naniia v Rossii (three volumes; Moscow, 1957–62), a collective product of the Institute of the History of Natural Science at the Soviet Academy of Sciences. The Russian work is so overwhelmingly detailed, and so fearful of controversial interpretations, that it can be used only as a reference work. Bolder in interpretation and more selective in detail, Vucinich's book can be read. It will be a richly rewarding experience for those who give it the thoughtful study it deserves.

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Business and the University

The Corporation and the Campus. ROBERT H. CONNERY, Ed. Published for the Academy of Political Science, Columbia University, by Praeger, New York, 1970. x, 188 pp. Cloth, $7.50; paper, $2.50.

In these papers from a conference jointly sponsored by the Academy of Political Science and the Council for Financial Aid to Education, spokesmen from higher education analyze a number of different issues confronting the universities, and spokesmen from the corporate world either respond or indicate areas of possible cooperation between education and the business community. The overall impression is that the spokesmen for business are responsible, far-seeing, and willing to accept the necessity for substantially increased corporate support for higher education during the '70s. There is little carping about troubles on the campus although one might have expected some of this to creep in. There is little complaint that universities may have been somewhat inefficient in their past management of affairs and funds. Nor is there much of the "bear" mentality implying that higher education during the '70's should be much less expansionist.

Indeed, the positive things stated should make those concerned with the management of higher education exceedingly hopeful for the future. Major business units and leading universities are expected to assume responsibility for remedying some of the critical social and environmental ills of the society. Although other segments will be asking the business community for assistance, the corporate world should try hard to maintain increased rates of giving to higher education, perhaps even at the rate of a 10-percent increase each year for the decade. There is general recognition that enlightened leadership in corporations is essential if corporations are going to act responsibly, and there is evidence that each year more and more top leadership in business is becoming converted to providing assistance for higher education.

Although the papers delivered by members of the academic community seem adequate, they typically do not reflect as much willingness to change, to grow, and to examine previously held assumptions. Indeed, the voices from the university sound quite orthodox. Thus universities employing their customary instrumentalities are urged simply to redirect the focus of attention and try to solve such vexing questions as the improvement of the urban condition. Looking back over the research record of American universities since World War II, a speaker pleads for support to do more of the same in the future—this in spite of some strong suspicions that, except for major breakthroughs in the health sciences and physical sciences, university research may very well have been quite ineffective and unproductive during those two decades. There is seemingly some recognition that institutions ought properly to concern themselves with such matters as Black studies and changed admissions patterns for disadvantaged youth; but there seems to be no disposition to examine radical new ways of dealing with those matters. Particularly with respect to management and governance of higher education do these representatives from the university seem self-satisfied. The argument is advanced that universities are peculiar entities to whose operations short-run measures of efficiency do not properly apply. Rather, there is almost the implication that serendipity is to be expected and used as the criterion of university success. Several spokesmen do examine the possibilities of some financial and management palliatives, but none raises the question of whether or not the fundamental deployment of resources characteristic of universities might be seriously reexamined.

The book is a substantial contribution to the literature of higher education, for it does bring together under one cover much of an emerging conventional wisdom about institutions and the corporate world. And the book does hang together much better than is typical of conference proceedings. A possible salutary use of the book, since it is not overly long, might be as a working paper for seminars of university boards of trustees, which the boards of at least major universities might consider holding. Because the corporate world is reasonably well represented on such boards of trustees, such seminars might help insure the wider reading which *The Corporation and the Campus* deserves but which it probably will not receive.

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Bacterial Genetics

The Molecular Basis of Gene Expression. BENJAMIN M. LEWIN. Wiley-Interscience, New York, 1970. xii, 446 pp. + plates. $18.

The literature concerning the molecular events attendant on gene replication and gene expression is vast and adorned by numerous experiments of great ingenuity and sophistication. In his new book Benjamin Lewin has succeeded in bringing together lucidly and succinctly the most important recent information as it pertains to bacteria and bacterial viruses. There are over 700 references, most of them to papers published in the last decade. The bibliography is complete through 1969, and there are even some references to papers published in 1970.

The book is divided into four parts. The first part is a refresher course on both general and microbial genetics plus nucleic acids. It is useful if you have forgotten first principles, but no substitute for a general genetics course. In the second part the author shifts into high gear and maintains the pace through the rest of the book. This section deals with the code, protein synthesis, and transcription, with separate chapters on the ribosome and transfer RNA. A good example of the clarity and succinctness of the writing is found in the four-page discussion of nonsense codons. The author moves quickly from general considerations to a brief but successful analysis of the subtle, logical experiments of Brenner and his colleagues which led to the recognition of the UAA, UAG, and UGA codons as nonsense.

The third section of the book is an account of the regulation of gene ex-

pression in bacteria. After a general exposition on the *lac* operon, the author considers the comparative anatomy of other bacterial operons. He introduces the subject with a short discussion of the kinds of circuit diagrams expected in positively and negatively controlled inducible and repressible systems and of the genetic predictions for regulatory elements in each case. He then considers translational control and reviews the confusing mass of experiment and hypothesis on polarity and polar mutants. The final section of the book contains three chapters dealing with replication, repair, and recombination in DNA.

The great merit of Lewin's book is that it places the hundreds of recent papers on the molecular aspects of gene expression and replication in bacteria and to a lesser extent bacterial viruses in perspective. One comes away from the book with the feeling that one has finally caught up with the literature. The book should serve not only as a superb primer for the rusty or peripherally interested geneticist but as an excellent text for a second-level course in molecular genetics.

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Microorganisms

The Yeasts. A Taxonomic Study. J. LODDER, Ed. Second edition. North-Holland, Amsterdam, 1970. xvi, 1386 pp., illus. $65.

Written by 14 specialists, this bulky treatise is based on the studies of a vast number of yeast strains, obtained from individuals and culture collections around the world. The authors have developed an array of standard procedures and media which ensure that their results are strictly comparable and reproducible by others; a precise account of the methodology is found early in the book. The book further contains: an excellent review of the sexual and asexual modes of reproduction encountered among the yeasts and of the complications they engender for yeast taxonomy; determinative keys for the identification of genera and species; and detailed descriptions of the properties of each of the recognized taxa, along with comments on the criteria used for their differentiation. It is therefore an invaluable source of information on yeasts and indispensable to anyone who has a more than passing interest in these organisms.

The classification of yeasts, like that of most other microorganisms, presents problems that stem from the paucity of characteristics that have an incontestable evolutionary significance. Some of the authors seem to believe that it is possible to formulate phylogenetic principles applicable to this group; but, however ingenious, the arguments presented rest on premises that many biologists will be reluctant to accept. I therefore found it refreshing to come across statements by other contributors that reveal a growing awareness of the precarious status of such arguments and unhesitatingly advocate the use of differential properties in a purely pragmatic manner. In the introductory section dealing with the genus *Saccharomyces*, Van der Walt clearly expresses this attitude: "The present demarcation of the genus is thus utilitarian and aims merely at providing a method of reference and communication" (p. 556–57). A scrutiny of the properties used to define the currently accepted genera and species leaves me with the impression that this holds true for most of these taxa. I therefore propose that in future editions such terms as "related" and "relationship," with their phylogenetic connotations, be replaced by less pretentious ones that imply no more than degrees of resemblance ("similar," "similarity").

With one exception, the genera are distinguished by morphological characteristics. Because the study of a yeast usually begins with a microscopic examination of the culture, this seems rational enough. But such features have occasionally been used in a misleading manner. If, for example, a yeast culture is found to contain triangular budding cells, the key to the genera unambiguously leads, by way of 1c, 2c, 6b, and 9a, to *Trigonopsis*; but such cells also occur in *Candida diddensii* (figs. 354 and 172). The genus *Candida*, comprising the non-spore-forming yeasts that produce a pseudomycelium, includes the two species, *C. glaebosa* and *C. melibiosica*, in which this feature is not apparent (figs. 186 and 218), even when they are grown under conditions that favor pseudomycelium formation (slide cultures and Dalmau plates).

The genera *Cryptococcus* and *Torulopsis* are differentiated by a single physiological property, namely the ability or inability to use inositol as a carbon and energy source. Comparable criteria serve to subdivide genera into species; morphological characteristics are no longer considered suitable for this purpose. Again, from a utilitarian standpoint, this practice may be acceptable, but it seems precarious, for it has been noted that a strain propagated over a prolonged period of time on special media may acquire new physiological properties, and it is also known that microorganisms can lose the ability to metabolize a particular substance as the result of a single-gene mutation. These facts imply that an original isolate and its progeny may be classified as different species.

These critical remarks are not intended to depreciate the value of the book as the most extensive compilation of information on yeasts currently available. It occupies a position similar to that which *Bergey's Manual* has attained in bacteriology. And just as consecutive editions of the latter have been improved by criticism of the preceding ones, it is hoped that future editions of *The Yeasts* may benefit from a careful consideration of the misgivings here expressed.

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Proteases

Structure-Function Relationships of Proteolytic Enzymes. International Union of Biochemistry Sponsored Symposium No. 37, Copenhagen, June 1969. P. DESNUELLE, H. NEURATH, and M. OTTESEN, Eds. Academic Press, New York, 1970. 310 pp., illus. $17.50.

This volume represents an attempt at a grand survey of information that has been accumulated regarding enzymes that function in the hydrolysis of peptide bonds. Necessarily, because of the diversity of proteins involved in catalyzing this hydrolytic process at differing peptide specificity sites within cells of diverse function, the quality of the available facts varies enormously with the particular enzyme. Therefore, although it contains a number of excellent articles, this symposium volume is very much a mixed bag.

As of the date when the symposium was held, three-dimensional structures to atomic resolution had been determined for chymotrypsin, elastase,