arrival and service distributions, and the fourth on queue discipline, priorities, and other special cases. The bibliography is extensive.

The work by Takács is at the same time the most mathematical and the most unified logically of the four. It has all the formalisms dear to the mathematicians heart (but to no one else!) and no discussion whatever of the practical implications (or often even of the meaning) of the formulas that fill its pages. Yet I believe it will be a mine of useful technical suggestions for those queuing specialists with sharp picks and strong shovels. It deals in turn with the single-server, then the many-server system, for different arrival and service statistics and with formulas for transient behavior as frequent as with those for steady-state. Telephone traffic problems are treated next, then machine repair, and finally the behavior of electronic radiation counters, devices that also have their congestion problems. Here, we are pleased to see, operations research has begun to repay physics.

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A Productive Compromise

A General Pattern for American Public Higher Education. T. R. McConnell. McGraw-Hill, New York, 1962. xi + 198 pp. $4.95.

Higher education in this country faces rapidly accelerating demands that arise from growth in population, the increasing percentage of college-age youth seeking collegiate education, and society's expanding need for professionally trained specialized manpower. In addition, universities are under mounting pressure to expand their research and technical services to help the nation meet its local, regional, national, and international responsibilities.

What kind of institutional structure for public higher education would best serve these needs? This is the essential question considered in this timely addition to an outstanding series of studies from the University of California's Center for Research in Higher Education at Berkeley, whose chairman, T. R. McConnell, is the author of the present volume.

Two major assumptions underlie McConnell's analysis: first, that the problems created by the rising demand for higher education are not to be solved by making education more selective; second, that the brunt of expanding enrollment will be borne by public rather than private institutions. Although he recognizes the important role of private institutions, McConnell decided to limit this volume to a discussion of the structure of comprehensive, statewide systems of public colleges and universities.

With respect to selectivity, he thinks that, while shortages of facilities and staff might lead to short-range restrictions on admission, the long-run trend will be toward broadening the population base of higher education. Convincingly, McConnell rejects Havighurst's contention in a recent volume that declining occupational demand for people with college education will reduce, and perhaps even reverse, the trend of increasing enrollment. With John Gardner, McConnell believes that American society requires increasingly greater "training in depth"—involving many types and levels of talent—rather than a highly educated elite separated by a great intellectual gulf from "the meagerly educated masses."

The diversity of student attributes and the heterogeneity of social demands would seem logically to call for an appropriate division of labor among institutions of higher education—with universities, 4-year colleges, junior colleges, and technical institutes performing somewhat distinctive functions for typically different kinds of students. Instead, McConnell notes, the trend is toward convergence among institutions, with the 4-year colleges striving to become universities, junior colleges pressing to become 4-year institutions, and technical institutes trying to become comprehensive junior colleges. The striving for higher status in the institutional hierarchy reflects the attitudes and values of students, parents, faculty, and alumni—not to mention the economic and political interests of local and regional groups. The author's account of developments in California emphasizes the power with which such forces oppose plans for the division of responsibility among institutions in a statewide system.

Nevertheless, McConnell believes that the growing shortages of funds and staff, as well as the failure to provide the varied types and levels of education needed to meet the diverse needs of our complex society, will require some form of statewide coordination among public institutions: voluntary coordination, compulsory coordination, or centralized operating control. His preference is for voluntary coordination, which seems to offer the best possibility for "productive compromise" between the values of autonomy (initiative, flexibility, experimentation, the quest for institutional excellence) and those of coordination (economy, improved specialization of function, better correlation between needs and programs).

Although many "state planners" of higher education will not find the evidence, to date, convincing, this view has the great merit of recognizing the dynamic, "dialectical" nature of the process of social change in a democratic society. Somewhere between the chaos of laissez-faire competition and the enervating rigidity of the legislated blueprint, an appropriate pattern for American public higher education will be found; McConnell, in this book, has made a notable contribution toward the identification of its essential character.

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Precursors of a New Era

The Correspondence of Isaac Newton. vol. 3. 1688–1694. H. W. Turnbull, Ed. Published for the Royal Society. Cambridge University Press, New York, 1961. xviii + 445 pp. Illus. $25.

In this third volume of the monumental Newton correspondence, we reach the years 1688 to 1694, when the *Principia* has been published and the hero has entered into his most diversified period. Here are letters from his life as a member of the Convention Parliament, his patient explanations to Samuel Pepys about the mathematical probability of throwing sixes at dice, essays on theology and chemistry, and material related to the famous episode of psychotic delusion when, amongst other things, he accused John Locke of attempting to embroil him with women and to sell him an office. There is perhaps more human interest and less mathematics in this volume than in the preceding two, but when one is dealing with a Newton, even the lesser items may be of the deepest interest.

Alas, this is the last of three volumes produced under the careful and diligent editing of H. W. Turnbull. He died in May 1961, but a year after the death of another great toiler in the cause of Newton, W. H. Robinson. Unfortunately, though the production is magnificent and the book a worthy part of the canonical literature, this tome shows signs of having been hurried and of being used to some extent as a catchall for miscellaneous material. Although 58 of its 147 items are hitherto unpublished, only 13 new letters by Newton are in the collection, and for the most part these are not particularly significant—the real riches for this period undoubtedly lie in the manuscript materials which are to be published by D. T. Whiteside. Of the six new Newton manuscripts here mixed in with the letters, three should either have been in volume 1, or have been reserved for the addenda, since they relate to the early postplague period of mathematical development. The faults of the volume are however only minor blemishes, and the important thing is that, thanks to these three massive volumes and to the renaissance of Newtonian studies which has accompanied them, a whole new era of accurate historical scholarship is being born.

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Biological Problems

A Textbook of Comparative Endocrinology. A. Gorbman and H. A. Bern. Wiley, New York, 1962. xiv + 468 pp. Illus. $12.50.

Basic Endocrinology. For students of biology and medicine. J. H. U. Brown and S. B. Barker. Davis, Philadelphia, 1962. vii + 228 pp. Illus. Paper, $4.50.

Comparative Endocrinology is a textbook prepared to serve students of biology as an introduction to the field and intended to encourage them to "recognize the important biologic problems whose solutions may be approached through endocrinologic investigation." The intentions of the authors are amply fulfilled in a book that is a pleasure to read. The work is organized into 16 chapters, nine of them concerned with individual endocrine glands. There are, in addition, an excellent general introduction, chapters on gastrointestinal hormones and on vertebrate and invertebrate neuroendocrinology and neurosecretion, and an intelligent summary-chapter on steroid hormones and steroidogenesis. Finally, in a chapter on endocrine integration, the complex interplay of hormones in a variety of systems and processes (for example, migration, hibernation, osmoregulation) is described, and in the concluding chapter there is a broad and thoughtful discussion of the wider aspects of chemical mediation. Throughout the work, comparative aspects of the subject are emphasized, and the problems are discussed in their widest biological context.

There are numerous well-chosen illustrations, and the diagrams are simple and clear. It is a pleasure also to read a book, intended for students, which takes pains to show how many problems still await solution. I detected very few errors in *Comparative Endocrinology*. Of these, the one most urgently requiring correction is the definition of "R. Q." in the footnote on pages 220 and 221; it is both upside down and backward. The authors also refer to gluconeogenesis from protein *and* fat (pages 232, 317, 324), although it is now fairly clear that in animals net sugar formation from fat does not occur. Inexplicably, in the light of Pickford's work, the authors say (pages 328 and 450) that the mammalian growth hormone does not stimulate growth in fish. Finally, on page 432, the authors refer to "permanent steroid diabetes," but I know of no unequivocal instance of a steroid diabetes persisting after the steroid is withdrawn. These are, however, minor disturbances in a sound work of broad design, which deserves the gratitude and appreciation of any student of biology.

Basic Endocrinology is a little book conceived with the good intention of providing a simple, straightforward introduction to endocrinology for students of medicine and biology. It is a sorrow to report that this excellent intention is not realized. The book is poorly organized, badly written, and carelessly edited. The diagrams and illustrations are heterogeneous, sparse, and frequently unenlightening. The treatment, as it must be in a small book, is highly synoptic. But it is not a synopsis of carefully chosen evidence; it is rather a synopsis of interpretation, not always well-ordered, not always correct, and frequently imprecise. Two quotations will illustrate the characteristic wooliness of the text:

"It has so far been impossible to demonstrate any feedback mechanism for growth hormone, although it is well known that appropriate lesions of the hypothalamic region will produce obesity" (page 47).

"Further work has established the site of action of glucagon. The breakdown of glycogen to glucose-6-phosphate occurs in the presence of a phosphorylase which (in turn) received the phosphate from ATP under the action of dephosphophosphorylase which is in turn accelerated by a kinase. The present concept is that glucagon acts on the kinase system to increase the rate of ATP breakdown" (page 185).

It is a pity. There is need for a good text of this kind. Both authors are experienced investigators and teachers, and it is to be hoped that they will undertake an immediate, thoughtful, and thorough revision of this book.

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Brachiopoda

On the Morphology and Classification of the Brachiopod Suborder Chonetoidea. Helen M. Muir-Wood. British Museum (Natural History), London, 1962 (available from British Information Services, New York). viii + 132 pp. Illus. Plates. $22.

Helen Muir-Wood's monographic treatment of the suborder Chonetoidea constitutes a notable contribution to the knowledge of Paleozoic brachiopods which will be welcomed by all students of Paleozoic fossils. Most useful are the comprehensive reviews and emendation of all chonetid genera, subfamilies, and families. This work is, however, far more than a critical review of the literature; it is based on a number of years of painstaking study of the Chonetoidea in both European and North American museums. In all, 31 genera are diagnosed, including seven new ones, as well as eleven subfamilies including nine new ones, and four families including one new family. To the nonspecialist the ratio of subfamilies to genera may appear excessive, but this reflects the lack of attention shown the Chonetoidea by most paleontologists rather than an unwar-