for the somatic segregation of traits. The chromosomal investigations of Sutton, Wilson, Cannon, and particularly Boveri, which soon followed, revealed that Mendel's laws could be "understood in terms of the behavior of the chromosomes during the formation of the germ cells. Hybrid research and cytology were thus united" (p. 290).

This is a standard and convincing thesis. It may, however, be tailored too snugly to the famous triple rediscovery of Mendel. We need to give more flesh to the story, to understand the work of Nägeli, Hertwig, Weismann, and Boveri—to mention only the most obvious—in more depth and in their own rights. We must be wary of historical hindsight, for the studies of Sutton, Wilson, and Boveri did not immediately convert all Mendelians to the chromosome theory. Finally, we might follow the lead of William Provine, who recently (*The Origins of Theoretical Population Genetics*, University of Chicago Press, 1971) has broadened the historical question to include the conflict between discontinuities of sudden variations and the continuity of evolution. The emergence of neo-Darwinism, in fact, may also have played a significant role in forming classical Mendelian genetics.

We are fortunate to have this translation and revision of Stubbe's *History of Genetics*. It will be an important guide for those who wish to understand the origin of modern genetics. The book is nicely produced and contains many fine photographic reproductions.

FREDERICK B. CHURCHILL
Department of History and Philosophy of Science, Indiana University, Bloomington

Nucleotides

Regulation of Purine Biosynthesis. J. FRANK HENDERSON. American Chemical Society, Washington, D.C., 1972. xvi, 304 pp., illus. $12.95. ACS Monograph 170.

This mongraph draws together for the first time the information widely scattered through the literature on the effects of metabolites and drugs on the rate of formation of inosin monophosphate by synthesis de novo in bacterial and animal cells.

The organization of the book is well thought out. After brief chapters on purines in nature, the pathway of purine synthesis de novo, and the properties of individual enzymes, a long chapter is devoted to the effects of the concentration of substrates such as phosphoribosyl pyrophosphate, glutamine, aspartate, and glycine and of the H_4-folate coenzymes on the process. The treatment is very thorough, with the reactions responsible for the formation of these substrates also receiving careful consideration. This information should be of particular value for the design of drugs that influence purine synthesis by competing with the substrate of one of the intermediary reactions.

Another lengthy chapter brings together the information on the inhibition of purine biosynthesis by its end products. Here, one weakness of the book becomes manifest: its failure to include a consideration of the reactions responsible for the formation of adenosine monophosphate and guanine monophosphate. It is important to keep in mind that the levels of AMP and GMP depend on the generation of these compounds from the IMP which arose by synthesis de novo and from the adenine and guanine provided in the diet or derived from the degradation of AMP and GMP. Without a consideration of these reactions and of their control, a thorough understanding of the regulation of synthesis de novo of purines by feedback inhibition is impossible. I am sorry that, perhaps because of exigencies of space, the book appears to define purine biosynthesis as synthesis of IMP.

A brief chapter on the regulation of enzyme amount and genetic regulation brings together the rather scanty information on these important matters. Another brief chapter deals with branches of the pathway leading to thiamine and to histidine. Here again, failure to consider the control of the interconversion of IMP, AMP, and GMP interferes with the treatment of the subject.

Two interesting chapters, on inhibition and stimulation by drugs and on pathological abnormalities of purine biosynthesis, conclude the book. They provide an excellent account of our present understanding of the basic defects in Lesh-Nyhan syndrome and gout and of the use of drugs affecting purine biosynthesis. In conclusion, the book will be found very useful by investigators dealing with the many biological processes in which purine nucleotides participate.

BORIS MAGASANIK
Department of Biology, Massachusetts Institute of Technology, Cambridge

Submersion Technology

Man beneath the Sea. A Review of Underwater Ocean Engineering. WALTER PENZIAS and M. W. GOODMAN. Wiley-Interscience, New York, 1973. xvi, 832 pp., illus., + loose tables. $32.50.

This is not a book intended for light reading, even by diving and submarine buffs. This reviewer plowed bravely into many chapters and found a great deal of information readably presented and yet not attracting me to read much deeper. This is mainly a reference book, or perhaps a text. As the authors say, it is "addressed generally to men with technical training who study and work in the ocean—ocean engineers." They produced it because they needed information on transporting man beneath the sea.

Senator Claiborne Pell's foreword describes the book as "an exploration of ocean engineering systems required by man for systematic residence beneath the water." It is primarily a Westinghouse effort, supported by that company's files and with the flavor of that group's opinions about what undersea projects are worthwhile and how they should be carried out.

The book opens with a review of the technical history of diving, full of fascinating fragments from diving history recounted—or merely alluded to—so briefly as to be tantalizing but not satisfying. This is followed by a review of design concepts for diving systems and descriptions of several saturation diving systems.

Chapter 5, by far the longest in the book, deals with manned submersibles, with a page apiece on dozens of varieties including some that did not work very well and numerous Soviet and Japanese versions. A number of instructive types were missed, however, including the fascinating undersea dredge developed by Ocean Science and Engineering, Inc. Communications, navigation, and sonar, subjects on which as much national effort has been spent as on everything else in the book, are decidedly short-suited—no doubt for security or proprietary reasons.

Gas storage and life support systems are well covered in the next two chapters, as are pressure vessels, hatches, and underwater electrical connectors. This is where the book is at its best. It tells you things you'd like to know (if you are going to design a small submersible) and gives references to many of the main papers on individual items. In fact, the reference lists and illustra-