In an age which demands the training of large numbers of new investigators in the biomedical sciences, Burnet's assertions that no one can do effective research unless he enthusiastically enjoys it and that research is essentially intellectual play, to be equated with an organized sport, and imbued with a competitive spirit, are timely. His view that no great discovery in the experimental sciences is ever made more than a year before its discovery is inevitable is probably correct, and young scientists probably do have nightmares in which the specialized fields in which they are being trained, or in which they have learned to excel, wither away.

One cannot escape the conclusion, however, that some of Burnet's gloomy thoughts are the outcome of too many years away from the laboratory bench. Is much current research really without bearing on the progress of medicine or on the development of knowledge? And has laboratory research really fulfilled its major function? Active scientists will be unable to accept the statement that laboratory research in biology will cease to provide new concepts and that we are merely "waiting for the end" in most of the great inquiries of biology and medicine. Most would accept Burnet's view that biology of man himself, in those aspects that are uniquely human—his behavior, his genetics, the processes that determine growth, individual differences, and the nature of aging and death—is a new world for scientific conquest.

It is disappointing that Burnet reveals little about how he functions. He confesses to a lifelong uncontrollable urge to theorize and generalize and admits that he has very little interest in anyone else's theorizing upon a subject that interests him. However, he does not tell us how he manages to keep up with the information explosion on such a broad front, how he stores and retrieves the facts he draws upon with such facility, or how he plies his craft as a writer so productively.

This book will be of interest to microbiologists, immunologists, epidemiologists, oncologists, and even molecular biologists. Moreover, it reads so easily that at least one person found it to be a delightful biologist's book at bedtime.

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Diabetes

Pathogenesis of Diabetes Mellitus. Proceedings of a symposium, Stockholm, Sept. 1969. EROL CERASI and ROLF LUFT, Eds. Almqvist and Wiksell, Stockholm, and Wiley, New York, 1970. 354 pp., illus. $31.50. Nobel Symposium 13.

Unlike most volumes resulting from symposia, this collection of 12 contributions essentially covers the current knowledge of its subject in a very even and integrated manner. As valuable as the papers themselves are the carefully edited discussion following each presentation, most of which include data yet to be published or frank opinions and speculations put forward by the participants, among whom were not only some of the world's leaders in diabetes research such as Berson, Kipnis, Lacy, Levine, Taylor, Siperstein, Randle, and Steiner but also non-diabetes-oriented scientists like Sutherland, Changeux, Hechter, Krebs, and Tomkins.

The separate chapters start with Cerasi and Luft, editors of the volume, summarizing their data correlating diabetes with a delayed secretion of insulin following a glucose load. Presented are data, mainly from studies on identical twins, showing that this delay is inherited and suggesting that the primary lesion is related to the cyclic adenosine monophosphate system in the beta cell, since theophylline, a phosphodiesterase inhibitor, is capable of accelerating the delayed secretion toward normal. Chapters by Kipnis, Lacy, Taylor and Montague, Steiner *et al.*, and Renold *et al.* summarize what is known of the beta cell, its metabolism, and its various stimulating factors. Much attention is directed, and justifiably so, to how glucose itself stimulates insulin release. Again the discussions are as important as the presentations—for example, Randle's comment (p. 271) that concentrations of glucose-6-phosphate may rise 15-fold in mouse islets in the presence of high amounts of glucose, a finding that supports the view that glucose phosphorylation has an operationally high K_m. Also, the essential role of Ca^{++} in the release mechanism is emphasized in several discussions.

In other chapters Renold reviews the various experimental animal models, and Steinberg and his colleagues, using recent studies on the American Pima Indian, defend his hypothesis that diabetes in man may result from an autosomal recessive gene, the homozygous individual being susceptible to the disease. A bimodal distribution of glucose tolerance in the Pimas supports the hypothesis, and a mathematical defense (far beyond the comprehension of this reviewer) is presented in evidence.

Other fascinating bits of information are scattered throughout the volume, such as the bizarre spontaneous elevations of growth hormone concentration in the diabetic noted by Lundbaek (pp. 305–06), the micrographs of the beta cell granules made by Orci in Renold's laboratory using freeze-etched material, and Krebs's argument that the quinolinate inhibition of gluconeogenesis, as noted by Lardy, may have physiologic meaning. The chapter by Lardy on gluconeogenesis and that by Randle on glucose homeostasis are most current, contain the principal references, and are superb reviews of the state of the art, and yet are brief and succinct. Finally, the discussion between Siperstein and Lundbaek summarizes the pros and cons of the hypothesis that the vascular basement membrane is an independent expression of the inherited disorder rather than a secondary result of the abnormal insulin and carbohydrate metabolism.

The volume ends with "reflections," each several pages in length, by several of the participants. These are somewhat repetitive of the preceding chapters, but are nevertheless of some interest and use.

This reviewer's overall assessment is evidenced by the fact that he is recommending that several copies of the volume be placed on the reserve shelf in his university library as a standard reference for undergraduates and postgraduates in endocrinology, metabolism, pathology, and internal medicine.

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Biological Messages

Communication in Development. Twenty-eighth symposium, Society for Developmental Biology, Boulder, Colo., June 1969. ANTON LANG, Ed. Academic Press, New York, 1970. xii, 272 pp., illus. $12. *Developmental Biology*, Supplement 3.

The orderly development of an organism and the coherent responses an organism makes to a changing environment require precise coordination between the elements and processes that