Guide to Biological Horizons

Is this volume an authoritative source book, or does it have handicaps that make it useless?

Mark Graubard

To the publisher's descriptive phrase, "A unique achievement in one volume," and the introduction's comment, "the Editor realizes that it is impossible to please everyone" (both statements are fully justified), should be added the plaint, "the book is also a reviewer's nightmare." There can be no doubt that there was a crying need for just such a convenient and authoritative encyclopedia, one that was both expansive and up to date. **The Encyclopedia of the Biological Sciences** (Reinhold, New York, 1961. 1119 pp. $20), edited by Peter Gray, is remarkably successful for fulfilling so demanding a challenge. It could hardly be otherwise with the adopted editorial policy of having only recognized and salient experts in various fields discuss the basic or pivotal terms and concepts in the entire range of the biological sciences. The coverage is enormous and the topics are keenly stimulating to the relaxed browser—witness the first and the last six entries: Abiogenesis, Acantharia see Actinopoda, Acanthocephala, Acarina, Acoelomata, Actinomycetes; and then Wöhler, Friedrich (umlaut omitted), Wood, Xiphosura, Xylem, Zingiberales, and Zoogeography. The people writing the compact, well-edited, and in general, excellently styled articles are men of the caliber of Beadle (biochemical genetics), Davson (secretion), Oparin (origin of life), Romer (Chordata), Waksman (Actinomycetes), Williams, R. J. (biochemical individuality)—to pick at random a few of the generally better known names from the vast list. Needless to add, every one of the more than 600 contributors is a scientist of stature writing in his own specialized field in which he cannot be found wanting, no matter how firmly one may disagree with one point or another in his approach, coverage or stress.

As a rule, wherever needed, excellent illustrations are used. In most respects the index is adequate and generous, all articles seem to contain a goodly supply of cross references and to carry in their bibliographies the very latest and best lists of suggested titles as sources for more detailed information. But, above all, the science of biology is brought up to date in its modern, lush, and variegated splendor, with the newest terms, concepts, and pathways mustered for review. A biologist who completed his formal training even 20 years ago, but, perish the thought, has not kept abreast of events that are moving at full speed, may very likely find himself, perhaps on the third page, in the plight of Rip Van Winkle.

After having said all this, however, I feel obliged to add, in all honesty, the reactions of two equally, if not better, qualified fellow workers in the vineyard. One is an older man, a competent teacher, modest and studious; the other is considerably younger but clever, erudite, outspoken, and keen. The former was delighted with the volume, read it avidly for 5 days on end, and hated to part with it. The *Encyclopedia* fulfilled all his expectations, and more. It brought to his desk the entire panorama of modern biology: the most recent researches, experiments, and concepts which he would not otherwise have encountered in his own limited subject, an area in which his own work is fairly conspicuous. He read, he declared, with an avidity he had not experienced in many years about how whale pups come into the world, of the involvement of ATP (adenosine triphosphate) in the growth of the microfibrils of cellulose, of the endoplasmic reticulum under "Cell," of melanophore-expanding hormones, as well as of grassland climates, population genetics, the gradient of starch grain density in the *Lycopodium* embryo, hibernation and mere stupor, and RNA (ribonucleic acid) synthesis, of course. What a package of relevant knowledge between two covers. Although in spots the *Encyclopedia* made him feel a bit inadequate, he got a thrill out of discovering at least one serious miss—the term *estivation* is not cited. He consoled himself with "Excretion," and that was excellent.

The younger man, on the other hand, bluntly declared with unconcealed contempt that he would not recommend the *Encyclopedia* to high school teachers, to graduate students, or to colleagues because the book had enough shortcomings to be disqualified on all these fronts. Needless to say, he had some valid criticism supported by evidence and corroborated by a few other readers. Thus, he feels that such major items as crossing over or synapse, though mentioned in the index, are given peremptory and inadequate treatment, not in accord with their true status in modern science. Neurosecretion is poorly used in the index and inadequately treated, and cytoplasmic inheritance is omitted. In response to the plea that, granting the particular failings in the index, all these topics are fairly well covered by integrating brief references in several articles—articles which the reader would naturally consult in the course of his search—quite a few other objections of the same nature were promptly advanced to support and uphold the original condemnation. Nevertheless, it is a fact that Sonneborn's article on "Plasmagene" entails cytoplasmic inheritance and that the one on "Impulse conduction and transmission" by A. S. Marazzi deals with the synapse, although neither reference is listed in the index.

Summary and Verdict

These and other comments lead to the following: The editor's dictum that no work of this kind can please everybody is correct. Also, some shortcomings in such a pioneering work seem inevitable, as they can probably be found in the most pleasing of brides. One serious weakness is inherent in such a work: Precisely because outstanding authorities are called upon they are likely to stress their own researches and may overlook the contributions or approaches of others. This seems to be

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a frequently encountered human factor, and it may be a hard one to eliminate. Next, the editor may regard a certain topic well enough covered in one or two articles not to plan for a separate heading, since neither size nor space is unlimited. The editor, no doubt, has to curb many an author who understandably might be carried away with enthusiasm for his own subject. But on the whole the space allotment seems fair, with precision and compactness the general rule. Since judgment is difficult, here are some examples: Carbon dating, 3¼ columns; coloration of animals, 13 (this includes three columns of various chemical formulas); endocrine system, 9; plastid, 3⅓; pineal, 1; endogenous rhythms, 2; photoperiodism (plant), 3½; genetic drift, 2; salt marsh, 2; primates, 9; population genetics, 9 (including all major equations).

While the idea of including biographical sketches is a valuable and pleasant diversion in a volume of this kind, the inclusion of such names as Agnes Arber, but not C. B. Bridges or E. B. Wilson, presents a problem. Moreover, many of the historical sketches are quite superficial and faulty. Entirely false and even expendable is the paragraph on Giodanao Bruno; Wöhler did not synthesize urea but found it in the reaction system; Johannes Müller's somewhat flippant biographical sketch lacks the spirit of that great man.

However, all factors considered, the verdict remains as originally stated. The volume is an excellent pioneering venture of immense value to every teacher and student of biology. It is thorough, authoritative, up to date, and it is exceptionally strong in reporting the latest researches in most fields of biology. It is beautifully illustrated, well cross-referenced and indexed (with minor lapses here and there which should be corrected in revision) and with more-than-hoped-for coverage. The style is so lucid that any alert high school student can consult most entries with profit. Such a student may find quite a few wholly incomprehensible because they presuppose considerable knowledge of chemistry, physics, and mathematics. But these provide references to fuller texts; besides, if he goes so far as to seek out these references, he may be able to plough through with some profit. Even the hard ones give him the opportunity to do so.

And all this in one volume—and at a relatively tolerable price for such an enterprise.

Two Congos

Congo. Background of conflict. Alan P. Merriam. Northwestern University Press, Evanston, Ill., 1961. xiii + 368 pp. Illus. $6.

Alan Merriam, an anthropologist at Northwestern University, has been in the Belgian Congo for extensive research visits on two occasions: in the early 1950's, when the Congo was still regarded by many as the "model colony," and in 1959 and 1960, during the transition to independence and, as it turned out, chaos. From this personal background and from a wealth of detailed information garnered from many diverse sources, he has written a book which, though focused on events that have not yet run their full course, provides an overview valuable not only for an understanding of what the Congo is like now but also for an understanding of the kind of stage upon which future events will unfold.

The volume begins with a short introduction that considers historical, geographic, and ethnographic matters and then turns directly to Belgian colonial policy whose guiding principle of paternalism, with the usual colonial components of cupidity intricately interwoven with a measure of sincere but prideful and insensitive idealism, serves to explain much of the background out of which later events grew, swiftly, disastrously, and yet, as Merriam makes clear, not really inevitably. One of the most interesting chapters describes, in concretely human terms, how independence came to two "Congos" (all too often only one or the other is talked about in isolation): the Congo of the interior (in this case, the village in which Merriam resided during most of his field research) and the Congo of the urban center (Stanleyville being the example used). After these descriptions, the detailed, more purely political narrative of parties, leaders, negotiations, and the vicissitudes of pre- and post-independence politics becomes more understandable to the reader, more consistent in its apparent lack of logic. Merriam has happily chosen to present many of these facts in the framework of a calendar of specific events. With the feeling of immediacy that it gives, this calendar will remain invaluable in any future discussion of the series of Congolese debacles, for already the accidental is too often forgotten and the small but crucial event tends to disappear as sweeping mythologies, always so appealing in their simplicity, begin to take shape. There is a sobering aspect to this retrospective view; if the Congolese villager and townsman are found to have been unrealistic in their expectations, so are many of the supposedly more sophisticated analysts—on one side, the Belgians and the apologists of the "perfect colony" who were blind to the dynamics of a continent which they forgot existed at all; and those on the other side who, fascinated with general trends, impatiently ignored the role of the unique and concrete fact and hailed the hasty Belgian capitulation as a show of political realism.

Mercifully, the reports from the Congo have left the front page in recent weeks. It would, however, be unforgivable for us to slip once again into forgetting that the Congo exists. This book will amply prepare the reader to avoid this error; and it will prepare him not only to expect more news but also to understand the news better when it does come.

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California Flora

Flora of the Santa Cruz Mountains of California. A manual of the vascular plants. John Hunter Thomas. Stanford University Press, Stanford, Calif., 1961. viii + 434 pp. Illus. $8.50.

The Santa Cruz Mountains of California form the backbone of the peninsula west of San Francisco Bay and north of Monterey Bay. Although the range is only about 50 miles long and 2000 feet high, the flora is rich and varied. The mountains dip down into the ocean on the west, and the flora is coastal. Above the beaches and cliffs are extensive areas of redwood forest (Pacific Forest). This vegetation type occurs also in the more moist canyons on the east slope of the range, but most of the drier inland side is covered by California Chaparral. The inland foothills are California Oak Woodland. Thus the flora of the Santa Cruz Mountains includes a high percentage of the species occurring in the lowlands of northern California.

The text includes distributional notes, keys to the families, genera, and species, some synonymy, and intro-