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come change from garden peas. The chapter on linkage, crossing-over, and gene-mapping precedes that on sex linkage. In my opinion it would be wiser to treat the special case of sex linkage first and then to deal with linkage in general, but this is not a serious fault.

Although he includes a discussion of the common human chromosome aberrations and describes the medicolegal applications of the ABO blood groups (including a brief discussion of states recognizing blood-group evidence in court), Burns's emphasis on human genetics may not be as great as some students would like. The book ends with a chapter in which problems of human genetics and genetic engineering are discussed.

The Science of Genetics includes a number of typographical errors; but one or two more serious problems should be noted. On pages 42, 220, and 221 Burns cites chromosome numbers for the saltmarsh grasses (*Spartina*) that have been demonstrated to be erroneous. *Spartina* spp. commonly are cited as a textbook example of speciation via interspecific hybridization followed by amphidiploidy. Many of the newer botany, genetics, and cytology books give the corrected counts. Burns's failure to do so may be regarded by many as a minor error, but such errors tend to shake one's confidence in what otherwise seems to be a fine book.

Two other problems should be noted: In the chapter on inheritance related to sex Burns cites pattern baldness in man as an example of sex-influenced inheritance. Although he is not alone in doing so, some writers would not agree with him; instead, they would cite pattern baldness as an example of sex-limited inheritance. Perhaps it would be best to present both alternatives, with supporting pedigrees. Also, in the same chapter Burns says that 50 sex-linked (X-linked) genes are known in man. Human geneticists now suggest that the the number of known X-linked genes in man is at least 70. Such matters do not negate the many fine qualities of this book. If *The Science of Genetics* proves to be the success that I anticipate it will be, the author surely will consider correcting the weaknesses mentioned when a third edition is prepared.

Thomas R. Mertens
Ball State University
Muncie, Ind.

History and Philosophy

PUBLIC AFFAIRS, by C. P. Snow. 1971. Charles Scribner's Sons, New York. 224 p. \$6.95.

C. P. Snow—novelist, physicist, civil servant—has long addressed himself to the relationship of science and society.

This book brings together his major statements: "The Two Cultures and the Scientific Revolution," "The Two Cultures: a Second Look," "The Case of Leavis and the Serious Case," "Science and Government," "Appendix to 'Science and Government,'" "The Moral Un-neutrality of Science," and "The State of Siege." A prologue and an epilogue give Snow's most recent thoughts on the major themes of this collection.

Readers who know Snow from his controversial "two cultures" statement will find the other essays equally thought-provoking. The volume will be especially valuable to seminars dealing with science and politics, but the engrossing account of the conflict of personalities and policy recommendations of two scientists, Sir Henry Tizard and Lord Cherwell, should be pondered by all who are concerned with the role of scientists in government. Snow provides a sound argument for the need to enlist scientists in the forming of public-policy decisions; and he asserts that their participation must be open rather than secret: "the euphoria of secrecy," he says, "goes to the head."

In "State of Siege" Snow discusses the related problems of world population growth and world food resources and of the growing gap between rich and poor nations. He has been joined by many since he first presented this argument, in 1968, but the actions he foresaw as necessary to solve these serious threats to the species have yet to be implemented.

James T. Robinson
University of Colorado
Boulder

REASON AND EXPERIENCE, by James L. Larson. 1971. University of California Press, Berkeley. 186 p. \$7.50.

This book is an analysis of the conflict between practical and theoretic tendencies in the work of Linnaeus (Carl von Linné). Larson begins by rejecting the traditional scientific and philosophic approaches to the problem as inadequate and guilty of error, which has "for too long a time [stressed] the role of a single set of considerations in Linné's systematic work." He insists that the argument must be enlarged to include a thorough examination of the assumptions of 18th-century naturalists concerning the system, the elements, and the representation of natural order.

In his first, and longest, chapter Larson traces the history of the problem of order in nature as it developed and was interpreted by the herbalists during the 200 years before Linnaeus. Emphasis in this chapter is on the conflict between order as understood by reason alone and as understood in the light of observed affinities and practical considerations. The remainder of the book

is an analysis of that conflict in the work of Linnaeus, with separate chapters devoted to, respectively, classes and orders, genera, species and varieties, and nomenclature.

The book includes an extended statement of conclusions, a bibliography, indices of citations in the principal works of Linnaeus and the writings of other workers, and a translation of *The Method of Carl von Linné, the Swede*, which is a broadside that first appeared in 1736. Adding to the general attractiveness of the book are six pages of halftones, including my personal favorite, the title page from *Hortus Cliffortianus* with W. T. Stearn's interpretation of the symbolism.

Reason and Experience is a rather difficult book, but it is at the same time quite readable and often captivating. The insights on the mental turmoil through which Linnaeus passed are valuable contributions to our understanding of the man and should enlarge our appreciation of his role in the shaping of traditional systematics.

The book is not intended as a major contribution to modern systematics; nevertheless it can be read with profit by all who have an interest in Linnaeus or the nature and magnitude of the forces to which he responded in his work. Readers interested in history and philosophy of science should find the book unusually attractive and useful.

Paul H. Monson
University of Minnesota
Duluth

BIOLOGY IN THE NINETEENTH CENTURY, by William Coleman. 1971. John Wiley & Sons, New York. 187 p. \$7.50 hardback, \$3.95 softback.

Histories of broad fields of science (especially biology) have been little more than listings of names, dates, and discoveries. Because it avoids this difficulty remarkably well, the present work should be welcomed by historians and scientists alike. Coleman has written an interpretive and integrated history that covers a surprising amount of ground in few pages. He is necessarily selective, but he does examine thoroughly the main lines of thought during a period when biology was being transformed into a modern science. The function of this book (and of the series of which it is a part) is to provide an overview of the major trends in 19th-century scientific thought for nonspecialists, particularly teachers and college students.

Beginning with the introduction (in 1800, he says) of the term "biology" into natural philosophy, Coleman traces the professionalization of biology in the universities, research institutes, and natural-history museums. He finds two major themes in 19th-century biology: the search for (i) historical and (ii) functional explanations of living phe-

nomena. These appear to Coleman to be distinct, and often mutually exclusive, concerns. He shows how these two modes of explanation permeated several crucial subdisciplines: cytology, embryology, evolution, physical anthropology, and general physiology. He shows how concern for functional explanations—especially a concern for experimental as opposed to descriptive work—came to dominate biology by the end of the century, eclipsing the prevailing historical mode of thought, which had reached its zenith in the work of Darwin. Altogether, Coleman is able to tie together many aspects of 19th-century biology that have often appeared to be disconnected and episodic.

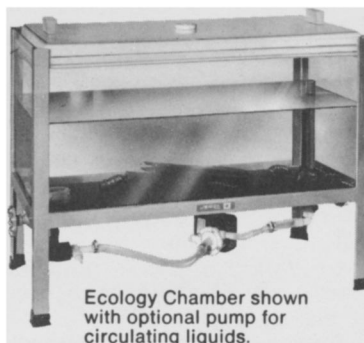
The sections dealing with evolutionary doctrine and the science of man are outstanding. Here Coleman clearly delineates the connections among studies of species diversity, the Platonic doctrine of transformation, the rise of geology, the Darwinian revolution, and the growing awareness of man's place in nature—matters that formed the warp and woof of historicist biology during the 19th century. The chapter on man is a remarkable synthesis of much recent work in the history of an-

thropology as well as a preceptive reading of many of the older primary sources (Auguste Comte, Herbert Spencer, Émile Durkheim). By including this material Coleman has wisely expanded the customary definition of biology to include anthropology and sociology, which were seen by many 19th-century biologists as growing naturally out of evolution studies. Particularly important, in this treatment, is Coleman's attention to the strong links between 19th-century biologic studies of man and the ideas of racism characteristic of western culture. He rightly shows the pseudoscientific basis of these ideas and exposes them for what they are: rationalizations of the white man's exploitation of his nonwhite brethren.

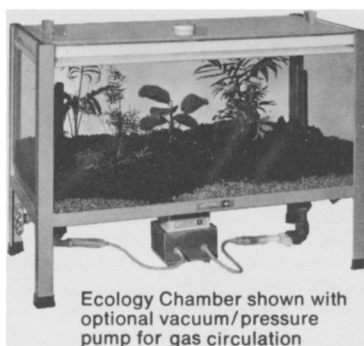
Biology in the Nineteenth Century is not without its faults. The type is much too small. Coleman's style is sometimes turgid or a little pedantic. Another fault is in consequence of trying to weave such a large fabric in so small a space: many names and scientific contributions are introduced for which full explanation, within the confines set, is not possible. However, the bibliographic essay at the end of the book is outstanding.

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