moto and one by Ichimura and Aruga, the latter is interesting in its description of algal adaptation to light and temperature, and of the lack of light inhibition in sessile algae and algal blooms. Koyama presents a fairly lengthy study of the mechanism of methane production in paddy and lake soils, and Tanaka briefly discusses manganese in lake waters.

Papers dealing with oceanography include Sugiura's on oxygen and phosphate relationships of the Kuroshio current, Uda's on oxygen distribution in the Pacific, and a rather inappropriate one by Rakestraw on silicate and oxygen—inappropriate in this volume because 10 of its 13 pages are tables. All three authors give their oxygen results in terms of milliliters per liter, a mode of expression that I find peculiarly unsuitable. Two papers on methods, one by Smith and Hood on *p*H measurement and one by Richards and Kletsch, will be useful, although the title of the latter, "The spectrophotometric determination of ammonia and labile amino compounds in fresh and sea water by oxidation to nitrite," reveals its weakness. The method is sensitive but too all-embracing and would be dangerous for use in waters rich in dissolved organics.

Papers by Kitano on factors influencing the formation of low magnesium calcite, high magnesium calcite, and aragonite and by Lowenstam on the strontium and magnesium contents of coexisting calcites and aragonites show how this sort of problem can be approached experimentally and observationally. Kitano finds the peculiar fact that, whereas glycine inhibits calcite formation, glycylglycine stimulates it. Would that he had investigated glyglygly.

Zobell contributes a good review of hydrostatic pressure as a factor affecting the activities of marine microbes and also provides appropriate words of introduction regarding Professor Sugawara. Finally, Warren Wooster's bland article on international oceanography completes the oceanographic picture. A quick calculation based on his estimate of the number of oceanographers shows them to be a rare breed—one in a million—but this should surprise few oceanographers.

The atmospheric portion of the title derives from two papers: a seven-page one in which Iwasaki and six (!) other authors describe what seem to be almost indefinable variations of chemical composition in rainfalls and one by Kuroda on xenon isotopes of the atmosphere.

Contributions on nuclear geochemistry include, among others, that of Kuroda (mentioned above), a carefully reasoned approach by Ingerson and Pearson to the problems arising from use of carbon-14 to estimate the age of groundwaters, and a study of the behavior of strontium-90 (Sr^{90}) in Lake Haruna (Japan) by Hanya and others. Hanya and his associates conclude that Sr^{90} must reach the lake only by direct precipitation onto its surface, as runoff is depleted in the isotope. They find the ratio Sr^{90}/stable Sr in aquatic plants and animals mirrors that of the water and conclude that no Sr^{90} is being deposited on the lake bottom. Because this last conclusion is based on one sediment sample that was probably mixed with prefallout material, it is not particularly convincing. Two papers, by Miyake and others and by Torii and others, deal with the distribution of uranium, radium, thorium, and the like in the sea; two are concerned with the isotopic composition of lead in sediments (Chow and Tatsumoto) and lavas (Patterson). A neat paper by Goldberg and others compares ages determined on a Caribbean core with the ionium/thorium and the ionium/proactinium methods and concludes that if the ionium/thorium result is based on hydrochloric acid–leached material the results are comparable.

The contribution by Hodgson and others, which does not fit any of the three categories, is simply a speculation about the likelihood of three major mechanisms for oil field formation.

The range of subjects covered in this volume makes sense only in the light of Sugawara's interests and work. On any other basis the range is too broad and the treatment too shallow for the volume to be really useful. Because this ailment seems to afflict a great many books these days, it might be worth considering the alternative of limiting the contributions to *Zeitschrifts* and similar honorary volumes to a small number of articles, preferably reviews such as Zobell's in this volume. After all, the honor bestowed on the recipient lies as much in quality as in quantity. I suspect that most copies of this volume will turn up in institutional libraries rather than in private collections.

With regard to the mechanical details of this volume, the arrangement of the articles, which at first seems to be random, turns out to be on the basis of the date on which the manuscript was received! The volume, or should I say the reader, suffers from careless editing, with virtually every article having its complement of typographical errors—in one case five errors in fourteen lines. The structure of some sentences in the introduction and in several of the essays is rather unusual; this is understandable but not entirely excusable.

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Botany

In the introduction to **Native Wild Plants of Northeastern United States and Eastern Canada** (Warne, New York, 1965. 231 pp., $3.95) the author, F. H. Montgomery, states that "over 4600 species of plants occur within the area covered by this guide." Herein is the dilemma that faces any author of a popular work on plants—what to include and what to leave out? Montgomery has made a selection of some 400 species, all intended to be indigenous and most of them herbaceous. He has omitted species in a number of common families, including grasses and sedges, and included but one representative in each of several others. For a more adequate coverage of common wild plants, the companion volume *Weeds* (also by Montgomery) must be used.

The author points out in his preface that the book is intended to be intermediate between the usual type of popular handbook and the advanced type of text. The introduction deals briefly with such matters as habitats, distribution, and plant naming and is followed by a 15-page key. Extended use of the key must precede any attempt at sound criticism, but the stressing of vegetative characters does not, in my opinion, eliminate pitfalls, even in the early steps of using.

The text follows essentially the sequence of families and genera in *Gray's Manual.* Brief descriptions are given and complex terminology avoided when possible. Perhaps of greatest value are the 298 line drawings which conveniently are placed very near the descriptions. In many instances, for example *Dentaria diphylla* and

Cicuta maculata, underground parts should certainly have been shown, but for most species the drawings, though somewhat uneven in quality, seem to be adequate for general recognition.

The greatest deficiency is the absence of range date. For Ontario and the area around the lower Great Lakes, where nearly all the species may occur, there should be less difficulty, but for New England this becomes a serious shortcoming. Some 22 of the species treated here reach only to western New York; 21 others extend east only to Vermont or Massachusetts, while 11 more are found only to New Hampshire.

The book is of convenient pocket size and should prove adaptable for use in making field identification. It will also be useful for quick recognition where details of flowers and fruits are not important.

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On Teaching Biochemistry

How much biochemistry should we inflict on medical students? The question haunts everyone engaged in such teaching. The body of knowledge of this discipline has been increasing exponentially since the 1930's; the textbooks have been growing, and the medical students groaning, in proportion. It is no secret that most students resort to the use of "ponies" as guides through the maze of required information.

The authors of **Biochemistry** (Williams and Wilkins, Baltimore, 1965. 387 pp., $6.75), S. P. Datta and J. H. Ottaway, teach biochemistry at the universities of London and Edinburgh, and they have organized their lectures into a book which has gone through six editions under the title *Aids of Biochemistry*. *Biochemistry*, the current edition, is then apparently a pony grown to almost full size.

The organization of the book is traditional; it does not deviate from that found in books written 40 years ago: hydrogen ion concentration, chemistry of carbohydrates, chemistry and lipids, and so on. The student does not encounter anything dynamic until he reaches chapter 7 where enzymes are discussed. The authors cannot be blamed for this presentation; with respect to textbooks it is an almost universal heritage from the German school of biochemistry of some 60 years ago. For the first third or more of the course the student must endure a barrage of descriptive details of what is essentially the chemistry of natural products. He could be led much sooner into areas of biochemistry which may capture his imagination and which might make the memorizing of descriptive material more endurable. After all, one can teach all there is to know about enzymes if a student knows the structure of succinic and fumaric acids.

Another instance of the authors' overly strong ties with the past is their use of the meaningless term "detoxication" as a chapter title. However, to their credit, it should be noted that they promptly explain that no such process really exists. For, owing to advances in our knowledge of enzyme chemistry, it has bcoeme clear during the past three decades that what used to be called "detoxication" is simply the cumulative result of the lack of specificity of some enzymes. This teleologically rooted term should have been buried as soon as it became apparent that many "detoxication" products are more toxic than the starting material.

The book is very weak in the presentation of the impact of newer knowledge of genetics on biochemical thought. Nor is it free of serious errors. On page 81 the following statement is made: "Since the RNA which exists in the various subcellular fractions is probably heterogenous it is not surprising that there are wide variations in the estimates of its molecular weight; values between 20,000 and 2,000,000 have been found and liver sRNA probably has a molecular weight near 10,000." It would be difficult to devise a single sentence which would convey more misinformation about RNA.

The production of the book is dreadful. Small print is tightly packed on small pages. In the copy that I examined pages 281 to 316 are bound upside down and, consequently, in Hebraic order. How this blunder in the bindery escaped notice is beyond comprehension. I riffled the pages before the eyes of an intelligent 12-year-old child, and within a second she commenced the laughter of delight which she reserves for discoveries of "goofs" of the adult world.

It is difficult to see what purpose this book will serve. The need of medical students will not be fulfilled by more textbooks and more ponies. What is needed first is an agreement on the periphery of the area of the discipline to be covered. Such a delineation could come as a consensus from the teachers of biochemistry and the teachers of clinical subjects. Then a few well-written texts of reasonable size might present a coherent, current view of biochemistry which the medical student may receive with a sense of excitement.

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Metals and Gases

The author of **Thermodynamics and Phase Relations** (Academic Press, New York, 1965. 322 pp., $13) is J. D. Fast, chief metallurgist at the Philips Research Laboratories and professor at the Technical University of Eindhoven. The two-volume series, *Interaction of Metals and Gases*, of which *Thermodynamics and Phase Relations* is volume 1, is apparently aimed at undergraduates and practicing metallurgists. This first volume is complete in itself, well written, and indexed. The author's style is very readable (as in his book on entropy) and his 50-page introduction to thermodynamics is unusually lucid; one topic leads smoothly into the next, symbols are adequately explained, equations derived, and many practical examples given. There are no home problems. Pertinent references to the literature (up to 1964) are given in footnotes on nearly every page.

The section on thermodynamics and the calculations of equilibria precedes chapters that deal with reactions of pure metals and gases (silver-oxygen to tungsten-oxygen systems), reactions of alloys with gases, carbon and oxygen in steel, solutions of gases in metals (emphasizing hydrogen), and solutions of gases in alloys. The gases (hydrogen, oxygen, nitrogen, and carbon monoxide) and the metals discussed are those of practical metallurgical interest with occasional mention of exotic alloys used as getters.

It would not be fair to criticize omission of many systems and subjects —for example, heat capacity, rare gases, and similar topics—that have been omitted or treated too briefly; however, the omission of defect-theory [see Libowitz's excellent book *Solid*