# BOOK REVIEWS

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**The History of Anesthesia. Third International Symposium: Proceedings.** Edited by B. Raymond Fink, Lucien E. Morris, and C. R. Stephen. Park Ridge, Wood Library-Museum of Anesthesiology, 1993. Pages: 467. Price: $70.00 Softbound, $80.00 Leather-bound.

> All men who are interested in public affairs, but especially those who desire to influence such affairs, must concern themselves with two intellectual activities: History, without which one cannot understand mankind or one's own times and people: Literature, which is the expression of conscious and reasoning mankind.[1]

In this enlightened, scientific age, the value of the individual often is ignored or downplayed in the clamoring of the many and the powerful. It is a pleasure to read of so many individual personalities who, strong or weak, correct or in error, in medicine or totally unrelated fields, have made such significant contributions to the practice of anesthesia. This book is the culmination of an international symposium held in Atlanta, Georgia, on the sesquicentennial of Crawford W. Long's first anesthetic administration. It attracted scholars and historians, educators and students, from all over the world. Speaking as one who was there, the sheer number of papers presented made attendance at all the lectures an impossibility.

Agonizing choices had to be made. What a delight to have them all before me to pick and choose at leisure. Who was Otto Keppeler? What psychic experience did Sir Humphrey Davy have in Slovenia? What was Denis Browne's Top Hat? What happened to Winston Churchill while under anesthesia? What was military anesthesia like during the Civil War or during Desert Storm? One can't help but marvel at the ingenuity of those who developed equipment and methods for the safe delivery of anesthesia, most of which are taken for granted by today's practitioners. Particularly noteworthy are the biographies on R. Douglas Sanders and Juan Marin.

The editors have done an excellent job dividing the topics into apparatus, agents and techniques, biographies, military, and general. There also is a complete index of topics and authors. The presentations that were on videotape are summarized, by necessity. There is something here for everyone, regardless of geographic location, area of interest, or field of endeavor. This book should be in the library of every department of anesthesia, and residents and staff should be encouraged in its perusal. It combines history and literature in a stimulating and often amusing manner. The outstanding careers of so many of the contributors would seem to confirm the proposition that a prerequisite for a leadership position is a concern with these two intellectual activities. The softbound edition is especially pleasing with its pictures of Crawford W. Long in youth and in age and the map of Georgia on the spine.

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## Reference

1. Belloc H: On the Place of Gilbert Chesterton in English Letters. New York, Sheed and Ward, 1940, pp 45–46

**The Biology of Nitric Oxide: Physiological and Clinical Aspects.** By S. Moncada, M. A. Marletta, J. B. Hibbs, Jr., and E. A. Higgs, London, Portland Press, 1992. Pages: 397. Price: $138.68.

In 1980, R. F. Furchgott and J. V. Zawadski demonstrated that relaxation to acetylcholine in the rabbit aorta depended on the presence of an intact endothelium. Furchgott hypothesized that acetylcholine stimulated release of an endothelium-derived relaxing (EDRF), which caused relaxation of the vascular smooth muscle. EDRF was shown to have an extremely short half-life, to be potentiated by scavengers of oxygen-derived free radicals, and to exert its action *via* stimulation of guanylate cyclase and a rise in cyclic guanosine monophosphate in the smooth muscle cell. In 1987, Moncada and coworkers published conclusive evidence that EDRF was nitric oxide. Ignarro and colleagues confirmed this work later that year. It is now widely accepted that the properties of EDRF are identical to those of nitric oxide and that the latter accounts for the observed endothelium-dependent phenomena. Since then, nitric oxide has been shown to play a vital role in several organ systems. *The Biology of Nitric Oxide: Physiological and Clinical Aspects* contains the Proceedings of the 2nd International Meeting on the Biology of Nitric Oxide, held in London in 1991. The abstracts presented here describe a vast array of topics in current nitric oxide research.

The abstracts are divided into three main sections. The first, "Cardiovascular Effects," is by far the largest section, reflecting the enormous contribution of endothelium-derived nitric oxide to the control of both the systemic and the pulmonary circulation. Many abstracts in this section deal simply with the demonstration of nitric oxide release and action in various blood vessels and a variety of species. The conclusion to be drawn from these data is that nitric oxide is ubiquitous in the circulation, not only in the large arteries but also in the resistance vessels. These data suggest that the endothelium can exert moment-to-moment control over the underlying smooth muscle *via* release of the short-acting agent nitric oxide. That nitric oxide fulfills this role is demonstrated in several abstracts describing the effect of inhibition of nitric oxide synthesis or damage to the endothelium *in vivo*. For example, oral ingestion of inhibitors of nitric oxide synthesis causes hypertension in rats. Nitric oxide production is important in the coronary circulation also, and it is ironic to note that glyceryl trinitrate, used for more than 100 yr to relieve angina, finally has been shown to act *via* the generation of nitric oxide. Some abstracts describe novel donors of nitric oxide, such as nitrosimines, and iron-containing nitrosyl compounds. Presumably, these agents will have therapeutic use in the future.

Nitric oxide is a double-edged sword, however. In septic shock,

bacterial endotoxin (lipopolysaccharide) stimulates macrophages to produce cytokines, such as tumor necrosis factor, interferon, and interleukins 1$\beta$ and 2. The abstracts presented here show that these agents stimulate both the endothelium and vascular smooth muscle to produce large amounts of nitric oxide, which may account for the profound hypotension and lack of responsiveness to vasoconstrictor agents that characterize septic shock. Nitric oxide is degraded to nitrate and nitrite, which may contribute to end-organ damage. It is notable that dexamethasone may alleviate these effects by inhibiting nitric oxide synthase. Perhaps steroids will acquire a new role in the management of endotoxic shock.

The second chapter of this book, "Central and Peripheral Nervous System," begins with an abstract by Garthwaite et al. that gives an excellent overview of the role of nitric oxide in the central nervous system. Understanding of the role of this substance in the central nervous system is still in its infancy; although as one abstract demonstrates, nitric oxide synthase is distributed widely in the neuronal elements of the cerebellum. In the central nervous system, as in the circulation, nitric oxide has both beneficial and toxic effects. For example, nitric oxide may modulate the N-methyl-D-aspartate (NMDA) receptor, which controls such processes as the formation of memory. By contrast, induction of epileptiform discharges by these same NMDA receptors is enhanced by the precursor of nitric oxide, L-arginine. One abstract implicates production of nitric oxide by brain macrophages in the etiology of multiple sclerosis. Several abstracts provide evidence that the biochemistry of nitric oxide production in the central nervous system may differ from that of the vascular endothelium, such that the two may not be compared. Further research is awaited in this area.

Abstracts dealing with the peripheral nervous system mainly address nonadrenergic, noncholinergic neurotransmission in the gut and the genitourinary system. It is clear from the evidence presented here that nitric oxide forms a major component of inhibitory neurotransmission in both of these systems. Thus, nitric oxide mediates relaxation of the stomach and colon and alters tone in the smooth muscle sphincter of the bladder. There appear to be two main ways in which nitric oxide modulates inhibitory neurotransmission. First, it seems to have a prejunctional inhibitory effect on peptidergic neurotransmission. Second, nitric oxide may be a primary neurotransmitter in its own right. Both these possibilities warrant further investigation.

The third chapter, "Clinical Aspects," focuses on the role of nitric oxide in human physiology and pathophysiology. Nitric oxide release seems to be important in pregnancy, and loss of endothelial function and consequent diminution of nitric oxide production may account for the substantial rise in blood pressure that characterizes pregnancy-induced hypertension. The placental circulation also seems to require nitric oxide release for normal functioning. However, the greatest therapeutic benefit so far is the use of inhaled nitric oxide to relieve pulmonary hypertension. Nitric oxide is oxidized to inactive metabolites immediately after inducing vascular smooth muscle relaxation. Thus, systemic effects of nitric oxide are avoided.

The role of nitric oxide in septic shock has been mentioned. One abstract demonstrates that, in humans, inhibition of nitric oxide synthesis reverses the profound hypotension associated with this condition. This introduces the exciting possibility of improved management and an increased survival rate in endotoxic shock.

However, release of nitric oxide may have deleterious effects. In the allergic response, immunoglobulin E stimulates production of histamine from the mast cell; the histamine then causes nitric oxide release from the endothelium, resulting in the vasodilatation and vascular leakage characteristic of anaphylaxis. Hypotension and "leaky capillary" syndrome also are characteristic effects of interleukin-2 chemotherapy in advanced cancer that are abolished by inhibition of nitric oxide synthesis. These observations may lead to the use of nitric oxide synthesis inhibitors during this type of therapy.

This book provides a comprehensive overview of the important topics in current nitric oxide research. The abstracts are organized well, and their message is clear. By its nature, it is a book to refer to rather than to read from cover to cover. It will be most useful to those who are thinking of embarking on a particular area of nitric oxide research and wish to know the present thinking on that topic. I highly recommend this volume as a worthwhile addition to any reference collection on the biology of nitric oxide.

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**International Anesthesiology Clinics: The Pediatric Airway.** Edited by Lawrence M. Borland, M.D. Boston, Little, Brown and Company, 1992. Pages: 137. Price: $39.00 non-subscribers, $31.20 subscribers.

This volume is a compilation of topics presented at the 2nd International Symposium on the Pediatric Airway. This reviewer attended the meeting and was gratified to see the proceedings appear in the form of this monograph. The monograph consists of 13 chapters and reflects a multidisciplinary approach. Contributors include pediatric anesthesiologists, otolaryngologists, pulmonologists, surgeons and intensivists, as well as orthodontists and neonatologists. As the editor states in the preface, "The philosophy is the management of the pediatric patient with a difficult airway is best served by a combined effort."

The philosophy is reflected in the book, and therein lies both the strength and the weakness of the tome. Interested readers will gain new insight by the multiple perspectives presented. However, anesthesiologists may be frustrated by the lack of specific recommendations regarding anesthetic management of children with complex airway problems.

The initial chapters are devoted to "information applicable to all patients." This includes a discussion of respiratory gas monitoring in anesthesia, but this well written chapter lacks a pediatric focus. The pitfalls of end-tidal carbon dioxide monitoring in infants and children are not discussed. Following this chapter is a summary of recent laboratory investigations on the effects of inhalation anesthesia on the upper airway in infants and children. An excellent and comprehensive review of cardiovascular and pulmonary interactions closes the first section of the book. That review highlights not only airway problems associated with congenital heart lesions but also heart disease as a consequence of chronic airway problems.

Acute airway diseases are the topic of the following section of articles. These articles include a brief review of neck masses in children followed by a refreshing perspective on foreign body aspiration in infants and children. Life-threatening upper airway infections are the subject of another informative review. Anesthesiologists may be frustrated because there is no discussion of anesthetic management for these challenging problems.