storage systems to fulfill the requirements of mother and embryo. The book is a model of clear, well-documented, and provocative writing and constitutes both a limited comparative review of mineral metabolism and a study of reproductive adaptation in amphibia, reptiles, birds, and mammals. It should prove useful to the developmental biologist interested in comparative embryogenesis.

The first section of this monograph summarizes much basic information related to the organ systems involved in calcium dynamics: among the topics treated are bone formation, turnover and kinetics of calcium, distribution and regulation of calcium in plasma and tissue, its distribution in the ovarian yolk, yolk composition and vitellogenesis, and the role of the endolymphatic calcium-storage sacs in amphibia. The major portion of the volume concerns reproductive and developmental processes: calcium balance and its regulation during gestation and lactation and in the neonatal mammal, placental transfer, calcium balance and metabolism in the adult and in the embryonic chick, reptile, and anuran, eggshell formation, and the dynamics and significance to the hen of medullary bone as a mineral storage depot. No ex cathedra presentation, the discussion suggests many unanswered questions for the inquisitive student. The book is well illustrated, referenced, and indexed. More monographs of this caliber may be hoped for from the Modern Biological Studies series.

DAVID W. BISHOP
Department of Animal Science, Cornell University, Ithaca, New York

Polymerization

Organic Chemistry of Synthetic High Polymers. ROBERT W. LENZ. Interscience (Wiley), New York, 1967. xvi + 837 pp., illus. $15.

This book by R. W. Lenz, with contributions by D. C. Feay and N. S. Schneider, represents one of the most recent additions to the subject of the organic chemistry of synthetic macromolecules. It is intended to serve as a textbook which will interest and assist both the undergraduate teacher and the graduate student in courses dealing with the organic aspects of polymer chemistry and as a reference book for those interested in the polymer field. We believe that the authors have been modestly successful.

The organization of the book is based on the reactions involved in the formation of high polymers. After a brief introduction which concentrates on the approach to the subject material and the relationship of structure to properties of polymers, a comprehensive discussion of many types of step-growth polymerization and homogeneous and hetereogeneous chain-growth polymerization is presented. The book is concluded with a section concerned with the reactions of polymers.

Although this text is characterized by a different approach to the presentation of the organic chemistry of synthetic macromolecules, this approach requires that the reader refer to various chapters in order to obtain information on a specific monomer. This drawback becomes significant if a certain monomer polymerizes by several different mechanisms. Moreover, it is to be noted that the broad range of topics covered prevents detailed discussion of each one. This is particularly noticeable in the section entitled Step-Growth Polymerization.

The author is to be commended for his coverage of many different reactions and monomers involved in the syntheses of high polymers and for the inclusion of pertinent illustrations and compilations of kinetic data, which these readers find very useful as reference material. If used in conjunction with texts dealing with the physical aspects of synthetic polymers, this book could provide a comprehensive background to the rapidly growing field of macromolecular science.

C. G. OVERBERGER
J. C. SALAMONE
J. ŠEBENDA
Department of Chemistry, University of Michigan, Ann Arbor

A 17th-Century News-Gatherer

The Correspondence of Henry Oldenburg. Vol. 4, 1667–1668. Edited and translated by A. RUPERT HALL and MARIE BOAS HALL. University of Wisconsin Press, Madison, 1967. xxvi + 601 pp., illus. $12.50.

As the Halls' meticulous edition of the correspondence of the Royal Society's secretary proceeds through 1667 and 1668, the volume of letters reaching and leaving Oldenburg grows steadily larger. He was now in touch with natural philosophers from Danzig to Portugal and to Bermuda, and he had a regular exchange with France. Unfortunately, Boyle moved to London, and so a major source of news ceased, but we can still follow the major concerns of the period—transfusions, with their dubious results, and the ensuing quarrel over priority; tides; Wallis's dispute with Dulaurens (which descended to the complaint that the latter spelled *Ellypsis* with a *y*); dissections undertaken by the French; and various physical wonders. Monstrous births, witchcraft, stones which attracted poisons, and similar matters were still the subject of earnest discussion, but amid the welter of ideas, both serious and far-fetched, a definite shift in interest toward continental biology can be perceived. Oldenburg first approached Malpighi in December 1667, thus starting a famous relationship; and the French transfusions and dissections of the eyes of birds occupied much attention.

It could be said that Oldenburg was glad to be able to whip up this new business. Meetings of the Royal Society appear to have been rather poor fare during these months, for their enthusiasm seems to have centered on plans for a new building. The meatiest news was coming from abroad; and, though one can see Oldenburg as the honest pursuer of a wider intercourse among scientists, his requests for word of discoveries—and even descriptions of the terrain of foreign lands—sometimes took on a plaintive note. He needed them, of course, as self-justification, to show cause why his services were needed, to have something to disseminate. Yet he slipped easily into a strident, imperialistic tone in behalf of his adopted country, notwithstanding his wish to extend the range of his correspondence. His worst ingratiating manner is revealed in patronizing attitudes toward foreigners, fierce claims of English priority, and smug comments about the need for careful examination before the Royal Society (still in its first decade!) could give its august approval to some discovery.

Nonetheless, there is no denying that Oldenburg was the great clearinghouse of information of his day, a vital catalyst in the creation of a genuine scientific community—though the obsession

with secrecy (to protect priority) and the many requests from foreigners that English works be translated into Latin show the difficulties he faced. Through him one can follow, perhaps more clearly than in any other single source, the slow realization throughout Europe—in this generation before the *Principia*—that a new era in man's investigation of nature had arrived. One can sense the wonder and the exhilaration, and for this reason alone one must wish the Halls strength to complete a task that has begun in such exemplary fashion.

THEODORE K. RABB
Department of History,
Princeton University,
Princeton, New Jersey

Inventor of an Industry

Light for the World. Edison and the Power Industry. ROBERT SILVERBERG. Van Nostrand, Princeton, N.J., 1967. vi + 281 pp., illus. $5.95.

The protean talents of Thomas Alva Edison continue to attract the attention of biographers. And with good reason. Edison's life was almost a paradigm of the American success story, and Edison himself became something of a folk hero. Few individuals can be accounted responsible for the growth of a major industry in the way that Edison can. He is a particularly attractive figure for the historian of technology because he dealt with a science and a technology readily comprehensible today by even the modestly educated layman. Nor was his life without drama: the struggles with the technology of electricity and his battles with financiers and promoters for the control of his inventions and of the industry they founded are all subjects ready-made for the pen of the narrative historian. If the scientific failures of Edison's later years did not lend a tragic note to his life, they at least provided an element of pathos.

Silverberg, a professional writer with particular experience with children's books, has provided a solid narrative account of Edison's career through the 1890's. His style is lively and consistently interesting, and he guides us with a sure hand through the labyrinthine corporate politics of the early years of the electrical industry. Four pages of illustrations, a satisfactory index, and a brief list or sources (though no footnotes) contribute to the attractiveness of Silverberg's account. All in all it is a craftsmanlike job which will be of considerable interest to that mythic figure the "average reader."

It is not, however, a particularly original or analytical book. Silverberg rightly argues that Edison's major contribution to the industry was not the invention of the incandescent electric lamp but the development of a complete system of power production and distribution as well as illumination. But students of the early electrical industry pointed this out long ago. There is a paucity of clear, precise technological explanation. Indeed, the author is generally content with unanalytical narrative. When he does seek to explain large events he is sometimes on uncertain ground. Suggestions that Edison's innovative barrenness after 1884 was the result of the shattering effects of his first wife's death (pp. 200–01), for example, are largely unprovable speculations.

This volume can be recommended as a sound, interesting narrative account of Edison's role in the development of the electrical industry. But serious students of the history of that industry must still turn to Harold Passer's *The Electrical Manufacturers* (1953), and individuals interested in a comprehensive, authoritative biography should read Matthew Josephson's *Edison* (1959).

KENDALL BIRR
Department of History,
State University of New York, Albany

Goals and Purposes

Science Is Not Enough. VANNEVAR BUSH. Morrow, New York, 1967. 192 pp. $4.50.

The title of this book does not prepare the reader for the wealth and variety of its content. It is not an expression of disillusionment from one who has drunk the wine of scientific adventure to the dregs and found them bitter. It is, rather, an anthology of the mature reflections of a connoisseur who knows at first hand the products of many vineyards, who wishes to share his experiences with his friends, and whose imagination envisions even nobler vintages that may be in store for the generations to come.

Like the career of its illustrious author, the volume before us has a scope, a breadth, and a depth that are nothing short of prodigious. In a series of ten essays, Bush discourses on a wide range of human interests in a forthright style that makes the reader oblivious to the passage of time as page after page unfolds a panorama of modern thought and action. Every page sparkles with some flash of humor, some gem of wisdom, some penetrating barb at human foibles, softened by a kindly phrase that reveals the author's sympathetic understanding of human nature. I shall try to summarize the scope of the book without losing its flavor by mentioning the title of each essay and adding a remark or two about its content.

The opening essay, entitled "The builders," describes in poetic prose the activities of those who build the organized structure of knowledge called science. The second essay, "Science pauses," covers the whole field of science from molecular biology to cosmology, even entering the realms of logic and philosophy. Important conclusions may best be described in the author's own words:

> Science, too, has come a long way, in delineating the probable nature of the universe that surrounds us, of the physical world in which we live, of our own structure, our physical and chemical nature. It even enters into the mechanism by which the brain itself operates. Then it comes to the question of consciousness and free will —and there it stops.
>
> Science proves nothing absolutely. On the most vital questions, it does not even produce evidence.
>
> But is all the labor of science vain to the thinker, the seeker after a sure harbor, amid the mystery, evil, cruelty, majesty, that surrounds us? By no means. Science here does two things. It renders us humble. And it paints a universe in which the mysteries become highlighted, in which constraints on imagination and speculation have been removed. . . .

He calls on the philosopher for help, bidding him revive the mission of philosophy in the days of its glory, to dream and guide the dreams of men, "presenting its mission humbly and in the concepts that science offers."

Although every essay carries some message for youth, the third, entitled "The gentleman of culture," should have special appeal to those in the formative years of their lives. After admitting the possibility of adverse reactions to the nouns in the title, the author goes deeply into the modern connotations of both and their significance in the modern world. Let me give the author's idea of a gentleman of culture, adding that he is under no delusion about the obstacles that exist in this