubillos from Kentucky, Louisiana, Mexico, Colombia, and Chile, respectively. Now specific names can be added to dividing branches, instead the leaves that are shown representing individual countries such as Venezuela, Colombia, Argentina, Brazil, Chile, and Mexico. Similarly, the individuals noted on the narrative may be considered as direct scions of Ralph Waters or as his immediate progeny, and since we can expect that these additions to the Aqualumni Family Tree will keep increasing as their trainees are now on the fifth or sixth generations, they will inevitably continue to train specialists in the tradition of the Madison school, excelling in teaching, research and/or patient care.

With variations that can be expected from country to country, Ralph Waters would be proud today of most, if not all, the "chips off the old block," as more than 92% of the anesthetics are personally given by doctors on a one-on-one basis<sup>21,23</sup> in Latin America, so they have faithfully followed one of Ralph's favorite premises, as it relates to his main goal, "To teach Doctors to go out and teach other doctors."

#### **Editorial Comment**

It has been pointed out that, in the pre-war years of the 1930s and 1940s, the number of officially paid residency positions at the Wisconsin General Hospital were quite limited. Among the numerous visitors, many were simply observers; a few had external fellowship support; some others were "short-term volunteers." All were welcomed to participate in the regularly scheduled educational clinical discussion sessions.

According to the records of anesthesia from the Wisconsin General Hospital, three other individuals from Latin American countries who were on the roster of Wisconsin anesthesia residents are:

- 1. Alfredo Pernin, M.D. January 17, 1946-August 1, 1946, from Montevideo, Uraguay.
- 2. Louis G. Bouroncle, M.D. December 1945-October 1946, from Lima, Peru.
- 3. Jose Q. Guerra, M.D. September 5, 1945-September 9, 1946, from Monterey, Mexico.

All three of these men returned to their home countries to share with others what they had learned during their residency experience. However Dr. Guerra, after a short time in Mexico, elected to come back to the United States where he entered private practice of anesthesiology in Toledo, Ohio, and continued there for the remainder of his career.

Dr. Aldrete's expressed concern about the desirability of update and expansion of the Aqualumni Tree provides the opportunity for comment and refutation. The primary purpose of "The Tree" was to demonstrate the continuously widening influence of Dr. Waters on education of physicians in anesthesiology. The documentation and construction of the Waters professional lineage, beyond the original Wisconsin trainees of Dr. Waters, was a complex task which required our focused attention for more than two years prior to display at an ASA meeting in 1984. Apparent omissions are the result of rigid criteria and the decision to include only those individuals who became

#### J. ANTONIO ALDRETE

chairpersons or heads of teaching programs *in medial schools and universities*. Undoubtedly, with less rigid criteria, there would be many other individuals who could claim for themselves a direct or possibly even a somewhat tangential relationship to the Waters professional lineage.

In the intervening twenty years since the design of the Aqualumni Tree there have been no major revisions and we continue to feel there is no need for such. Individuals who wish to explore their own professional lineage are encouraged to do so.

#### References

- 1. C Parsloe, "Ralph Milton Waters: His influence on the world and me," *ASA Newsletter* 65.9 (2001): 17-18.
- 2. A Gonzalez-Varela, Por el camino de la Anestesia (First Assembly of Anesthesiologists of Buenos Aires, 1996): 101-102.
- 3. JC Delorme, "La Anestesia endotraqueal," Revista Medica 19 (1938): 48-51.
- 4. JA Wikinski, "Homenaje al Dr. Juan Armando Nesi en su Nonagesimo anivesario," *Rev Arg Anest* 57 (1999): 284-286.
- 5. EA Rovenstine, "Anestesia Endotraqueal," Anales de Cirugia de Rosario (1938).
- 6. Noticias de Interes, "Visita del Profesor E. A. Rovenstine," Rev Arg Anest Analg 1 (1939): 84.
- 7. CL Burstein, et al., "Laboratory studies on the prophylaxis and treatment of ventricular fibrillation induced by epinephrine during cyclopropane anesthesia," *Anesthesiology* 1 (1939): 167, 171.
- 8. Z. Vieira, personal communication.
- 9. DG Meira, "Contribuicao Historia da Anestesia No Brasil" (1968): 21-120.
- 10. L. Cabrera, personal communication.
- 11. E Frias, "Explosiones por Anestesicos," Caracas, Venezuala: Actas VIII, Congreso Latinoamer Anest, 1966: 714.
- 12. N. Valencia, personal communication.
- 13. M Martinez-Curbelo, "Continuous peridural segmental anesthesia by means of a ureteral catheter," *Anesth Analg* 28 (1949): 1-4.
- 14. M Martinez-Curbelo, "Nueva tecnica de la anesthesia del plexo braquial: Ventajas de esta anesthesia regional en clinica ortopedica," *Rev Med Cubana* (1933).
- 15. A. Kassan, personal communication.
- B Bandera, "Consecuencia post-anestesica del ciclopropano," *Cirugia y Cirujanos* 1 (1938): 34-37.
- 17. F Cid-Fierro, "Breves consideraciones sobre el ciclopropano en anestesia: 830 observaciones," *Cirugia y Cirujanos* 10 (1938).
- 18. V Garcia-Olivera, "Anecdotas de un Anestesiologo," Mexico, 1999.
- 19. L. Perez-Tamayo, personal communication.
- 20. M. Colon-Morales, personal communication.
- 21. JA Aldrete, "Historia de la Anestesiologia," in *Texto de Anestesiologia Teorico Practica*, ed. JA Aldrete, (Salvat Editoes, 1986): 3-24.
- 22. LE Morris, "R. M. Waters Legacy," ASA Newsletter 65.9 (2001): 21-24.
- 23. JA Aldrete, "Contribuciones originales de Latinoamericanos a la Anestesiologia," *Rev Esp Anest Reanim* 45 (1998): 340-348.

ir Ivan Magill (1888–1986), at that time considered to be the doyen of British anaesthesia, delivered the first "Ralph Waters Memorial Lecture" to the Midwest Anesthesia Conference in 1966.<sup>1</sup> Magill described Ralph Waters (1883–1979), "as one whose inspiration and example have been outstanding throughout his life."<sup>1</sup>

### **Thomas B. Boulton**

# THE RELATIONSHIP OF WATERS TO CLINICAL ANAESTHESIA IN GREAT BRITAIN

Sir Robert Macintosh (1897–1989) Nuffield Professor of Anaesthetics at Oxford, who had been the first anaesthetist outside the United States to be elected as a full-time Professor in 1937,<sup>6</sup> went further when he delivered the same memorial lecture in 1969. Macintosh spoke of Waters as "the outstanding personality of our specialty over the past one hundred years."<sup>7</sup> This, as will be emphasised later in this paper, was a very significant assessment. That these two leading British pioneers, speaking in the lifetime of Waters, should be so united in their opinion is praise indeed.

Ralph Waters' influence on the philosophy, academic status, and development of anaesthesia in the United States and throughout the world is well documented.<sup>2-5</sup> This paper focuses specifically on the techniques developed by Waters that had a revolutionary effect on clinical anaesthesia both in the United States and in the United Kingdom.

Another British pioneer, Professor Sir Geoffrey Organe (1908-1989) of the Westminster Hospital, London, was the first Secretary General and the third President of the World Federation of Societies of Anaesthesiologists. He asserted in 1982 that prior to the centenary celebration in 1946 of Morton's seminal demonstration of ether anaesthesia at the Massachusetts General Hospital in 1846, advances in general anaesthesia were almost wholly confined to the English speaking world of the United States, Great Britain, and the British Commonwealth.<sup>8</sup> It is not surprising, therefore, that there has always been a natural and important interchange of information between the British and American spheres of influence in anaesthesia.

Organe went on to detail the important and dramatic advances that had taken place in anaesthesia (during the fifteen years prior to 1946.)<sup>8</sup> This fifteen year period approximates to the most productive years of Ralph Waters' twenty-one year tenure as the Chief of Anesthesitics at the University of Wisconsin, from 1931, just two years before he was appointed to full Professor in 19339 to two years before he ceased clinical practice in 1948.<sup>2-5</sup> Organe listed the developments as "endobronchial anaesthesia for thoracic surgery, Evipan and Pentothal, cyclopropane in closed breathing systems, which allowed artificial ventilation of the lungs, and curare."8 Waters was intimately concerned with promoting all of these developments.<sup>2,8</sup> These concepts of intubation, light anaesthesia, and controlled ventilation with cyclopropane, as advocated by Waters, and later with curare, as promoted, particularly, by the British Professor T. Cecil Gray of Liverpool, England, ultimately led up to the years

immediately following the retirement of Waters in 1949 to the establishment of the modern techniques of anaesthesia for major surgery as we know them today.<sup>10</sup> It is true, however, that Waters had a somewhat conservative view of the value of thiopental (Pentothal) as an induction agent,<sup>12,13</sup> despite the fact that he has been credited with being the first to use thiopental in man, even though Lundy of the Mayo Clinic published the first report.<sup>4</sup> Waters also believed, initially, that the value of the recently introduced curare would be limited.<sup>5</sup> This is not surprising. In 1942 Waters regarded curare as a useful muscle relaxing adjuvant to spontaneously respired general anaesthesia. In common with the majority of physician anaesthetists on both sides of the Atlantic, well into the early 1950s, including Harold Griffith (1894-1985) of Montreal who introduced the drug to clinical anaesthesia,<sup>16</sup> Waters, in 1944, regarded curare as a useful muscle relaxing adjuvant to spontaneously respired general anaesthesia.15

# Ralph Waters, M.D. and John Snow, M.D.

The relationship of Waters to British Anaesthesia dates back to his earliest days as a private practitioner with practice limited to anaesthesia in Sioux City and Kansas City. This was well before he was appointed to the faculty of the University of Wisconsin to head the nascent anaesthesia service in 1927.<sup>2,3</sup>

Ralph Waters was inspired throughout his career by the example of the life and work of the English physician John Snow, M.D. (1813–1858).<sup>17,18</sup> Waters acknowledged Snow to be the first professional physician anaesthetist.<sup>17</sup> Snow put anaesthesia on a firm clinical and scientific basis in the period immediately following the receipt in England of the news of Morton's successful demonstration in 1846.<sup>18</sup> Sir Robert Macintosh, speaking in 1969, referred to Waters as the most outstanding personality of the specialty of anaesthesia during the previous century. This almost takes us back to the death of Snow in 1858.<sup>18</sup> Macintosh chose his words deliberately. Research into the scientific basis of general anaesthesia had been very limited in the years between the death of John Snow<sup>17</sup> in 1858 and the start of the clinical career of Waters in 1913.<sup>18</sup> Macintosh clearly regarded Ralph Waters as the direct successor to John Snow.<sup>7</sup> Moreover, the same few general anaesthetic agents in use in Snow's time (nitrous oxide, ether, and chloroform) were those available to Waters at the beginning of his career.

Snow was enjoying a rising reputation as a general practitioner, lecturer, and author in London when the news of Morton's demonstration of ether anaesthesia reached England in 1846. Snow witnessed some of the early attempts at ether anaesthesia. Some of these were fortuitously successful but others were dismal failures. Some surgeons, who had been initially enthusiastic, abandoned its practice.<sup>18,19</sup>

Snow constructed inhalers based on scientific principles following careful studies of the physics of ether vaporisation and the pharmacology of ether. His results were so reliable that by May 1847, he had become the leading proponent of ether anaesthesia in London, and anaesthesia was firmly established as an accepted procedure.<sup>18,19</sup> Snow published his monograph on ether anaesthesia in October 1847.<sup>20</sup> There is little doubt that the reciprocal news of the successful use of anaesthesia in London did much to revive the temporarily flagging interest in New England.<sup>18</sup>

John Snow, like Ralph Waters, was an indefatigable research worker. His series of eighteen papers, published between 1848 and 1851 under the general title of *Narcotism by the use of vapours*,<sup>21</sup> are years ahead of their time in their description of experimental technique. They include animal and self-experimentation on carbon dioxide absorption using potassium hydroxide.<sup>21</sup> Carbon dioxide absorption was to become a career long interest of Ralph Waters.<sup>22,24,26</sup> Snow suffered a cerebral hemorrhage from which he died in 1858 as he completed the last sentence of his major work *On Chloroform and other Anaesthetics: their actions and administration.*<sup>18</sup>

Waters wrote a perceptive biography of Snow in 1936.<sup>17</sup> He also drew the attention of his British colleagues to the life and works of this great pioneer at his lecture to the Royal Society of Medicine during his visit to England in the same year. There are a considerable number of references to the work of Snow in the scientific papers written by Waters. For example, in the preamble of his first paper on cyclopropane, Waters and his colleagues refer to John Snow's experimental use of amylene in an attempt to find an anaesthetic more easily inhaled than ether but safer than chloroform.<sup>22</sup>

There are many parallels in the careers of Waters and Snow. It is therefore not difficult to understand why Waters admired Snow so much.<sup>2-5, 7-21</sup> Both were originally general practitioners. Snow established, by his example and insistence, that the administration of anaesthesia should be in the hands of medical practitioners and of dentists in their own practices in the British sphere of influence.<sup>17,18</sup> This was a circumstance that was greatly envied by Waters, who was able to establish anaesthesia as an academic discipline in a manner that was the envy of his British colleagues in the 1930s.<sup>2-5</sup> Both Snow and Waters were meticulous research workers, superb clinicians, and careful record keepers.<sup>2-5,17-21,23</sup> Both men published widely. Both were mindful of the needs of others, and both were loved and respected by their contemporaries.<sup>2,18</sup> But, Waters was also an accomplished teacher and departmental organiser in a way that was not possible in Snow's time.<sup>2-5, 18, 20,21</sup>

#### The Genius of Ralph Waters

Before turning specifically to the developments in clinical anaesthesia, for which Waters was responsible, and their relationship to British anaesthesia, it is important to emphasise that it is futile to search for primacy in scientific discovery. Waters' genius in furthering clinical anaesthesia was his ability to study and acknowledge the work of others, to research it further, to correlate it, and then to put it into practical effect. Waters' accomplishments were assessed precisely by his great friend and admirer, the Australian Geoffrey Kaye (as quoted by Gillespie).<sup>2,24</sup>

A feature of the career of Ralph Waters that is not always appreciated is the considerable amount of academic and innovative clinical activity that he had undertaken as a private practitioner in Sioux City and Kansas City before he joined the faculty at the University of Wisconsin in 1927.<sup>2-5</sup> It was during this period that he conceived his vision of a cadre of specialist physician anaesthetists in medical schools who would train and support a widespread corps of general practitioners with experience of anaesthesia throughout the United States.<sup>3</sup> He also established "Downtown Anaesthesia Clinics" to which surgeons could bring their cases for anaesthesia and surgery, first in Sioux City and later in Kansas City. These were surely among the earliest examples of an organised ambulatory surgical facility.2-5 Most importantly, he applied the principle of carbon dioxide absorption (or "filtration" as he at first referred to it) to clinical anaesthesia with nitrous oxide and ethylene several years before he was offered, and accepted, the appointment at Madison in 1927.2.25.26

# The "To-and-Fro" carbon dioxide absorption apparatus

Partial rebreathing, and even total rebreathing for short periods, in order to deepen anaesthesia with nitrous oxide or ethylene but without carbon dioxide absorption, was practised by many anaesthetists well into the 1930s.<sup>27</sup> This was partly an economic measure, but the increased carbon dioxide tension would also, undoubtedly, enhance anaesthesia and stimulate respiration, as demonstrated by Leake and Waters in 1929.28 However, retention of carbon dioxide was also justified by the proponents of rebreathing because of the widely held theory, proposed by Yandell Henderson, Professor of Physiology at Yale, that surgical shock was caused by hyperpnea and consequent depletion of carbon dioxide.29 It was, therefore, courageous of Waters, as a little known general practitioner, to advocate the use of an apparatus that was contrary to the views of the eminent Yale professor. Waters discusses the problem in his first paper from 1924, describing his "to-and-fro" carbon dioxide absorption apparatus, which he had by then used since 1921 for over 200 cases.<sup>25</sup> He cites the animal work of the Brazilian Osorio de Almeida brothers<sup>30</sup> and of Dennis Jackson (1878–1980), then of St Louis, which refuted Yandell Henderson's theory and supported the benefits of heat and moisture retention to combat surgical shock.<sup>10-32</sup>

Waters lists the advantages of his absorption technique.<sup>25</sup> First was economy; this was an important consideration in the private practice in which he was engaged in 1924.25 It is also recorded that the hospital managers were well pleased when he took over in Madison in 1927 because of the reduction of the amount of money that had to be spent on anaesthetic agents.<sup>2</sup> The second advantage was size of the apparatus; it was portable and convenient, a valuable asset in private practice. Third was the avoidance of "disagreeable odors" in the operating room (in addition to the use of ethylene, ether and ethyl chloride could be added through a hole in the canister). The fourth advantage was "welfare of the patient," which was improved because of retention of water and body heat. In addition, the "to-and-fro" system could also be easily sterilised.<sup>25</sup> The author found this feature particularly valuable and an advantage over circle absorption systems in the days when tuberculosis was still a major problem.

# Endotracheal and Endobronchial Intubation

Waters states that in 1924 the one limitation of his absorption technique was that it could not be used to full advantage for "nose and mouth work," because of the need for a close fit of the anaesthetic mask with the face.<sup>25</sup> The British physician anaesthetists Stanley Rowbotham (1890-1979) and Ivan Magill solved this problem, more or less contemporaneously, in the early 1920s by the development of widebore endotracheal intubation.<sup>33,34</sup> Gauze packing of the pharynx was required to ensure a gas tight fit if Magill's plain rubber tubes were used, but Waters and his friend Arthur Guedel (1883-1956), then at Indianapolis, described a better solution in a paper in 1928, a seal with an inflatable cuff.<sup>2,35</sup>

The stage was now set for further development of anaesthesia for thoracic surgery. The next step was the description of endobronchial anaesthesia by Gale and Waters. Endobronchial anaesthesia was achieved by the insertion of a long cuffed tube, by touch, into either bronchus, as required.<sup>2,36</sup> Magill, in London, in turn improved upon the technique by designing a special bronchoscope, which, when inserted into the lumen of the tube, allowed it to be positioned by direct vision.<sup>37</sup>

# The Anaesthesia Service at the University of Wisconsin in the 1930s

By the early 1930s the anaesthesia service at the University of Wisconsin was well established.<sup>2-4</sup> The educational programme designed to train those who were destined to become the leaders of the specialty in university hospitals in the United States, as well as a number of other countries overseas, was fully operational. There were also residency and medical student programmes for training those whom Waters intended would provide the backbone of a physician anaesthetist service in smaller hospitals.<sup>2-4</sup> The number of senior visitors to Madison from the United Kingdom and the major British dominions, particularly from Australia and Canada, also increased markedly during the 1930s.<sup>2,4,38</sup> These leaders of the specialty were particularly keen to study the organization of the department. They envied its facilities for research and education at both undergraduate and postgraduate levels.<sup>2,4,7,13,24,38</sup> They could not yet hope to emulate Waters' department because of the conditions under which the specialty of anaesthesia was practised in the British sphere of influence.<sup>39</sup>

#### Cyclopropane

Waters and his colleagues first used cyclopropane clinically in 1930.40 The pharmacologist Professor Velyen Henderson, the chemist Dr. George Lucas, and the physician anaesthetist Dr. Easson Brown had done animal research work on cyclopropane at Toronto. They had also administered it to volunteers, including themselves and Dr. Frederick Banting of insulin fame.<sup>42</sup> They were unable to proceed to clinical trial, however, for medicopolitical reasons and suggested that Waters should do so.<sup>40</sup> There was some delay after the initial trial, due to the problem of supply,<sup>22,40</sup> and it was not until 1934 that the first papers on clinical use at Wisconsin were published.43 Thereafter, cyclopropane was increasingly used at Madison in place of nitrous oxide and ethylene.<sup>2,40</sup>

Dr. R. M. Muir of South Africa brought a cylinder of cyclopropane to England in December 1933. He demonstrated its use on a few cases to Stanley Rowbotham and his colleagues at the Cancer Hospital in London. They were impressed and started to use the agent.<sup>54,4</sup> They published a paper in November 1935, reporting on a cyclopropane series of 250 cases.<sup>54,4</sup> But generally, the acceptance of cyclopropane in the United Kingdom was s1ow.<sup>46</sup> Rowbotham and his colleagues state in their paper that, for the sake of economy, they initially used a rather crude absorption method. A handful of sodalime was placed in a one imperial gallon (4.55 liter) rebreathing bag.<sup>54,4</sup> They concluded that cyclopropane was a valuable anaesthetic but that it would be chiefly useful for "obtaining deep anaesthesia or for fortifying nitrous oxide and oxygen anaesthesia temporarily."<sup>54,4</sup>

The slow increase in the use of cyclopropane in the United Kingdom was partly due to its cost, but more to innate conservatism.<sup>46</sup> Many leading British physician anaesthetists were wedded to spontaneously respired, relatively high-flow nitrous oxide and oxygen vaporising ether and chloroform.<sup>47</sup> This was delivered without carbon dioxide absorption by the ubiquitous Boyle's machine in larger centres. In many smaller provincial hospitals in the United Kingdom, open drop ether and chloroform administered by experienced general practitioners was still the norm.<sup>39,46,47</sup>

# The visit of Ralph Waters to the United Kingdom in 1936

There was an increase in the use of cyclopropane by leading physician anaesthetists attached to medical schools after the stimulating visit to the United Kingdom by Waters in 1936.<sup>2,7,47,48</sup> In a geographically compact country like Great Britain, with an extensive and efficient railroad network in the 1930s, it was possible for almost everybody who was anybody in British anaesthesia to come together on the first Friday evening of each month at the Royal Society of Medicine. Waters, therefore, spoke to a comprehensive and enthusiastic audience.<sup>49</sup> He represented to his British colleagues the value of-and the need for-the creation of academic departments of anaesthesia.48 The foundation of academic departments of anaesthesia did not even begin in the United Kingdom until the following year however, when Robert Macintosh was elected to the newly endowed Nuffield Chair of Anaesthetics at the University of Oxford in 1937.6

Waters propounded three major clinical concepts in his 1936 lecture at the Royal Society of Medicine that were not very familiar to British physician anaesthetists at that time.<sup>49</sup> These were the use of cyclopropane, the value of carbon dioxide absorption, and, possibly most important of all, the technique of controlled respiration in the apneic anaesthetised patient.<sup>49</sup> Techniques employing controlled respiration were destined to revolutionise anaesthesia, particularly for upper abdominal and thoracic surgery, by avoiding hypoxia and eliminating excess carbon dioxide, and finally solving the problems of the open pneumothorax.<sup>10,11</sup>

#### **Controlled Respiration**

Guedel and Treweek had described the use of controlled ("passive") respiration under

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ether anaesthesia in 1934. They used the Waters "to-and-fro" absorption apparatus and called the technique "ether apnea.<sup>\*\*50</sup> They stated that ill effects did not occur if the blood carbon dioxide was lowered, but also, rather surprisingly, that ether apnea was of no advantage except that "a quieter operative field can be presented than with the same saturation of ether

in other circumstances."<sup>50</sup> Waters employed controlled respiration with cyclopropane for intrapleural thoracic surgery.<sup>2,46,49</sup> There was considerable powerful opposition to such a revolutionary technique on both sides of the Atlantic.<sup>46,51,52</sup> However, Michael Nosworthy (1902–1980)<sup>53</sup> of St. Thomas' and the Brompton Hospitals in London, while still in his thirties, visited Wisconsin in 1938. He became convinced of the value of controlled respiration with cyclopropane for thoracic anaesthesia using the Waters absorption apparatus.<sup>10,13,46,53</sup> Nosworthy had ample opportunity to employ the technique in 1940 on civilian air raid casualties and wounded soldiers after the evacuation of the British army from Dunkirk.53 Nosworthy delivered his classic paper, "Anaesthesia in chest surgery with special reference to controlled respiration and cyclopropane" at the Royal Society of Medicine in April 1941. It is interesting that he did not employ endotracheal intubation in any of his controlled respiration cases.<sup>12</sup> Nosworthy had also visited the famous Swedish thoracic surgeon, Crafoord.<sup>46,54</sup> Crafoord used an early mechanical positive-pressure ventilator (the Spiropulsator) to hyperventilate major thoracic cases with nitrous oxide and 15% -25% oxygen, supplemented as necessary by local anesthesia.54 He had occasionally used cyclopropane when the anaesthesia provided by nitrous oxide was inadequate, but he did not like doing so as its use prevented the use of the cautery to control hemorrhage, because of the explosive risk.<sup>54</sup> Neither Waters<sup>48,49</sup> nor Nosworthy<sup>13,53</sup> mention the explosion hazard of the use of cautery with cyclopropane.

It is of interest that the Subcommittee on Anesthesia of the National Research Council, of which Waters was Chairman, used (with due acknowledgement) one of Nosworthy's diagrams on bronchial drainage in the wartime handbook, *Fundamentals* of *Anesthesia*, published primarily for the United States Armed Services.<sup>55</sup>

The modern selective anaesthesia technique of using controlled respiration with nitrous oxide and oxygen on apneic patients with their respiratory muscles paralysed with
neuromuscular blocking agents (the "triad of anaesthesia"), was popularised by Gray and his colleagues at Liverpool, England, in the decade following the retirement of Waters in 1949.<sup>10,11</sup> This obviated the use of cyclopropane and also permitted the employment of the cautery. The use of curare in this way was adopted rather more slowly in the United States than in Great Britain. This was possibly due to the influence of the well known Beecher and Todd article published in 1954, which, rightly or wrongly, discouraged the use of curare.<sup>10,56,57</sup> Even so, in 1946, Phyllis Harroun and Hubert Hathaway of San Francisco had independently advocated a very similar technique to that promoted by Grav.<sup>10,11,58</sup>

#### Conclusion

The year of Ralph Waters'retirement, 1948, marked a watershed in the professional development of the specialty of anaesthesia on both sides of the Atlantic. It was the year in which the National Health Service was inaugurated in the United Kingdom; thereafter, the administration of all anaesthetics became the responsibility of trained specialist physicians.<sup>39</sup> In the United States, the example set by Ralph Waters was beginning to come to fruition in 1948. Thereafter, the number of specialist Board Certified Anesthesiologists and academic departments of anaesthesia increased exponentially.<sup>58</sup>

The word "relationship" rather than "influence" was deliberately used in the title of this paper. Ralph M. Waters undoubtedly exercised a very considerable influence on British academic and clinical anaesthesia, but, on the other hand, this paper has demonstrated the relationship between the spheres of influence of anaesthesia in the United States and Great Britain has been, and still is, reciprocal and mutually beneficial. Long may this continue to be so.

### References

- 1. I Magill, "Ralph M Waters Memorial Lecture," Anesthesiology 28 (1967): 201-208.
- 2. NA Gillespie, "Ralph Milton Waters: A brief biography," Br J Anaesth 21 (1948-49): 197-214.
- 3. RM Waters, "Pioneering in anesthesiology," Postgrad Med 4 (1948): 265-270.
- 4. LE Morris, "The continuing influence of Ralph M. Waters on education in anesthesiology," in *Anaesthesia: Essays on its history*, ed. J Rupreht, et al. (Berlin: Springer-Verlag; 1985): 32-35.
- 5. GB Rushman, NJH Davies, and RS Atkinson, A Short History of Anaesthesia: The First Hundred Years (Oxford: Butterworth-Heinemann, 1996): 95-96.
- 6. J Beinart, A History of the Nuffield Department of Anaesthetics 1937-1987 (Oxford: University Press, 1987): 1-40.
- 7. RR Macintosh, "Ralph M. Waters Memorial Lecture," Anaesthesia 25 (1970): 3-13.
- G Organe, "An account of the development of the World Federation of Societies of Anaesthesiologists," in Anaesthesia: Essays on its history, ed. J Rupreht, et al. (Berlin: Springer-Verlag, 1985): 311-313.
- 9. NM Greene, Anesthesiology and the University (Philadelphia: Lippincott, 1975): 311-313.
- 10. TB Boulton, "Classical File. T. Cecil Gray and the 'disintegration of the nervous system," *Survey* of Anesthesiology 38 (1994): 239-252.
- 11. TC Gray and GJ Rees, "The role of apnoea in anaesthesia for major surgery," *Br Med J* 2 (1952): 891-896.
- 12. TW Pratt, et al., "Sodium ethyl (1-methyl butyl) thiobarbiturate. Preliminary experimental and clinical study," *Am J Surg* 31 (1936): 464.
- 13. MD Nosworthy, "Cyclopropane," Anaesthesia 30 1975: 487-490.
- 14. JW Dundee and GM Wyant, Intravenous Anaesthesia (Edinburgh: Churchill Livingstone, 1975): 1-5.
- 15. RM Waters, "Nitrous oxide-oxygen and curare," Anesthesiology, 5 (1944): 618-619.
- 16. HR Griffith and GE Johnson, "The use of curare in general anesthesia," *Anesthesiology* 3 (1942): 418-420.
- 17. RM Waters, "John Snow. First anesthetist," Bios 25 (1936): 40-45.
- 18. J Snow, On Chloroform and Other Anaesthetics. Their Action and Administration, ed. BW Richardson (London: John Churchill, 1858): 1-443.
- 19. RH Ellis, "Early ether anaesthesia. The enigma of Robert Liston," in *Essays on the History of Anaesthesia*, ed. AM Barr, TB Boulton, and DJ Wilkinson (London: Royal Society of Medicine Press, 1996): 23-30.
- 20. J Snow, On the Inhalation of the Vapour of Ether in Surgical Operations (London: John Churchill, 1847): 1-88.
- 21. J Snow, On Narcotism by the Inhalation of Vapours, ed. RH Ellis (London: Royal Society of Medicine Press, 1991): 1-112
- 22. JA Stiles, et al., "Cyclopropane as an anesthetic agent. A preliminary report," *Current Researches* Anesth Analg 13 (1934): 56-60.
- 23. RH Ellis, ed., *The Case Books of Dr. John Snow* (London: Wellcome Institute for the History of Medicine, 1994): 1-663.
- 24. G Wilson and LE Morris, "My dear dogfish—A correspondence between Ralph M. Waters (1887-1979) and Geoffrey Kaye (1903-1986)," in *The History* of *Anaesthesia*, *Proceedings of the Second International Symposium on the History of Anaesthesia*, *London, July 20-23, 1987*, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989): 580-590.

- 25. RM Waters, "Clinical scope and utility of carbon dioxide filtration in inhalation anesthesia," *Current Researches Anesth Analg* 3 (1924): 20-22.
- 26. RM Waters, "Advantages of carbon dioxide filtration with inhalation anesthesia," Current Researches Anesth Analg 5 (1926): 160-162.
- 27. PD Woodbridge, "Better anesthesia at less cost. The carbon dioxide absorption method," *Current Researches Anesth Analg* 12 (1933): 161-173.
- 28. CD Leake and RM Waters, "The anesthetic properties of carbon dioxide," *Current Researches Anesth Analg* 8 (1929): 17-19.
- 29. Y Henderson, MM Scarborough, "VI Acapnia and shock. Acapnia as a factor in the dangers of anesthesia," *Am J Physiol* 26 (1910): 260-286.
- 30. A Ozorio de Almeida, and M Ozorio de Almeida, "The nature of surgical shock and Henderson's theory of acapnia," *JAMA* 71 (1918): 1710-1711.
- 31. DE Jackson, "The employment of closed ether anesthesia for ordinary laboratory animals," *J Lab Clin Med* 2 (1916-17): 94-102
- 32. C Parsloe, "The contribution of two Brazilian Physiologists to the introduction of carbon dioxide absorption into clinical anaesthesia. An acknowledgement by Ralph Waters," in *The History* of *Anaesthesia, Proceedings of the Second International Symposium on the History of Anaesthesia, London, July 20-23, 1987*, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989): 590-595.
- 33. ES Rowbotham, IW Magill, "Anaesthetics for the plastic surgery of the face and jaws," *Proceedings Royal Society Med* 14 (1921): 17-27.
- 34. IW Magill, "Endotracheal anaesthesia," Proceedings Royal Society Med 1929; 22: 83-88.
- 35. AE Guedel and RM Waters, "A new endotracheal catheter," *Current Researches Anesth Analg* 7 (1928): 238-239.
- 36. JW Gale and RM Waters, "Closed endobronchial anesthesia in thoracic surgery. Preliminary report," *Current Researches Anesth Analg* 11 (1932): 283-287.
- 37. I Magill, "Anaesthesia in thoracic surgery, with special reference to lobectomy," *Proceedings* Royal Society Med 29 (1936): 643-652.
- 38. LE Morris, "Ralph M. Waters (1883-1979) To teach doctors a scientific basis for anaesthesia," in *The History* of *Anaesthesia*, *Proceedings of the Second International Symposium on the History of Anaesthesia*, *London*, *July 20-23*, *1987*, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989): 579-580.
- 39. TB Boulton, *The Association of Anaesthetists of Great Britain and Ireland 1932-1992 and the Development of the Specialty* of *Anaesthesia* (London: Association of Anaesthetists of Great Britain and Ireland, 1999): 28-113.
- 40. BJ Bamforth, "Cyclopropane anesthesia. Its introduction at Wisconsin," in *Anaesthesia. Essays on its History*, ed. J Rupreht, et al. (Berlin: Springer-Verlag, 1985): 271-275.
- 41. GHW Lucas and VE Henderson, "A new anaesthetic gas. Cyclopropane," J Can Med Assoc 21 (1929): 173-175; VE Henderson and GHW Lucas, "Cyclopropane. A new anesthetic," Current Researches Anesth Analg 9 (1930): 1-6.
- 42. GHW Lucas, "The discovery of cyclopropane," *Current Researches Anesth Analg* 40 (1946): 15-27.
- 43. RM Waters and ER Schmidt, "Cyclopropane anesthesia," JAMA 103 (1934): 975-983.
- 44. S Rowbotham, et al., "Cyclopropane. A report based on 250 cases," Lancet 2 (1935): 1110-1113.

- 45. R Bodman, "Cyclopropane and the development of controlled ventilation," in *The History* of *Anaesthesia*, *Proceedings of the Second International Symposium on the History of Anaesthesia*, *London, July 20-23, 1987*, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989): 218-221.
- 46. TB Boulton, "Ralph Waters' visit to Great Britain in 1936," ASA Newsletter 65.9 (2001): 13-16.
- 47. RM Waters, "The present status of cyclopropane," Br Med J 2 (1936): 1013-1017.
- 48. RM Waters, "Carbon dioxide absorption from anaesthetic atmospheres," *Proceedings Royal Society Med* 30 (1936): 11-22.
- 49. AE Guedel and DN Treweek, "Ether apneas," *Current Researches Anesth Analg* 13 (1934): 263-264.
- 50. HK Beecher, "Some controversial matters of anesthesia for thoracic surgery," *J Thorac Surg* 10 (1940): 202-219.
- 51. CL Hewer, "Discussion," Proceedings Royal Society Med 34 (1940-1941): 505-506.
- 52. MDT Nosworthy, "Anaesthesia in chest surgery, with special reference to controlled respiration," *Proceedings Royal Society Med* 34 (1940-194): 479-505.
- 53. C Crafoord, "Pulmonary ventilation and anaesthesia in major chest surgery," *J Thorac Surg* 1 (1940): 368-370.
- 54. RM Waters, *Fundamentals in Anesthesia*, 2nd ed. (Chicago: American Medical Association, 1944): 156.
- 55. HK Beecher, DP Todd, "A study of the deaths associated with anesthesia and surgery. Based on a study of 59,548 anesthesias in ten institutions, 1948-1952 inclusive," *Ann Surg* 140 (1954): 2-34.
- 56. DR Bacon, "An enduring controversy: Henry K. Beecher and curare," *Bull Anesth Hist* 17 (2001): 226-224.
- 57. P Harroun, HR Hathaway, "The use of curare in anesthesia for thoracic surgery. Preliminary report," Surg *Gynecol Obstet* 82 (1946): 229-231.
- 58. AM Betcher, et al., "The Jubilee year of organised anesthesia," *Anesthesiology* 17 (1956): 226-234.

nitially, to expand on Patrick Sim's introduction, I wish to mention that the books that Patrick was speaking about, which were authored by Geoffrey Kaye and his colleagues, came from the Alfred Hospital in Melbourne. But, I am from the Royal Prince Alfred Hospital in Sydney. These two institutions are totally separate – 1000 km

## Barry Baker

# WATERS ACROSS THE WATERS

apart. Both were named after Prince Alfred, one of Queen Victoria's younger sons who was on a state visit to Australia in the latter half of the nineteenth century when he was the subject of an abortive Irish assassination attempt. The citizenry of both cities were so horrified and embarrassed at this event that they raised enough money to found the two hospitals. I wish also to draw your attention to my title "Nuffield Professor of Anaesthetics." Sir Keith Sykes, who contributed earlier, is also a Nuffield Professor of Anaesthetics. There are two Nuffield Chairs of Anaesthetics in the world - one in Oxford and one in Sydney. They were both founded by William Morris, Lord Nuffield, partly on profits from the Morris Car Company. We are very grateful in Sydney, and I am confident in Oxford as well, to Lord Nuffield's benefaction to academic anaesthesia.

This presentation has been labelled "Waters across the Waters" because of the waters of the Pacific, which separated Geoffrey Kaye in his association with Ralph Waters, but I had in mind also the concept of "waters" as in guarding the "Mysterious Waters," taken from Wesley Bourne's book. Ralph Waters did, I believe, guard those mysterious waters that Wesley Bourne talked about, which we all care for ourselves in our daily activity with patients. Geoffrey Kaye, shown in this picture in late life at his lathe (fig.1), was a very keen machinist and this knack was one of the attributes that Ralph Waters actually admired about him. Please note that unlike Guedel, he had all his fingers!

Geoffrey Kaye died in 1986, but retired from anaesthetic practice in 1957 because of independent family means. In 1976 he was enticed to write his memoirs, beginning from 1927, the year when he started practice in anaesthesia. He had graduated in medicine in 1926 which was his last year as a student. In those days, in Australia there were no interns, and thus he started work and chose to do anaesthetics from day one. The typescript of Kaye's Memoires (fig. 2) is in the Australian and New Zealand College of Anaesthetists' Archives in Melbourne, Australia.<sup>1</sup> In 1975 the College of Anaesthetists was then the Faculty of Anaesthetists, Royal Australian College of Surgeons. Fig. 3 is a portrait of Geoffrey Kaye at that time of his life, commissioned by the Australian Society of Anaesthetists to commemorate his status as the Founding Father of the Society. There were other founders, but he was the main driving force. I became interested in Geoffrey Kaye and Ralph Waters at the Second International Meeting on the History of Anaesthesia in London in 1987, when Gwen Wilson and Lucien Morris spoke at a session labelled, "My Dear Dogfish," about the years of correspondence between Ralph Waters and Geoffrey Kaye.<sup>2</sup> Fig. 4 is a picture taken at

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Clockwise from left – Figure 1. Geoffrey Kaye in his workshop in the 1980's. Photograph by Dr. John D. Paull. Courtesy of Dr. John Paull and the Australian and New Zealand College of Anaesthetists. Figure 2. The front page of Geoffrey Kaye's Memoirs. Courtesy of the Australian and New Zealand College of Anaesthetists. Figure 3. Photograph of Lucien Morris and the late Gwen Wilson, immediately after their presentation "My Dear Dogfish" at the Second World Congress on the History of Anaesthesia in London in 1987.<sup>2</sup> Photograph by the Author.

Figure 4. Portrait of Geoffrey Kaye, which hangs in the Australian Society of Anaesthetists Headquarters, painted posthumously in 1987 by Alfred Hannaford. COURTESY OF THE AUSTRALIAN SOCIETY OF ANAESTHETISTS.





that symposium just after they had finished their dialogue—Gwen Wilson taking the part of Geoffrey Kaye and Lucien Morris that of Ralph Waters. I shall mention more about this Dogfish story, some of which was mentioned previously by John Severinghaus. The person who was responsible for persuading Geoffrey Kaye to produce his memoirs was Kevin Mc-Caul a Melbourne anaesthetist originally from Ireland and a former Dean of the Faculty of Anaesthetists, RACS (fig. 5). He persuaded Geoffrey to write down his reminiscences of thirty years of practice. McCaul added a note to Kaye's manuscript:



Figure 5. Photograph of Geoffrey Kaye and the late Dr. Kevin McCaul, who is wearing Faculty of Anaesthetists RACS robes, in 1976. COLLEGE ARCHIVES PHOTOGRAPH

Geoffrey was inclined to be of a changeable opinion about various events. He at this time, if not always, was less then enchanted by attempts by Sydney anaesthetists to claim premiership in the development of anaesthetics. I saw a lot of Geoffrey, he was a lonely sad man, who felt ignored.<sup>3</sup>

Geoffrey Kaye had a very good memory-but it was a convenient memory, which depended on what he wanted to emphasise and who he was for or against at the time, whether he remembered something or whether he didn't. But his memory for things was very good, so most of the events that I discuss here, which are actually factual in some way, are probably correct. Kaye notes in his introduction:

> I have been asked to write down recollections of the years 1927-57, when Australia was moving into the main stream of modern anaesthetics. I cannot confirm these recollections, because my library and collections have long been dispersed. I must therefore depend upon memory, which is notoriously misleading.<sup>1</sup>

So he was giving himself an excuse! The version of his memoires, which I am discussing, is his unedited first version. He was persuaded to edit this first version because of the number of scurrilous remarks that were made. Both versions are extant, but I am taking all my quotes from the first version. Kevin Mc-Caul notes that Geoffrey Kaye was "at one and at the same time Australia's most advanced theoretical thinker in Anaesthetics and by an unbreachable distance the worst practitioner in what was then an art but which he persisted in treating as a highly developed science."3 He was well known to take all morning to anaesthetise one patient, while the rest of the list was being done by the residents or interns to keep the surgeons happy. Geoffrey Kaye came to wider Australian anaesthetic notice in 1929 at the Australasian Medical Conference in Sydney. The person who was critical to that meeting was Francis McMechan who had been very keen on encouraging Australian anaesthetists into the world grouping of anaesthetists. This meeting was the first time that a Section of Anaesthetics had been part of these congresses. Geoffrey Kaye read a paper on mortality associated with anaesthesia.

> At the Congress Geoffrey read a paper outstanding and different in its era; Francis read a paper on anaesthetic records, and Geoffrey had a mania for records. Francis knew well of forthcoming meetings in America, and knew equally well the outstanding names and centres of anaesthesia in America. Geoffrey was just about to start on a journey to further his knowledge. Francis was infirm and aging prematurely, and on the look-out, world-wide, for keen young men of vision to carry on his work. Geoffrey was just such a person.<sup>4</sup>

It was quite an extensive paper and Francis McMechan was taken by it. McMechan persuaded Kaye that he should visit some of the relevant North American sites on his planned overseas visit in the coming year. Geoffrey Kaye comments that:

> In North America, it appeared, were anaesthetists who were organised; who had post graduate courses and a journal of their own, and who took the basic sciences seriously. Further, they paid pre-anaesthetic visits, kept operationcharts and followed-up their patients. It was high time for us Australians to follow their example. North America was to be our Mecca for the ensuing two decades.<sup>1</sup>

To a degree that was correct, although many anaesthetists and other doctors continued to go "home" to Great Britain, which was still regarded by Australians at that time as the "motherland."

In 1930 Kaye arrived in the United States, having been to Europe first. He had corresponded with Waters because he wished to come to visit him, but he first met him at the 1930 IARS (International Anesthesia Research Society) Meeting in Philadelphia where: "Waters spoke upon the necessity of conserving the normal  $pCO_2$  during anaesthesia"<sup>1</sup>

We heard previously about prohibition during these times, but it was anything but prohibition at these anaesthetic meetings, apparently as the "President [of the Society] invited the dammed Englishman [Kaye] to Room 1421" for alcoholic drinks as part of socialising at the meeting.<sup>1</sup> I have another comment about this type of socialising later on. Kaye then visited McKesson prior to coming to Madison.

> In 1930, McKesson was a large and portly man with a reputation for commercial toughness...The two week's course cost £150. Although I spent six weeks with McKesson, he would accept no fee, saying that the advertisement in Australia would be an adequate reward.<sup>1</sup>

McKesson actually charged for his courses but gave Geoffrey Kaye completely free tuition for six weeks, simply as an advertisement to get other Australians to come for tuition and to use his equipment. He was obviously very astute in his abilities to pursue his commercial activity! McKesson was regarded by Geoffrey Kaye as:

> a superb clinical anaesthetist, but he had prejudices. One was against spinal anaesthesia...The technique ("secondary saturation") really employed the curariform effect of extreme hypoxia, and even McKesson's partners were chary of it. In his own expert hands, no harm seemed to accrue; but, with his imitators, many cases were reported of permanent cerebral damage.<sup>1</sup>

And so to Madison, with a description as Geoffrey Kaye remembered Madison at that time.

60,000 people, including about 10,000 students. It lay on a peninsula between

two great lakes, and was dominated by its vast State Capitol, modelled upon that in Washington itself, tree-shaded and "civilized," was a University city fit to be compared with Cambridge. The State University ranked high, even by world-standards.<sup>1</sup>

And Waters' department:

was informally-run, but everyone in it was wide-awake, knowing that "the Chief" would stand no nonsense...The slogan of the Department was, "Let us try it and see." Equally Waters – with his farming background – was a great exponent of "mule-sense," so named because the mule is a more sagacious animal than the horse.<sup>1</sup>

There have been several references, at this Jubilee Meeting, about mule-sense, during Waters' time during the war. This is Kaye's explanation of what Waters was talking about – "a more sagacious animal than the horse." So perhaps that is what Waters was actually referring to, rather than just the stupidity of driving around in the desert.

Kaye reports on what was happening in Madison at that time.

In 1930, the standard agents in Madison were  $N_2O$  and  $C_2H_4$ , given by canister-absorption. The latter technique was not difficult to learn, but one was too much swayed by McKessonian influence to appreciate its true value: the recognition came only later. Spinal analgesia was used only at the patient's desire. Waters, always the innovator, was already trying-out cuffed endotracheal tubes (de Caux/Guedel/Waters), although the cuffs had to be homemade at that time. He was also trying-out cyclopropane, but was loath to talk about it until more sure of his ground, which he became in 1933.<sup>1</sup>

Geoffrey Kaye had visited de Caux in London. De Caux later became famous in Britain for being locked up in jail for anaesthetising patients for abortions, which were illegal in those times. He subsequently returned to practice in dental anaesthesia again after his jail term, though unregistered as a medical practitioner. He had independently designed and used cuffed tubes.<sup>5</sup>

Another Australian to visit Waters around this time was Gilbert Troup from Perth, Western Australia, who wrote:

> Waters, on whose capable shoulders the bulk of the investigation has fallen, and whose baby cyclopropane is, so to speak, retains a perfectly open mind about it and welcomes criticism and argument. He will not commit himself at the moment and asks for another year of further clinical, pharmacological and experimental investigation before giving a definite opinion.<sup>6</sup>

Geoffrey Kaye, a little later in his memoirs mentioned that:

Incidentally, Guedel had, in the 1930s, described

a "zone of fibrillation" during induction with  $C_3H_6$ , but regarded it as innocuous. Waters sometimes used a "shock" induction, giving almost-pure  $C_3H_6$  for the first few breaths. The method proved

In person Waters was rugged, thick-set and unassuming. His keynote was scientific integrity. His criticism was terse but never unkind.

safe in his hands, but in those of others, even of Gillespie, fatality could result. There is, seemingly, no harmless "zone of fibrillation" after all.<sup>1</sup>

In person Waters was rugged, thickset and unassuming. His keynote was scientific integrity. He had no use for equivocation: when he met with it, the Waters pipe would come out of the Waters mouth for long enough for him to say: "However thin he slices it, it is still baloney!" His criticism was terse, but never unkind. Once, I sent him a little paper upon divinyl ether; his comment was: "Dear Geoffrey, it was a bad paper and I am sorry that you published it. Yours sincerely, R.M.W."<sup>1</sup>

Waters was no less happy in his relations with the physiologists and pharmacologists of his University. Thus, in 1928, they reviewed H.H. Hickman's experiments (1828) upon the anaesthetic properties of CO<sub>2</sub>. One recalls an appendectomy under CO<sub>2</sub>-O<sub>2</sub>, 10:90, with the patient carefully monitored and Waters himself giving the anaesthetic. After that, one simply had to try the mixture oneself. The hyperpnoea was such that, before oblivion came, one felt that never again would there be any air in the world!<sup>1</sup>

One alarming assignment was to address about a hundred of Waters' students. They were a husky lot, informally-garbed as lumberjacks, although this style would pass without remark on a modern campus. (He was used to being well attired with a suit and a tie as a medical student in Australia, so it was a bit of a shock to him to find that the Americans were a bit more laid back.) They were also multi-national, Madison attracting students from many lands. One could only talk about the British idea of medical education; of the major European teaching-centres; of travel, and how to do it at low cost; and of the importance of clinical research. The task was made no easier by the fact that one had been preceded, a few months before. by that superb orator, W.A. Osborne! At the end, Waters paid a tribute to British institutions and the British way of life, such as one did not expect in the insular Middle West.<sup>1</sup>

Kaye then went on to visit Lundy at the Mayo Clinic in Rochester, Minnesota. Douglas Bacon has mentioned some aspects of Lundy's relationship with Waters.

> His outlook upon general anaesthesia was limited, since he was at feud with McKesson and bitterly jealous of Waters. His arrogance was unlimited ... Lundy claimed the introduction of thiopentone into anaesthesia, in 1934; others, however, gave credit to Wisconsin. Waters could never be 'drawn' upon the subject....In person, John Lundy was short, dark, compact and forceful. His egoism equalled his energy, and he was an excellent hater.<sup>1</sup> [It has been reported that the medical representative taking the drug to Lundy stopped off in Madison on the way leaving two ampoules of thiopentone with Waters who tried the drug with limited success and was not overly impressed, thus leaving Lundy to establish its place in anaesthesia.]<sup>7</sup>

You can just imagine it—a bundle of energy and fire! Kaye returned home to Australia and a correspondence was started with Waters, which continued over many, many years. This correspondence formed the basis for the Wilson/Morris presentation in London in 1987.<sup>2</sup> It started off with this sort of formality—"Dear Kaye" and signed "Ralph Waters," and "Dr Waters" signed "Geoffrey Kaye." One comment about this time, taken from some of this correspondence—not from the memoirs, is:

#### Dear Kaye,

I am afraid and I may have given you the impression that I am hard to get along with because of my failure to be as enthusiastic as I might have been about your text. I am rather a blunt sort and say what I think perhaps too freely. I certainly gave the worst of my impression in regard to the book. It is to my mind the best book and the nearest to one which I wish to recommend to my students.

#### Ralph M. Waters, M.D.<sup>2</sup>

This letter from Ralph Waters was in response to a slightly pathetic letter from Geoffrey Kaye about the fact that Waters had just sent him a six-page dissection of Kaye's book called Practical Anaesthesia; this was the first edition published in 1932. Kaye subsequently published another edition in 1946 with Orton and Renton who were his colleagues at the Alfred Hospital, Melbourne, which they dedicated to Ralph Waters. Ralph Waters was actually fairly complimentary in his original long letter, but he had, in typical Waters' style, been critical whilst trying to correct things, which he saw as inaccuracies. Another short letter was about a personal matter this time. Was young Geoffrey Kaye going to get married?

September 1, 1933

I have heard no mention of the date on which the Geoffrey Kaye family is to become established. Is there any serious move along that line? I have such a lot of fun out of my family that I rather feel it my duty to prod you youngsters along that you may not be too late in getting started. I shall expect a progress report in your next.

Waters<sup>2</sup>

This is his reply.

11th Oct. 1933

No there is no evidence of a family of Geoffrey Kaye's being established in the near future. I find it hard enough to support a car and a lathe, let alone a wife! In any case, I have all the instincts of a bachelor and am contented as I am – thus far. I do not doubt the many advantages of matrimony, and am always open to a "prod" if some kind friend such as yourself provides the girl and the wherewithal.

Kaye<sup>2</sup>

Ralph Waters backed off and never wrote about this matter of Kaye's possible marriage again!

Geoffrey Kaye was back in Madison in 1938 and:

There, R.M. Waters was as stimulating as ever. For example, he challenged one to bring a robust subject into Plane II of Guedel's Stage 3, using the McKesson apparatus without ether-supplement. All went tolerably until Plane I was passed; then, one reached for  $O_2$ -dial and ether-tap! Waters turned to his Residents: "Just as I told you! Even a pupil of McKesson's can't reach Plane II without either ether or hypoxia!"<sup>1</sup>

It wasn't a big success but I did inform you that Geoffrey Kaye was not renowned for his practical anaesthesia!

In 1938, this is Kaye's comment about the prohibition era, which had recently been repealed: "Since the repeal of Prohibition in 1935, much less drinking was being done, but this party was clearly meant to be an 'alcoholiday."<sup>1</sup> So there was a lot of drinking being done during prohibition, not so much afterwards! But this "party was clearly meant to be an 'alcoholiday," describing when the Madison Residents took Kaye out. Geoffrey Kaye again:

> Waters, despite his rugged exterior, was perceptive. Once in the changingroom, he asked how much time remained to one in Madison. The answer was two days. "Well," he said, "to stay or to

go? It's your decision: which?" Not expecting such a question, and rather taken-aback, one could only say something about commitments in Melbourne. "Alright," he said, "it mightn't have been an easy decision for you, so we'll not talk about it again." He guessed that the slightest pressure from him would have kept one in Madison, and that one might have regretted the decision later.<sup>1</sup>

Geoffrey Kaye was a bit flummoxed, he gave a fairly off-the-cuff response, Waters backed off, and that was that!

Kaye went on to the 1938 IARS Congress in New York where Waters was his sessional discussant:

> I myself had been detailed to compare and contrast the  $CO_2$ -absorption and positive-pressure techniques of gas-anaesthesia, a subject which one would certainly not attempt today. To my horror, Waters was told-off to open the discussion. He let me "off the hook" nicely. "I could," he said, "knock a few holes in that paper. Still, it was a thoughtful effort, and I do not propose to discuss it further."<sup>1</sup>

That is damming with faint praise! Also again to the Mayo Clinic:

In Rochester, Minn. John Lundy was as prickly as ever, and as jealous of Waters; indeed he resented not having been visited first. He was still the generous host and the superb regional-anaesthetist: he still employed nurse-technicians, but  $C_3H_6$  had replaced  $C_2H_4$ , and absorptiontechnique was standard.<sup>1</sup>

So Lundy had taken on some of Waters' techniques!

Then to the war, Geoffrey Kaye was in the Australian forces in Egypt where he became ill in 1942, needing an anaesthetist, and where: One recalled Waters' dictum ("If I didn't know my anaesthetist, I'd ask for 'open' ether") and suggested that agent. During the induction, one had the thought: "Is this fellow any good?" One found oneself answering: "You silly ass, take another six breaths, and you won't care whether he's good or not!" Actually, the anaesthetic was beautifully-given, without any after effects. The anaesthetist proved to be Geoffrey Wood-Smith, a Harley Street man!<sup>1</sup>

And who subsequently worked at the Royal Postgraduate Medical School at Hammersmith Hospital in London.

So, to the Dogfish story again!

In 1942, a Festschrift was planned to celebrate his twentieth [sic] year at Wisconsin. I provided a tale of a Grimsby fish-dealer who used to send live cod in tanks to London. What with good food and no exercise, the cod became so lethargic that buyers complained that their flesh was tasteless. The dealer therefore introduced a live dogfish: it chased the cod around and kept them in first-class condition. The analogy "took;" Waters became "the Dogfish" and we (at Noel Gillespie's suggestion) the "Codfish." Waters took it in good part, and often signed his letters "Dogfish." After his retirement, he changed this to "Dogfishthat-Was."1

There is also a statement very similar to this description in Gillespie's tributary to Ralph Waters in the *British Journal of Anaesthesia*.<sup>8</sup> Fig. 6 is, I believe, the first letter from Kaye to Waters where he refers to Waters as "My dear Dogfish." Waters continued to refer to himself as "Dogfish" right to the end of his life. Fig. 7 is a compilation from one of Waters' letters taken at the time of the Montréal Olympics to Geoffrey Kaye where he says amongst other

#### BARRY BAKER

and the second

14 COLLINS STREET MELBOURNE, C.1

25 Nov. 1944.

By dear Dogfish,

Conformably to pre-war custom, I shall devote this letter not at all to anaesthesis, but to a description of my summer holiday, 1944. A letter about something that isn't technical "shop" may entertain you by its novelty.

Southous to first a bone in the country to better held' it the children are all thoughtful and kind to me. chap rended Ardrey wrate another book The Husting = YEading gho this is (not accepted by the wiss ones I unley stand al yesterdag at finished his cast chafter, He calls to Interglacial man. As a reput I am quite repaired to have the world in radiated out of 28 istance of to be frozen in a cake ofice. in any case I am not planning to hang around ruch Longers So I'm not morriel . The ethletics in Herold Briffith's home to any heft one Occupiel last months and the politicians have done the same this months. May faithful colored T-Y lezeps me in contact with the outside, my seit wishes go with this to you that your health may again to restored. also best wishes to your & & sister. may you live tong and be ho

Figure 6. Letter from Geoffrey Kaye to Ralph Waters, held in the Australian and New Zealand College of Anaesthetists' Archives. Courtesy Australian and New Zealand College of Anaesthetists

Figure 7. Composite of a letter from Ralph Waters to Geoffrey Kaye at the time of the Montréal Olympic Games. Courtesy of THE AUSTRALIAN AND NEW ZEALAND COLLEGE OF ANAESTHETISTS

things "in any case I am not planning to hang around much longer, so I'm not worried." He signed this letter Dogfish, and he is in his nineties at this time.

Back again in America, after the war, Geoffrey Kaye was with Waters at the 1949 IARS Meeting:

> Waters was in Chicago. He looked amazingly well, from tending his Floridian citrus-groves. We visited the Trade Exhibition, where salesmen tried

hard to sell him apparatus. They were amazed by his invariable reply: "I'm an old buffer now, and don't practice!" They could picture death in harness, but not retirement from practice!"<sup>1</sup>

The exhibitors just could not comprehend someone who had been so active, like Waters, would have retired to Florida. After Chicago, Waters drove Kaye to Madison. Waters wasn't living in Madison by then, he was in Florida, but he was back to get an honorary degree. An interesting vignette of Waters' opinion at the time was recounted:

We attended one of the excellent Seminars, which were a feature at Wisconsin. The Residents gave the papers, and one of the senior staff played critic. Waters landed me in that role. There were two papers, one upon respiratory physiology and the other upon the acid-base balance. In honesty, one had to indicate that the one paper was inaccurate, and the other damnably ill-presented! There was then question-time, with the talk lasting for hours. Waters staggered us by saving that curare had no place in anaesthetics, and would be defunct within five years! Gillespie concurred; MacKay (who took over as Professor from Waters) and myself demurred.1

Now just a small diversion from Kaye about Gillespie because nothing much has been mentioned at this Jubilee Meeting about Gillespie, yet he was quite important in Madison.

> In person, Gillespie was middle-sized, lean and hard, with an accent, which combined Oxford with a soft, mid-Western drawl. His home was Bohemian, but never dull. He cooked; I cleaned: he had the bed, and I the divan. He played Bach and Händel. We viewed his heirlooms, explored his bookshelves and never slept before dawn. He was good company, for he read widely, spoke French and some German, and had "Latin and Greek enough for a gentleman." Some people, including Laurette McMechan, remarked that, whilst always polite to women, he took no interest in them. There were even hints of homosexuality. Of that, I saw no evidence whatever. His misogyny is explicable by his broken home, his strange upbringing, his mother's dominance, and his experience of the (TE) "Lawrence"/Chapman ménage...There

are really elements of a Greek tragedy in his strange career.<sup>1</sup>

And there were also hints of homosexuality concerning Geoffrey Kaye who was equally a bachelor and unmarried all his life!

So close was their association that Gillespie quoted extensively from Kaye in his tribute to Waters,<sup>8</sup> and when Gillespie died he received an Obituary,<sup>9</sup>quite unusually for someone from North America, in the *Medical Journal* of Australia. It was written by a "PERSONAL FRIEND who wishes to remain anonymous." That personal friend was Geoffrey Kaye.

When, "Summarizing the American scene in 1949, one was struck by the widespread activity in research and the frequency of endowments for it,"<sup>1</sup> which wasn't so in Australia and he was very envious. Kaye also summarised his 1927–57 experiences in anaesthesia:

> One was fortunate to have been "in anaesthetics" when one was. The methods of 1927 did not differ greatly, except for the endotracheal technique, from those of 1897. It was therefore fascinating to watch the emergence of the manifold techniques of today. Let us write them down in an order roughly chronological: The Magill's tube;  $C_2H_4$ ; C<sub>3</sub>H<sub>6</sub>; CO<sub>2</sub>-absorption; hypobaric and hyperbaric spinal analgesia; continuous caudal analgesia; the intra-venouslygiven barbiturates; blood-banks; tracheobronchial "toilet;" the stir-up régime; C<sub>2</sub>HCl<sub>2</sub>; the inflatable cuff; muscular relaxants; respiratory "aid" and "control;" endobronchial anaesthesia; the Copeland-Chatterson punch-card; plasma-expanders; mechanical ventilators; hypothermia; induced hypotension; the cardiac bypass; electronic monitoring; intensive care.1

He left out one vital change, because in 1927 in the whole of Australia there were only three specialist anaesthetists, with only a few more new specialists, including Geoffrey Kaye, in the late 1920s. General practitioners, who referred the patients to the surgeons for operation, gave the majority of the anaesthetics at that time. By 1957 those general practitioners were virtually all out of anaesthetics, at least in the major cities and towns. From 1927 to 1957 had been the transition phase where the general practitioner anaesthetist was eased out, and specialist anaesthetists established their place with more specialised skills and newer more potent agents.

One of the reasons why Ralph Waters cut himself off from clinical practice so abruptly when he retired may have been that the medical establishment in Florida cut him out:

> Waters, thinking that right-of-practice might add interest to his life, presented himself. He was bombarded with questions about modern drugs, of which he had never heard, and was failed! Whilst he will gladly write letters about semantics, or the Negro Question, or the misdeeds of NASA (at Cape Canaveral) he eschews the subject of anaesthetics. He is an admirable person.<sup>1</sup>

Another story that may be of interest, because I haven't heard it mentioned at this

Jubilee Meeting, was one in the memoirs about Waters' early life

In the straightened circumstances of the Waters' home, young Ralph had a stern upbringing. He was once fined one dollar for the illegal sale of newspapers on the Pennsylvania Railroad, and was so concerned about the probable reaction at home that he worked out the fine himself and never said a word to his parents!<sup>1</sup>

He was obviously brought up in a very strict household which may explain the formality of the engagement story told at the Dinner last night about the prospective son-in-law having to be interviewed by the prospective father-inlaw for the daughter's hand in marriage!

Gwen Wilson comments in her obituary about Geoffrey Kaye. "Geoffrey was a difficult man to come to know, and his high standards were discouraging to many, but once friendship was established, it was loyal and for a lifetime."<sup>10</sup> That friendship between Geoffrey Kaye and Waters *was* loyal and *was* for a lifetime. The Dogfish had a real disciple in Geoffrey Kaye, who was very influential in Australia, particularly in the southern parts of Australia more so in Melbourne than in Sydney. Thus, the Dogfish's ideas were transferred across the waters to Australia. BARRY BAKER

#### References

- 1. G Kaye, "As I Remember It," 1927-1957, Manuscript held in Library of the Australian and New Zealand College of Anaesthetists, Melbourne, Australia.
- G Wilson, LE Morris, "'My dear Dogfish' A correspondence between Ralph M. Waters (1883-1979) and Geoffrey Kaye (1903-1986)," in *The History of Anaesthesia, Proceedings of the* Second International Symposium on the History of Anaesthesia, London, July 20-23, 1987, ed. RS Atkinson and TB Boulton (London: Royal Society of Medicine, 1989): 580-590.
- 3. K McCaul, Handwritten addition to "As I Remember It," by G Kaye, Library of the Australian and New Zealand College of Anaesthetists, Melbourne, Australia.
- 4. G Wilson, One Grand Chain–The History of Anaesthesia in Australia 1846-1962 (Melbourne: ANZCA, 1995): 562.
- 5. DJ Wilkinson, "Francis Percival de Caux (1892-1965) an anaesthetist at odds with social convention and the law," *Anaesthesia* 46 (1991): 300-305.
- 6. G Troup, "Anaesthesia in America," Med J Aust 2 (1935): 857-863.
- 7. Dr. Lucien Morris, personal communication.
- 8. NA Gillespie, "Ralph Milton Waters: a brief biography," Br J Anaesth 21 (1949): 197-214.
- 9. Obituary of Noel Alexander Gillespie, Med J Aust 2 (1955): 596.
- 10. G Wilson, "Geoffrey Kaye, 1903-1986, Obituary," Anaesth Intens Care 15 (1987): 107-109.

fter his retirement in 1949, Waters stopped attending anesthesia meetings and withdrew to his Orlando, Florida orange grove. He had a world vision and used to hoist the United Nations flag in front of his home by the lake whenever he had foreign visitors. In 1950 he went to Denmark on a World Health Organization

## **Carlos P. Parsloe**

# RALPH WATERS AND THE THIRD WORLD CONGRESS OF ANESTHESIOLOGY, SÃO PAULO, 1964



Carlos P. Parsloe, M.D. Aqualumnus

tour of the Anesthesia Training Center in Copenhagen. But, he did not stay long in Europe and returned home.

During the Second World Congress of Anaesthesiologists in Toronto, Canada, from September 4-10, 1960, the Brazilian Society of Anesthesiology was chosen to organize the Third World Congress in 1964. The Brazilian Society decided to hold the Congress in São Paulo. Dr. Luis Rodrigues Alves was elected President of the Executive Committee and I became Chairman of the Scientific Committee. Thus started Luis' and my involvement with the affairs of the World Federation of Societies of Anaesthesiologists. Early on I thought it would be a unique opportunity for Latin American anesthesiologists, as well as for anesthesiologists from other parts of the less developed world, to invite Waters to deliver the opening address of the Congress. His name was legendary but very few colleagues had ever met him. Waters had been made an Honorary Member of the Argentinian Society of Anesthesiology in 1945 and of the Brazilian Society of Anesthesiology in 1949, and in 1951 had written the first article in the first issue of Revista Brasileira de Anestesiologia entitled "Progress in Anesthesia in the Western World."1 This excellent article was reproduced recently and proves invaluable

reading to savor Waters seminal ideas, which remain as valid today as they were over fifty years ago.<sup>2</sup> It is interesting to quote Waters' conclusions, which synthesize his beliefs in the importance of anesthesia and the role of anesthesiologists in medicine:

> The intimate relationship of Anesthesia to medical practice in general has been stressed. Fundamental knowledge of basic principles rather than the new, glamorous and spectacular has been recommended as a foundation of our specialty. Certain of our outstanding obligations, to ourselves and to others, have been outlined. And lastly have been discussed some physical, moral and mental qualities which seem to the author necessary to the success of the specialist in Anesthesia.

I wrote to Waters asking him to come with Mrs. Waters to São Paulo as official guests of the Congress. He declined the first and subsequent letters of invitation. He sent a short, incisive, telegram dated October 7, 1960: "Sorry trip impossible. Waters."<sup>3</sup> As the years passed, I became frustrated with the realization that he would not attend the Congress.

On a extended visit to the United States in 1963, I told Perry Volpitto about my frustration

#### CARLOS P. PARSLOE

and received a sound advice: explain directly to Mrs. Waters the importance of the occasion and how much the Congress would like for them to come to São Paulo. That I did, indicating the opportunity that so many colleagues would have to meet Waters. In fact, they came accompanied by their daughter Elva. Waters was 81 years old at the time. They arrived in



Figure 1. Ralph Waters (1883–1979) presenting the opening address. WFSA Third World Congress of Anesthesiology, São Paulo, Brazil, September 20, 1964. At his side Geoffrey Organe, Secretary-Treasurer, WFSA, elected President (1964–1968) during the Congress. COURTESY, WOOD LIBRARY-MUSEUM OF ANESTHESIOLOGY

Rio de Janeiro where they were met by Dr. Renato Milliet, who had spent some time in Madison, and they subsequently came to São Paulo. They attended all official Congress as well as private receptions. Waters was followed everywhere by an enthusiastic group of colleagues, mostly from South America, who had never thought they would have the opportunity of meeting him in person and talking to or hearing him. Years later, colleagues from different parts of the world have told me how they were thrilled to have met Waters. Perhaps Waters himself did not realize how widespread his fame and accomplishments had become. The widely used "Waters canister," the to-and-fro absorption method and cyclopropane, were indelibly linked to his name. Certainly, even more significant his teaching on the importance of maintaining the airway and ventilation, his endeavor to define anesthesiology as a role for physicians only, his emphasis on research and teaching medical students were of distinct significance and responsible for the establishment

of the modern era of safe clinical anesthesiology.

The scientific program for the World Federation of Societies of Anaesthesiologists Third World Congress of Anesthesiology listed in the four official languages (English, French, Spanish, and Portuguese) two Honorary Members: Ralph M. Waters, M.D., Emeritus Professor of An-

At the opening ceremony on September 20, 1964, Waters was led to the dignitaries' table, and after the protocol inauguration of the Congress he was introduced and asked to proffer the opening address. He spoke in his usual, unmistakably simple but forceful way, comparing himself to a ghost among other ghosts from the past history of Anesthesia,

esthesiology, University of Wisconsin, Doctor of Science, Western Reserve University, the first University Professor of Anesthesiology in the world, and Dr. Mario Castro d'Almeida Filho, Emeritus Professor, Catholic University, Rio de Janeiro, Brazil, the first Brazilian anesthesiologist and first President of the Brazilian Society of Anesthesiology.<sup>4</sup>

At the opening ceremony on September 20, 1964, Waters was led to the dignitaries' table, and after the protocol inauguration of the Congress he was introduced and asked to proffer the opening address. He spoke in his usual, unmistakably simple but forceful way, comparing himself to a ghost among other ghosts from the past history of Anesthesia, making historical remarks on topical figures in the development of anesthesia. Realizing the importance of keeping his address for posterity, I asked him after the ceremony for the text, which he had read. I was amazed when he quietly told me that, "a nice young man from the Brazilian Society of Anesthesiology" had asked for it and he had given it to him.

Naturally he had no copy of the text! After a frantic search, the culprit was found and he handed over the typewritten pages, since his intention was similar to ours: to preserve the text in view of its significance. Professor C. R. Stephen, then Editor of *Survey of Anesthesiology*, had the address printed as an Editorial in the June, 1967 issue. Waters' concluding statements are well worth reproducing:

> For the opportunity to join this Third Congress of World Representatives of those who try to relieve pain, I am most grateful to all you Brazilians, as well as to old friends from far countries. Every gathering, which brings together people from all parts of the earth helps a little, I believe, to hasten the day when enmity among the various nations will come to an end, and when all people can unite in

a world free from animosity and misunderstanding. May this Congress continue to meet and grow in years to come, to the benefit not only of the members who attend it, but towards the promotion of peace and cooperation throughout the world.<sup>5</sup>

Again, such admirable words well represent Waters' beliefs about anesthesia, the anesthesiologist role in medicine and his vision for a peaceful world.

During the Congress, Waters met many old friends, including Torsten Gordh, his first foreign resident and the first Professor of Anesthesiology in Sweden. After the Congress, Edith and I took the Waters family to the seaside city of Santos where he had a long conversation with Macintosh at the home of my parents. On the way back to São Paulo at night he wanted to see the Southern Cross constellation, which, to our chagrin, proved impossible. On another day we took him to the Butantan State of São Paulo Institute where snakes are kept for purposes of manufacturing antiserum for their venom. Waters' attendance at the Third World Congress of Anesthesiology was stimulating to a large number of colleagues, who for the first time had the opportunity of participating in a World Congress, and proved a success from our point of view. I think it is fair to say that the Waters family found their Brazilian experience enjoyable and not overly tiresome.

### References

- 1. RM Waters, "Progress in Anesthesia in the Western World," Rev Bras Anest. 1:1 (1951): 3-12.
- RM Waters, "Progress in Anesthesia in the Western World," Rev Bras Anest 1:1 (1951): 3-12, reprinted in Holding Court with the Ghost of Gilman Terrace, Selected Writings of Ralph Milton Waters, ed. David C. Lai (The Wood Library Museum of Anesthesiology, Park Ridge, IL, 2002): 196-206.
- 3. RM Waters, telegram to author.
- 4. Scientific Program, III World Congress of Anaesthesiology, São Paulo, Brasil, September 20-26, 1964.
- 5. RM Waters, "Editorial," *Survey of Anesthesiology* 11 (1967): 191-193. [See reprinted text of the 3rd World Congress address in this *Proceedings* book, pages 253-254.]

#### EPILOGUE

T his book contains papers from the program of an international meeting held in Madison, Wisconsin, 6-8 June 2002 in retrospective recognition of the major contributions of Professor Ralph M. Waters, M.D. to the development of the medical specialty of Anesthesiology. This meeting also celebrated the 75th anniversary of Dr. Waters' appointment to the Faculty of Medicine, University of Wisconsin in 1927, and his purposeful establishment of an academic center for teaching physicians the scientific basis and application of the broad range of medical knowledge requisite for the professional practice of safe clinical anesthesiology.

Opening ceremonies, the initial plenary lecture, and a welcoming reception were all held in the impressively elegant Senate Chambers of the Wisconsin State Capitol Building. Sessions on subsequent days used luxurious areas of the Concourse Hotel just one block north of the Capitol Square.

Registrants and participants came to this meeting from many parts of the world including Great Britain, Northern Europe, Latin America, Asia and Australia, as well as the United States.

Most presentations provide discussions about Waters himself, the Wisconsin program, some prominent Wisconsin trainees, and a few selected others of the Waters professional lineage. Other speakers described the dissemination across much of the world of Professor Waters' teaching concepts and standards of practice. These pages are replete with historical information, reminiscences, personal perspectives and anecdotes about Dr. Waters' charismatic personality (which stimulated many medical students to consider anesthesiology as a career!). Much of what Ralph Waters accomplished was due to his affable manner, obvious sincerity, effective persuasion and deliberate efforts to seek out and co-opt other individuals to actively support his objectives. Waters had an unusual ability to work with and through other people; like the coach of an athletic team his quiet but dynamic personality and projected enthusiasm engagingly attracted others to work with him toward attainment of his goal, the establishment of anesthesiology as a medical specialty.

Meeting attendees gained a new appreciation of the extent of the Waters multifaceted leadership and the far-reaching impact of his personal imprint as a medical educator on the remarkable growth of anesthesiology in the middle of the twentieth century.

By the end of the meeting all attendees also had an increased understanding of the way in which Waters made progress toward his goals by working together with individuals in other branches of medicine, both basic scientists and clinicians.

The worldwide influence of Professor Waters is somewhat analogous to the wake of a large ocean going ship which laps upon distant shores long after the initiating cause has disappeared from view. Similarly the patients receiving the benefits of current standard of anesthesia care are generally unaware of those who put the process in motion.

It is hoped that all readers of these Proceedings will recognize the innate challenge to all current anesthesiologists to strive our utmost to maintain and promote the ideals and professional standards Waters taught by example throughout his career at the University of Wisconsin.

- Lucien Morris, M.D.

Opening Address 3rd World Congress, 1964 São Paulo, Brazil Ralph M. Waters

Years ago I read a book. It is called *Van Loon's Lives* and was written by an imaginative Dutchman named Hendrick Van Loon. I found it a collection of ghost stories. In it are described a series of Saturday night dinners at which the guests, usually invited in pairs, turned out to be sample characters from history. Erasmus and Sir Thomas More made an interesting evening. William the Silent and General George Washington came together. Plato and Confucius were guests another evening. In other words, the book is the story of meetings of ghostly characters from the past, the history of whom made it probable that their conversations would be entertaining and instructive.

The last two medical meetings which I attended convinced me that, so far as modern medicine and anesthesia are concerned I am now, and long have been, a ghost.

When I received this magnificent invitation to come to São Paulo and bring my wife to this meeting, I thought: "Ah-ha!, they have read *Van Loon's Lives* and had the same reaction which I had when I read it so long ago, namely, how nice it would be to gather together some of the characters who had to do with the origin of the use of drugs and methods to relieve pain, the *pre-anesthesiologists*, if you will." And I thought, "What a wonderful idea that is and how grand it will be to see and talk to some of those old fellows!" I thought to myself, "These wonderful Brazilians have deduced, rightly, that Ralph Waters is now a near-ghost and we might as well include the old fossil in our list of invitations." So here I am with my good wife, and even my daughter, after all these years in the limbo of retirement.

It seems to be working out that way. I have already seen two shadowy figures in the lobby who remind me very much of Rev. Priestly and Anton Lavoisier, probably asking each other whether Karl Scheele really deserved any of the credit for discovering oxygen. It was good to note that Lavoisier's head seemed firmly in place.

So I know the party is on. I am sure that I shall run into Tom Beddoes probably hanging onto the arm of Humphrey Davy, and trying to claim credit for giving him his start in life and the opportunity to write that classic of all pharmacological classics on nitrous oxide, with the awesome title, *Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide or Dephlogisticated Nitrous Air and Its Respiration*, by Humphrey Davy, Superintendent of the Medical Pneumatic Institute.

That he did the work and wrote the book before he was 21 years old does not detract from its scientific value, and reading it now explains why the poet Coleridge, when asked why he attended Davy's chemical lectures at the Royal Institution in London, said: "I go to Davy's lectures to learn beautiful figures of speech."

But I shall run into other interesting personages, I am sure. I hope to find Fritz Serturner, the once pharmacist of Paderborn who spent so much time and effort finding out why one prescription for opium won him the praise of the physician who wrote it, while the next might get him an unpleasant "bawling out" because the patient to whom it was administered got no relief from pain at all.

I'd like to tell Fritz what a wonderful boon to suffering humans the isolation of morphine and the establishment of alkaloids on a firm basis has been for the past 150 years.

You may wonder why the committee on arrangements has not provided a special meeting room for the ghosts. I think they realized that all ghosts are of a retiring disposition and that, when they were active in life, meetings were infrequent or nonexistent. Presiding officers and all that were not common as now. Of course, if Frank McMechan gets here, he will be disappointed not to have a formal meeting. But without his wonderful wife, Lorette, he might have difficulty in navigating his little wheelchair. With her in days gone by, they surely traveled to the ends of the earth, and few indeed are the regions where their influence is not still felt, wherever anesthetists or anesthesiologists gather for meetings, or where papers on these subjects are read or published.

If John Snow does not show up, I shall be gravely disappointed. Since he had read nearly everything published for two or three hundred years before 1857 in the subjects of pseudochemistry and prephysiology, and verified or disproved by experiments of his own most of what he had read, he should still be the greatest well of information from which other ghosts, as well as modern anesthesiologists, could drink.

I don't know how you moderns would react to the idea, but I have always felt that it would be fun to meet and talk with some of the old chaps who never published much but, in their way, did contribute a lot to the development of ways of relieving pain. One of these who was scarcely recognized along the way was Gardner Q. Colton. One hundred years ago, you remember, he was traveling around the eastern part of the United States using nitrous oxide to illustrate chemical lectures to lay audiences. Horace Wells benefited from such a lecture. But I think it would be amusing to hear him tell of his experiences with Dr. Evans, the Paris dentist and friend of Emperor Napoleon the III. When Evans took Colton back to Paris at the Emperor's request to enliven an exhibit at the World's Fair in 1867, he created quite a stir, I imagine, with his public demonstrations of nitrous oxide anesthesia. He went back to the United States to establish the chain of advertising dental parlors where painless extractions were performed. But the dentist Evans went across the channel to show London how Colton used nitrous oxide, for the benefit of Clover, Richardson, and the others, and so brought back to Britain the idea which Davy had suggested to them nearly 70 years before.

If modern anesthesiologists should corner the ghosts of Sir Benjamin Richardson and the dentist, Thomas Evans, I would suggest that they try to learn from them the technique of making friends and influencing people. They might develop a "presence" which would overcome many of the handicaps which some of them experience in dealing with picayunish hospital administrators.

I hope we shall find the shade of Sir Frederic Hewitt drifting about, whose knighthood came, I am sure, not from his "presence," but from his sterling scientific work as the author of the first really comprehensive textbook on anesthesia. I hope many more of the preanesthetists will show up during the week.

For the opportunity to join this Third Congress of the World Representatives of those who try to relieve pain, I am most grateful to all you Brazilians, as well as to old friends from far countries. Every gathering which brings together people from all parts of the earth helps a little, I believe, to hasten the day when enmity among the various nations will come to an end, and when all people can unite in a world free from animosity and misunderstanding.

May this Congress continue to meet and grow in years to come, to the benefit not only of the members who attend it, but toward the promotion of peace and cooperation throughout the world.

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# A CELEBRATION OF 75 YEARS HONORING **RALPH** MILTON WATERS, M.D. MENTOR TO A PROFESSION

PROCEEDINGS-THE RALPH M. WATERS INTERNATIONAL SYMPOSIUM ON PROFESSIONALISM IN ANESTHESIOLOGY MADISON, WISCONSIN, 2002



UNIVERSITY OF WISCONSIN-MADISON ARCHIVES

No American physician deserves greater commendation than Ralph Milton Waters for elevating anesthesiology from a technical exercise to a medical specialty. The arrival of Waters at the University of Wisconsin in 1927 as an assistant professor of surgery in charge of anesthesia at the new State Hospital heralded a watershed event in the history of our field.

Much of what Waters accomplished was due to his affable manner, obvious sincerity, effective persuasion and deliberate efforts to seek out and co-opt other individuals to actively support his objectives. Waters had an unusual ability to work with and through other people; like the coach of an athletic team his quiet but dynamic personality and projected enthusiasm engagingly attracted others to work with him toward attainment of his goal.

*Therefore, in June 2002,* anesthesiologists from all over the globe convened in Madison, Wisconsin to celebrate the seventy-fifth anniversary of the appointment of Dr. Waters to the medical faculty of the University of Wisconsin Medical School.

Most of the presentations in this book provide discussions about Waters himself. Others describe the dissemination across much of the world of Waters' teaching concepts and standards of practice. These pages are replete with historical information, reminiscences, personal perspectives and anecdotes about Waters' charismatic personality, which stimulated many medical students to consider anesthesiology as a career.

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