

H. C. Darby's stimulating and authoritative paper, "The relations of geography and history," has been added, and Taylor's chapter on the exploration of Antarctica has been brought up to date, or nearly so.

As a reference work, the volume is distinctly useful. A reader desiring a brief summary of contemporary thought in geomorphology, climatology, historical geography, applied geography, cartography, and other such fields will find these fields well covered in the book. If, however, he is looking for a general overview of geography, of its breadth of scope, its aims, philosophy, and advancing frontiers, he should seek elsewhere: the volume, almost totally lacking in *Zusammenhang*, fails to provide a comprehensive and coherent view of the science.

The nongeographer would be well advised, therefore, to avoid reaching any conclusions about the status and accomplishments of this science from evidence found in this book. For one thing, a wholly anachronistic bias toward environmentalism underlies many of the contributions, notably those of Huntington, Visher, and, particularly, the editor himself. For another, systematic fields of human geography are not adequately covered. In sum, it can be said that the value of this work—and it is considerable—lies rather in the many useful essays it contains than in the character of the work as a whole.

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Chemical Engineering in the Coal Industry. An international conference organized by the National Coal Board, Great Britain, June, 1956. Forbes W. Sharpley, Ed. Pergamon Press, London and New York, 1957. v + 141 pp. \$8.50.

Due to the need to use the lower grade coals and also to produce a more nearly smokeless domestic fuel it has become increasingly important to upgrade these fuels by means of chemical engineering. In this volume there are seven technical papers, three by British authors, three by French authors, and one by a German, with an opening address by A. H. A. Wynn and a closing address by J. Bronowski, both of Great Britain. There is considerable discussion following each paper.

The conference considered various methods for developing suitable ways to produce a good low-smoke briquette suitable for domestic use. In the several papers the authors cover controlled oxidation and fluid oxidation of coal, carbonization of briquettes, hot briquetting, and semicarbonization, as well as tars that

have been obtained and how to treat low-temperature tars. In Great Britain, the problem is the need for efficient fuels for heating "fourteen million grate-heated houses"; in France, the production of good coke from coals which do not produce coke; in Germany, the production of special briquettes for smelting; while here in the United States it is the improvement of techniques for liquefying our coals, as in South Africa.

To sum up, this book urges us to use coal for the production of better fuels instead of the production only of heat and smoke.

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Our Nuclear Future. Facts, dangers and opportunities. Edward Teller and Albert L. Latter. Criterion Books, New York, 1958. 184 pp. Illus. \$3.50.

The first part of this book is a straightforward and engaging account of factual scientific material on nuclei and nuclear energy. The second part is something else again. Edward Teller is noted for the imaginativeness of his ideas and the intensity of his feelings and opinions. The last half of this book is concerned with material of a more political nature, regarding which Teller's opinions, like those of anyone else, can hardly be subjected to scientific tests of validity. It is perhaps a hazard for the uninformed reader, who may expect that the latter part of the book, like the first part, will give him a careful, balanced, objective account. With chapter 8, on "Action of radiation on matter," the noncontroversial and completely objective account ends. The subsequent part of the book does contain a good deal of equally objective material; but in addition, and in spite of the evident attempt of the authors to present both sides of many highly controversial questions, their strong belief that weapon development and testing must be continued not only is explicitly stated but also unfortunately results in severe coloring of the factual material involved.

Teller himself has stated that it is impossible to discuss these problems in a short space and that therefore he was, with Latter, writing a book on the subject. It is clearly also impossible to take up, in this short space, the very large number of instances where I find the authors' presentation and approach to be severely incomplete, illogical, or misleading. But one must give at least one example. The following illustrates the point.

In a discussion concerning the fact that the radiation dose to the average individual from fallout is so small that

it cannot produce any statistically detectable increase in leukemia, which is true, data are given in so unscientific a way as to be most unworthy of two such capable scientists as the authors. The data give the leukemia incidence in Denver, New Orleans, and San Francisco as 6.4, 6.9, and 10.3 new cases, respectively, per 100,000 population, for a single year. These data are then used to indicate that the extra cosmic radiation received by an individual in Denver as compared with the other cities does not produce any measurable increase in leukemia. The authors go even farther to discuss possible explanations for the "lower incidence of leukemia" (and of bone cancer: the corresponding numbers given are 2.4, 2.8, and 2.9) in Denver—for example, that "disruptive processes like radiation are not necessarily harmful in small enough doses." How improper it is to base their discussion on these data! It is clear that these data are so poor that they should not have been used at all. If given at all, the numbers should have been given in some such terms as 6.4 ± 1.3 , 6.9 ± 1 , and 10.3 ± 1.5 . (These statistical uncertainties follow from the sample sizes involved.) And if one asks how much additional leukemia might be expected from the extra cosmic radiation in Denver, the answer, calculable from data given elsewhere in the book, would be that the 6.4 ± 1.3 would be expected to be about 6.35 ± 1.3 were it not for the excess of cosmic radiation over that at sea level.

We all owe a very considerable debt to Teller for his contributions to the defense of the country. But his current views on the necessity of weapon development, and on the attendant questions of tests and fallout, are sharply disagreed with by a very large number of his fellow scientists. It would be most desirable for him to debate these matters, directly and as calmly as possible, with dissenters. If he would submit his arguments to the searching interrogation of these of his colleagues, it is possible that his great originality might be better directed toward the most constructive solutions to the problems which face the world.

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Histology. Arthur W. Ham. Lippincott, Philadelphia, ed. 3, 1957. xv + 894 pp. Illus. \$11.

This third edition of Ham's *Histology* continues the standard of excellence which characterized the two earlier editions. Excellence of organization and unusual clarity of expression make this textbook one to be read for pleasure as

well as information. Dr. Ham has presented the voluminous material in such an understandable manner that the book is admirably adapted for use at the undergraduate level as well as in the medical school.

New features of this edition include a superb discussion of the modern concepts of the ultrastructure of protoplasm, including an excellent collection of electron micrographs; a section on microscopy, including treatment of phase contrast, interference, and electron microscopes; and discussion of work on tissue culture and transplantation of tissues. The text material has been brought up to date with considerable revision of the sections on basement membranes, blood clotting, cartilage, bone, and teeth. Throughout the text the inseparable unity of structure and function is emphasized. Each chapter has an excellent bibliography, with many references from the recent literature.

Ham is certainly to be commended for accomplishing the near-impossible—producing an up-to-date, accurate, comprehensive work so clearly written as to be readily understood by the biologist with a minimum of background.

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The Faunal Connections Between Europe and North America. Carl H. Lindroth. Foreword by P. J. Darlington. Wiley, New York; Almquist & Wiksell, Stockholm, Sweden, 1957. 344 pp. Illus. \$15.

P. J. Darlington, himself the author of a recent and very important general work on world zoogeography, has, I think, accurately summarized in his foreword the contribution of Lindroth's book. He says in effect that it has added significantly to our understanding of the content and history of the best-known northern faunas of the earth, those of Europe and eastern North America. Darlington observes, too, that its author is eminently qualified for his task, since he occupies the unique position of one having more first-hand knowledge of the beetle faunas of both continents than anyone else. This from one who is himself an eminent zoogeographer and outstanding student of Coleoptera should recommend the examination of the present book to any interested biologist.

According to Lindroth, his purpose in writing is to explain how species of certain animal groups came to occupy areas of both continents. In treating the problem he finds opportunity to discuss a number of contingent matters, some quite controversial, that have proved to be of enduring interest for the systematist and zoogeographer.

His most trustworthy materials certainly include the entomological records that he has personally amassed or for which he can vouch. Many of these are new. For animals other than beetles he generally utilizes information available in the literature or supplied by American and European specialists.

His survey of mammals, birds, fishes, many kinds of insects, spiders, myriapods, terrestrial isopods, gastropod molluscs, and lumbricid oligochaetes leads him to believe that not less than 5000 species of such organisms are known to be common to Europe and eastern North America. Of these, about 500 species are apparently indigenous to both, but these latter are largely or entirely circumpolar, or disjunct circumpolar, in distribution. Then how is the existing distribution of those remaining to be explained? Lindroth believes that introduction by human agency or by overseas dispersal (by flight, wind, on floating debris, and so on) can account for most of these.

He suspects that if continental drift ever occurred, it took place too long ago to have had any discernible effect upon the disposition of present-day faunas. In any event he suggests that modern distributions for the most part are understandable without our having to postulate a direct continental connection between Europe and America at some past time.

Similarly, even if there were good geological evidence for a complete trans-Atlantic land bridge, on the basis of existing distributions he feels it unnecessary to postulate one. At the same time his appraisal of the Greenland-Iceland faunas leads him to believe that a dryland corridor of dispersal probably connected them with Europe during the Pleistocene.

Of particular interest for those of us especially interested in soil animals is Lindroth's detailed analysis of the beetle-myriapod-isopod fauna of Newfoundland. He presents quite a plausible explanation for the surprising fact that the fauna of Newfoundland, which is geographically part of North America, is predominantly European. Lindroth learned that, as early as the 17th century, vessels had begun to sail with earthen ballast from southwestern England to Newfoundland where the ballast was discharged ashore and where fish and lumber were taken on for Continental and English ports. Since the ballast usually was carried westward to Newfoundland, and not eastward to Europe, we have a plausible explanation for the occurrence of so many European insects, myriapods, and isopods in both places without a comparable representation in both of New World species. Evidently Lindroth investigated this possibility with great care, supporting his theories

with information gleaned from old sailing records and with collections that he made at known ballast dumps around English and Newfoundland ports. Since ships laden with ballast and agricultural produce also sailed from Europe to the mainland of eastern North America and the Pacific Northwest, it is not difficult to find an explanation for the often spotty appearance of European species in each, especially where the climate is comparable to that of Europe.

Clearly Lindroth has gone to considerable pains to extract from his considerable direct knowledge of the Eur-American beetle faunas some cautious though warranted conclusions. One has the feeling that these first-hand data really form the nucleus of his thesis and that he explores the distributions of other animals to augment or fortify the former. A survey of such scope inevitably includes errors of omission and misidentification, especially since the author had to rely upon secondary sources of information for data on some of the insects and other animals. For instance, as a specialist in Myriapoda, I can say confidently that his list of Eur-American myriapods is neither complete nor entirely accurate. On the other hand, it seems to me that he could come to many or most of the same conclusions on the firmer ground of the Coleoptera alone. As Darlington points out, when Lindroth writes of Eur-American beetles, he has no peer.

The format of the book—its numerous good maps, graphs, and tables—assists the reader to gain a clear picture of the author's text. Following each chapter there is an extensive bibliography. Finally, it is a pleasure to say that Lindroth's writing is direct and lucidly uninvolved. He orders his arguments neatly. His style, plus the fine maps and other aids, makes reading this book quite a pleasurable as well as rewarding experience.

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Bergey's Manual of Determinative Bacteriology. Robert S. Breed, E. G. D. Murray, and Nathan R. Smith. Williams & Wilkins, Baltimore, ed. 7, 1957. xviii + 1094 pp. \$15.

The sixth edition of "Bergey" (1948) was one 1500-page volume. This edition appears in two volumes, the one indicated above and an *Index Bergeyana*, to appear later. The *Index* will include most of the "*species incertae sedis*," the literature index, and the host and habitat indices. (The "*species incertae sedis*" in the previous edition for Micrococcaceae alone numbered almost 800 and occupied 37 pages of text.) Space thus ob-