

was dialyzable and hence not albumin-bound. This discrepancy may, in part, be explained by differences in the insulin preparations used, for these may differ in degree (and location) of iodination. Insulin preparations that are labeled primarily in the A chain (but not in the B chain) would, upon splitting, give rise to a nondialyzable albumin-bound B chain, but this would contain little I-131 radioactivity.

Dr. Kipnis emphasized that although the plasma synalbumin factor inhibits the diaphragm *in vitro*, when albumin is used at concentrations of 1.25 per cent, this does not necessarily mean that synalbumin likewise plays a physiologic role *in vivo*, inasmuch as the concentration of albumin in lymph and in the extracellular space (of muscle) is probably much lower than the minimum concentration of albumin required to inhibit the diaphragm *in vitro*. Dr. Kipnis further suggested that the observed association of the insulin B chain and albumin may be a secondary consequence of increased insulin breakdown (occurring as a result of insulin secretion). However, this explanation would not account for the reported increase in synalbumin in prediabetics or in relatives of diabetics.

Dr. Lazarow suggested an alternative possibility:

that diabetics might have an enzymatic defect in their beta cells, which results in failure to join the component A and B chains together. If, as a consequence, free B chains are released from the beta cells, these could subsequently be bound to the albumin fraction.

In commenting on using the criterion of "antibody suppressibility" for the identity of insulin, Dr. Lazarow also pointed out that, whereas those factors (other than insulin) which facilitate the passage of glucose through the cell membrane would not be suppressed by antibodies, the effect of an agent (such as  $10^{-3}$  M versene) which potentiates the action of insulin would be suppressed by the addition of insulin antibody. Thus, although insulin antibody suppresses the "insulin-like" effect of versene, this antibody suppressibility does not mean that the  $10^{-3}$  M versene solution contains insulin.

In summarizing the two-day proceedings, Dr. Lukens emphasized that many of the individual and group discussions which were sparked by this symposium would continue to take place in laboratories throughout the country during the ensuing months. In his judgment, these secondary discussions would prove to be as productive as those of the previous two days.

## BOOK REVIEWS

PHYSIOLOGY AND BIOPHYSICS (Howell-Fulton 19th edition). *Theodore C. Ruch, Ph.D., and Harry D. Patton, Ph.D., M.D., Eds.* \$17.00. 1242 pages. Philadelphia and London, W. B. Saunders, 1965.

Thirty-three authorities, more than half of them members of the faculty at the University of Washington in Seattle, have collaborated to produce a new edition of a book which has evolved from the intrepid Professor Howell's one-man job of 1896. In a sentimental moment, I took down the physiology text with which I wrestled in the spring of 1935—the 6th edition of Starling, edited by Lovatt Evans and Hartridge. The comparative mathematics of authority traced from Howell through Starling, Evans and Hartridge to Ruch, Patton and their thirty-one co-authors is at once our pride and our dilemma, our collective satisfaction in the remarkable achievements of our colleagues and our personal humiliation caused by the fact that each of us can be familiar with only a small segment of physiology. The rueful thought occurred to me

that an authoritative review of this book would have to be composed by a committee of thirty-three reviewers!

Physiology at any instant is what practising physiologists say it is, and their emphasis is apt to be colored by their training and experience. The editors of this book (if a page count is a valid indication of their innermost thoughts) judge neurophysiology to be the better half of physiology. This is certainly philosophically justifiable if one takes the view that the concept of integrative function is the very spirit of physiology. However, the non-neurophysiologist who contemplates this book feels not unlike a Chicagoan examining the well-known Bostonian's map of the United States which places Dedham just east of Cleveland. In any case, this volume contains the best presentation of modern neurophysiologic thought available anywhere. It is well written, the illustrations really illustrate and the bibliographies are most valuable. Especially noteworthy and interesting is a new section on the neurophysiology of behavior, in which one finds for the first time an orderly presentation of the concepts of consciousness, learning, memory, motivation, and emotion analyzed in neurophysiologic terms.

## BOOK REVIEWS

The other sections—on respiration, biophysics of transport across membranes, renal and body fluid physiology, digestion and excretion, metabolism and the endocrine system—have been prepared with equal devotion and skill. Some of the authors (especially Riley on the lung, Woodbury on pH and Scher on the circulation) offer us creative new syntheses of their fields and Masoro has tentatively opened up a discussion of that never-never land between physiology and biochemistry in which one tries to relate intracellular metabolic control systems to integrative physiology. If more of this point of view were introduced into teaching, learning the physiologic significance of biochemical facts could supersede the sterile memorization of metabolic pathways that is so similar to the exercises in rote memory I recall from my medical school course in gross anatomy.

The endocrine section, of particular interest to readers of this journal, is brief, accurate and interesting. I was especially glad to have Copp's new chapter on the parathyroids with its discussion of calcitonin and thyrocalcitonin. The section on diabetes is a more or less standard account. Readers who are especially interested in the mechanism of action of hormones at the cellular level can find more complete accounts in other sources.

It is amusing that physiologists in medical schools sometimes appear a little sheepish about their medical connections and about clinical applications of their subject. In fact, the word "medical" was deleted from the title of this edition, presumably because it would have tended to obscure the fact that the book contains so much "basic," or "true blue," physiology. Let not the reader be deterred. There is plenty of good, sound pathophysiology in this book, for the authors are delighted to point to clinical applications of physiologic knowledge whenever they can. This, of course, is as it should be, for the taxpayers of the country have generously supported us not because they are interested in the esthetics of physiology but because they are interested in better health.

This is not an easy book, especially for a reader whose mathematical development in utero was disturbed by the fact that his mother was frightened by a differential equation. How-

ever, I am sure that the modern medical student is far more sophisticated mathematically than most of us were in 1935, and that mathematical formulations of physiologic data offer new and more penetrating analytic tools—although occasionally one gets the impression that a mathematical restatement of the obvious looks more sporting than it actually is. I recommend this book enthusiastically for basic science teachers, graduate students, clinical investigators, and bright medical students who have had advanced courses in biology and mathematics as undergraduates. Ex-humanities majors had better start with something a little less encyclopedic.

ORAL ANTIDIABETIC THERAPY 1956-1965. *With Particular Reference to Tolbutamide (Orinase)*. By H. A. Tucker, M.D., \$13.50. 676 pages. Springfield, Illinois, Charles C Thomas, 1965.

This book consists of a compilation of the literature regarding oral hypoglycemic agents, giving the name of the author, title of the paper and journal reference. As the subtitle implies, most of the 1,706 articles selected make reference to tolbutamide. The tabulation is interrupted frequently by summaries of certain publications, totaling 558. The author states that "selection of particular papers for abstracting depended on interest at the time of their appearance." He states further that "the objective of this collection was to be representative rather than complete, and to have at least some items of interest to every clinician and clinical investigator."

At the end of the book is a "summary" consisting of twenty-five pages in which detailed information regarding tolbutamide and sodium tolbutamide is given. A table giving trade and generic names for various drugs and author and subject indices complete the book.

This volume will be useful to the investigator or clinician working in this specialized field by providing an easily available source of the many papers written on tolbutamide during the years covered by the bibliography. It is not a text book or a critical review but rather a compendium of published articles of which some selected ones are abstracted.