lism or the gastrointestinal hormones, are for the most part ones that have been reviewed recently or in which there has been little recent activity.

Several interesting evolutionary themes are elaborated in the papers. Berta Scharrer, in her discussion of the role of neurons in endocrine regulation, traces present-day integrative systems back to a stage in which neurons were the only source of hormones. In another chapter M. Fontaine and M. Olivereau discuss those endocrine glands that appear to have originated by the transformation of exocrine glands or by the concentration of scattered islets of cells.

The evolution of steroidal hormones is considered by Thomas Sandor, Sorin Sonea, and Afzal Z. Mehdi, who suggest that the common feature of steroids, the cyclopentanoperhydrophenanthrene nucleus, is of abiotic origin. Also, Peter Karlson, Jan Koolman, and Jules A. Hoffmann point out that the steroidal ecdysones of insects and crustaceans are related to phytoecdysones (ecdysone-like substances detected in plants). L. Gallien writes of steroidal effects in vertebrate oogenesis. D. Price and co-workers treat the steroidal control of gonoductal differentiation in amniotes, pointing out, however, that the inhibitor of the Müllerian duct of the mammal is probably not a steroid. Although steroids have many diverse functions, the types that have been synthesized and their biosynthetic pathways and mechanisms have shown little or no evolutionary change over an extensive range of organisms. Precise and detailed information regarding the mechanisms of action of two steroidal hormones is set forth by B. W. O'Malley and his associates, who summarize evidence that estrogen and progesterone activate specific genes to produce specific proteins in the oviduct of the chicken.

The discussion of sex and reproduction in fishes by J. M. Dodd shows on the one hand that much attention has been lavished on this enormous and diverse group, but on the other that the accumulated data are still too few to serve as a basis for generalization.

The pineal gland is still a puzzling structure, but in recent years, as Charles L. Ralph's chapter makes clear, much has come to light regarding its function in mammals. The regulation of release and the mechanism of action of melanophore stimulating hormone are comprehensively reviewed by Mac E. Hadley and Joseph T. Bagnara.

JAMES DENT
Department of Biology,
University of Virginia, Charlottesville

Vascular Physiology

The Peripheral Arterial Chemoreceptors. Proceedings of a workshop, Bristol, England, July 1973. M. J. PURVES, Ed. Cambridge University Press, New York, 1975. xiv, 492 pp., illus. $39.50.

Although this proceedings volume is entitled *Peripheral Arterial Chemoreceptors*, the papers are primarily studies on the carotid body. For those of us indirectly concerned with the functions of chemoreceptors or with chemoreflexes, the book provides an excellent means of updating our knowledge.

The book is unusual in two respects: First, the discussion of the functional role of chemoreceptors deals not, as is usual, with respiratory function, but with various aspects of the regulation of cardiovascular function. In particular, there is discussion of the interactions between chemoreceptors and baroreceptors, the role of the chemoreceptors in the "diving" responses, and the effects of chemoreceptor stimulation on various vascular beds, for example, coronary, skeletal, and cerebral. Second, the book provides a historical perspective. In its first paper Eyzaguirre and Gallego examine the original slides of de Castro, which are also republished in the volume. The inclusion of these slides permits an assessment of the progress that has been made in the study of histological morphology.

The book summarizes what, I think, are the major remaining controversies concerning the carotid body. These concern the morphology and function of the afferent and efferent components of carotid body innervation; the identity of the chemoreceptor; and the function of the glomic cells. That the meeting did not resolve the controversies is obvious from the discussions following almost every paper. These discussions, by the way, are most enlightening as to the views or, if you will, prejudices of the participants.

In addition to the papers on the carotid body, the book includes a paper by Speckmann and Caspers on the responses of neurons that are not part of the primary respiratory controlling system, in the lumbar spinal cord and the cerebral cortex, to changes in P_{O_2} and P_{CO_2}. They report that an increase in local P_{CO_2} leads to a depression of activity in the majority of cells whereas a decrease in P_{O_2} has a biphasic effect—first excitation and later blockade of activity. Treatment of the effect of P_{CO_2} on respiratory neurons of the brainstem is limited to a brief summary by Mitchell in the discussion following Speckmann and Caspers's paper.

The papers and discussions concerned with the function and innervation of type I cells are most stimulating. The views presented range from the idea that these cells are similar in function to the small, intensely fluorescent cells of sympathetic ganglia, secreting dopamine as an inhibitory transmitter (papers by Fillenz and Sampson, for example), to the idea that type I cells release acetylcholine, causing type II cells to contract (a paper by Jones).

PHYLLIS M. GOOTMAN
Department of Physiology,
Downstate Medical Center,
State University of New York, Brooklyn

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