conclude that experience, particularly early childhood experience, plays a larger role than has usually been assumed.

Most of his evidence comes from the work of Piaget and his collaborators at the Rousseau Institute in Geneva. Piaget's carefully detailed analyses of the intellectual development of many children provide the basis for two long chapters in Hunt's book. Their contribution to Hunt's argument is a detailed, and often charming, account of the processes of intellectual development, of the continuous interaction between what the child can do (as a result of genetic constitution or earlier experience) and what the environment offers in the way of stimulation, challenge, and variety of experience. These chapters, by the way, can be read alone if one wants an excellent introduction to Piaget's work but is not interested in the basic argument that Hunt develops.

Earlier chapters discuss the evidence for and against the belief in intelligence as something fixed and predetermined, the evidence for and against the belief in predetermined development, and the evidence and speculation concerning intellectual development that have come from newer work on neurophysiology, learning, and the effects of early deprivation on later performance, and the ideas that come from work on programing computers to solve problems. Then come the chapters on Piaget's work, a chapter on the implications of Piaget's work and the other evidence presented, one that reinterprets much of the evidence that had earlier been interpreted to favor the idea of a fixed and predetermined development of intelligence, and a final chapter of recapitulation and summary.

Intelligence is a phenotype "for which the genes set limits of potential development but which is finally developed through encounters with the environment." Anyone who believes that the environmental contribution is only a minor one has a very strong case to answer. While there can be no general answer to the question of how much each factor contributes, Hunt suggests that "a sound scientific educational psychology of early experience" might raise the average Intelligence Quotient by something like 30 points. This estimate seems reasonable. In a technological culture that increasingly demands intellectual ability, the possibility of such an average increase justifies major efforts to develop the additional knowledge needed to give us a "sound scientific educational psychology of early experience."

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Microorganisms

The Biochemistry of Intracellular Parasitism. J. W. Moulder. University of Chicago Press, Chicago, 1962. xvi + 172 pp. $6.

This excellent book covers a topic which, with few exceptions, has been neglected, namely, the biochemistry of the microorganism that is neither a typical bacterium nor a typical virus.

Following his introductory chapter, Moulder considers four obligate intracellular parasites. The first one is the malarial parasite, "an organism with wide metabolic capability but with a comparative handful of restrictive enzymic peculiarities." Moulder then turns to the rickettsiae, which "have retained most of their enzyme systems but have lost many mechanisms for buffering themselves against unfavorable changes in their environment." Next in line are the agents of the psittacosis-lymphogranuloma venereum group which "depend on their hosts to generate energy-rich intermediates for them." Last are the pox viruses, which, despite their complexity, are viruses and thus depend "on the host for synthetic enzymes." Two of these parasites have been intensely studied in Moulder's laboratory.

Although the four types of intracellular parasites are arranged in order of increasing complexity, Moulder, in his concluding chapter, finds no evidence of an evolutionary history among them. There seems to be a complete gap in our knowledge of any intermediate step between the organismal type of intracellular parasite which has its own DNA-RNA-protein relationship and the viral type in which the RNA of the host has been substituted.

The strength of this book lies in the lucid development of each topic. For example, the discussion of the psittacosis agent evolves from the developmental cycle and susceptibility to sulfonamides and penicillin to the syntheses of folic acid and of some cell wall components. Moulder adheres closely to available evidence, but he offers provocative interpretations and speculations. Isolated observations that cannot be readily integrated with other information are usually omitted. The illustrations and general format are excellent. The book contains an index and a list of references that is extensive and up-to-date, but selective.

This book can be highly recommended to any earnest student of biology, rather than to those in any particular specialty. It is highly informative and stimulating, it covers a promising field of research, and any reader with a basic knowledge of biology can understand it.

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General Biology Textbook

Principles of Biology. Neal D. Buffaloe. Prentice-Hall, Englewood Cliffs, N.J., 1962. xiii + 365 pp. Illus. Trade ed., $9.25; text ed., $6.95.

Principles of Biology is one of the relatively few general textbooks of college biology that are written specifically for a one-semester course. The one-semester textbook presents a particularly difficult problem, for the author must convey the essence of biological science without superficiality and yet must avoid undue emphasis on detail. (I still consider *Animal Biology* by Haldane and Huxley, which appeared some 35 years ago, a model of such treatment.)

Buffaloe follows traditional patterns of textbook organization. There are ten chapters, of which the first three are concerned with science and biology, the nature of matter, and the organization of living matter. This material is covered in 40 brief pages that allow space primarily for listing, rather than for explaining, these important subjects and concepts. Chapter 4, profusely illustrated with interesting photographs, attempts the classification of organisms (both plant and animal), but again the author succeeds only in listing a few representatives of each division and phylum. Metabolism is treated in chapter 5, with emphasis on catabolism and

anabolism, although a brief account of the "history of foods in man" is included. Growth and reproduction are considered in separate chapters which, as presented, introduce some measure of confusion, since aspects of embryonic development and differentiation are discussed in both of these chapters rather than in one comprehensive and integrated account. The discussion, furthermore, is too often vague and, because of unwarranted oversimplification, inaccurate. Fifteen pages of the chapter on reproduction are devoted to an elementary consideration of Mendelian genetics. Chapter 8 is concerned with responsiveness; chapter 9 with adaptation; and chapter 10 with biology, evolution, and human affairs. The last three chapters are, like the preceding ones, survey chapters. There is a 20-page glossary and a 14-page index.

The author states that "this book constitutes a mild revolt against what appears to be an almost frantic race for volume and abundant description." But at least the good, large textbook is able to accomplish what has eluded Buffaloe —careful and detailed description to facilitate *understanding*.

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History, Production, Use

Steroid Drugs. Norman Applezweig. McGraw-Hill, New York, 1962. xv + 742 pp. Illus. $25.

It is an amazing pleasure to find that in a 700-page book, half filled with chemical formulas and tables, the other half is a series of delightful essays which are written so that any scientific person can understand most of them.

The author, a chemist, was involved in early developmental work on sources of steroid materials, and he writes entertainingly of the historical aspects, especially of the finding of useful precursors in Mexico. The second section, on production processes, is somewhat more technical, and the nonbotanist will have some difficulty in determining what plants are referred to. However, the streamlined descriptions of the routes from varied precursors to various steroid hormones, intermediates, and derivatives are invaluable. To the outsider these steroid genealogies have been immensely baffling, but in this text, and especially in the flow chart on pages 82 and 83 (from *Chemical Week*), the story is easy to trace.

The third section deals with the applications of steroids in drug therapy. The author points out that, with the introduction of prednisolone, the door of chemical manipulation was widely opened and that large numbers of derivatives as well as the natural substances are available for use in treatment. Some enhance previously known effects, some antagonize, some innovate. Applezweig says (with at least relative truth) that although an organism can exist without steroids or their glandular sources, it cannot exist successfully under these conditions; the available compounds allow several kinds of success. Five main classes of therapeutic steroids are considered in detail: androgens, estrogens, progestins, glucosteroids, and mineral corticoids. The rise of anabolic agents and the continued usefulness of steroid estrogens (particularly partly purified mixtures and the 3-methyl ether of ethinylestradiol) in the face of cheaper synthetics, such as diethylstilbestrol, are noted for the first classes. Progesterone is involved not only in female reproduction, but it is a source in the body for several other steroids; what is given to produce the progesterone effect may be diverted to other uses. Some of the newer progestins, such as the retroprogesterones and 6-α-, 17-α-derivatives, are potent and have strictly progestational effects. Others, like the 19-nor series, have additional effects that have led to their widespread use as antifertility agents. In his discussion of the glucocorticoids, the author visualizes their action in stress or inflammation as the provision of extra energy to combat the process by assisting in the transformation of protein to sugar. Therefore, one must expect to produce one disease (protein destruction) if he is to benefit another (inflammation). The final class, aldosterone, the natural salt retaining hormone, is somewhat like the orphan viruses—looking for a disease —but, in this case, one in which it can be turned to good advantage.

Then follow chapters on steroid pharmacology, stress, cancer, renal and cardiovascular diseases, atherosclerosis, and the like; the chapter on the ovarian cycle and reproduction will be particularly useful in orienting workers in other fields.

Finally, the latter half of the book is a mine of specific chemical information, which is arranged in tabular form. The biologically active steroids are grouped for naming on the basis of 15 different fundamental compounds (for example, prednisolone, prednisone, and cortisol), and they are classified and coded according to 21 types of action (for example, anabolic, androgenic, and activity on the circulatory system). Then the structural formulas of 1400 compounds are given—a unique and tremendously valuable list.

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New Books

Mathematics, Physical Sciences, and Engineering

Advanced Inorganic Chemistry. A comprehensive text. F. Albert Cotton and G. Wilkinson. Interscience (Wiley), New York, 1962. 974 pp. Illus. $14.50.

Aerodynamically Heated Structures. Proceedings of the conference held in July 1961. Peter E. Glaser, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1962. 374 pp. Illus. $15.

The Aim and Structure of Physical Theory. Pierre Duhem. Atheneum, New York, 1962. 366 pp. Paper, $1.65.

Applied Geophysics, U.S.S.R. Nicholas Rast, Ed. Pergamon, New York, 1962. 429 pp. Illus. $15.

Basic Concepts of Physics. Arthur Beiser. Addison-Wesley, Reading, Mass., 1961. 351 pp. Illus. $7.75.

Bibliography and Index of Geology Exclusive of North America. vol. 25. Marie Siegrist, Mary C. Grier, and others. Geological Soc. of America, New York, 1962. 771 pp.

Block and Graft Copolymers. R. J. Ceresa. Butterworth, Washington, D.C., 1962. 212 pp. Illus. $7.50.

Calculus. vol. 2, *Calculus of Several Variables with Applications to Probability and Vector Analysis*. Tom M. Apostol. Blaisdell (Random House), New York, 1962. 540 pp. Illus.

Chemical Analysis. The working tools. vols. 1–3. C. R. N. Strouts, H. N. Wilson, and R. T. Parry-Jones, Eds. Oxford Univ. Press, New York, 1962. vol. 1, 483 pp.; vol. 2, 489 pp.; vol. 3, 280 pp. Illus. $23.55.

The Chemical Composition and Properties of Fuels for Jet Propulsion. Ya. M. Paushkin. Translated by William E. Jones. B. P. Mullins, Ed. Pergamon, New York, 1962. 480 pp. Illus. $15.

Cloud Physics and Cloud Seeding. Louis J. Battan. Doubleday, Garden City, N.Y., 1962. 156 pp. Illus. Paper, $0.95.

Experimental Physical Chemistry. Farrington Daniels, J. W. Williams, Paul Bender, Robert A. Alberty, and C. D. Cornwell. McGraw-Hill, New York, ed. 6, 1962. 640 pp. Illus. $7.95.