words from other related fields," I fail to see why, for example, the following terms are listed, sometimes with incorrect equivalents: *Eisenbahngelände* (railway territory), *Fördereinrichtung* (ticket distribution system), *Grenzverkehr* (frontier traffic), *Pickel* (pick axe), *Unternehmer* (contractor), and the like. The inclusion of the names of elements, chemical compounds, minerals, and other classes of terms, which often have similar spellings in both languages, also seems superfluous in a physics glossary—for example *Neon, Cadmiumarsenid, Renardit, Ulrichit,* and *Chromosom.*

Listing terms under their adjectival modifiers is not the best lexicographic practice, especially if the modifier does not alter the meaning; *elektrisch* and *magnetisch* have more than 40 entries each, and *mechanisch* has 19.

Many terms are poorly translated: *Kaltemission* (the translation is autoelectric emission, but should be field emission); *Ultraschalldickenmesser* (supersonic thickness gauge should be ultrasonic). Other dubious translations are: *Netzebene* (atomic plane), *Nullindikator* (null detector), *elektrisches Feld* (field of force), *gedämpfte Wellen* (type B waves), and *Brennzeit* (conducting period).

That specific areas of physics to which the terms apply are seldom indicated may cause misunderstanding—for example, *Blitzlicht* (flashlight). No distinction is made between British and American usage—for example, valve versus electron tube. Even casual perusal turns up omissions: *Elektret, Kraftarm, Lichtfluss, Messkreis,* and *Sendevermögen.*

The components of multicompound words are often not listed separately; for example, *Brennstoffvorratsmesser, Sonderrechenstab,* and *Gitterwechselspannung* appear, but *Vorratsmesser, Rechenstab,* and *Wechselspannung* do not. Misspellings and typographical errors are too frequent: "chrystal," nuclear "magic" moment, cubing "formular," "Hammerarbeit." The latter term has the double distinction of being both misprinted and incorrect; it should be *Hämmerbarkeit* (malleability).

The format and paper are satisfactory; the type, while legible, should have been larger.

Despite these shortcomings, the compilation has merit for the physicist and student not conversant with German, since most terms are pertinent and are rendered in accurate and idiomatic English. For the translator who does not have special knowledge of physics, the dictionary would seem to be less than authoritative.

I hope that a new edition will be more rigorously edited so that it will be comparable to the authors' other fine lexicographic contributions.

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Introductory Textbook

Botany: A Functional Approach. Walter H. Muller. Macmillan, New York, 1963. xvi + 486 pp. Illus. $7.50.

This addition to the available textbooks for general botany courses should be well received. It is intended for a one-semester course and follows a conventional organization. In approximately the first quarter of the book, Muller treats introductory material and fundamentals of structure. In the second quarter functional processes, their correlations, and their importance to plant distribution are considered, with a meaningful chapter on soils. Next, a chapter on inheritance and variation is followed by a section (nearly 150 pages) concerned with a survey of the plant kingdom. Final chapters treat evolution, growth and flowering, populations and their problems, and the origin of life.

The use of a single-column format, with wide outer margins, gives a pleasant typographic effect. Key terms are set in bold face type. Margins are used extensively for illustrations, most of which are drawings. More illustrations, including greater use of photomicrographs, would probably be helpful to students. A few comments on specific drawings may be noted. The extent of apical meristems and the distribution of immature vascular tissues are not handled accurately in the drawings that depict structural development in stem and root. Bundle sheath is omitted as a label in the drawing of leaf structure. No mention of this structure and its function is made in the text, but it is included in the glossary. In the illustration of *Ulothrix,* flagellae may well have been added to the spores produced from the zygote. A probable omission of text material is obvious at the top of page 35.

The coverage of the text is extensive and up to date, but its treatment of many aspects is abbreviated in conformity with the limitations of a one-semester course. Knowledge and full appreciation of variability is thereby limited, and in some cases accuracy is sacrificed. An appealing feature is the emphasis given to the application of fundamental subject matter to problems of significance for mankind. The author believes, and rightly so, that "botany lends itself more readily to the teaching of biological concepts of general educational value than do other biology courses." This belief finds expression by taking the subject out of the classroom and giving it effective application to conservation, dust bowls, plant distributions, plant diseases, population growth, and food problems.

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Physical Meteorology

An Introduction to Atmospheric Physics. Robert G. Fleagle and Joost A. Businger. Academic Press, New York, 1963. xii + 346 pp. Illus. $12.

Current textbooks on physical meteorology tend to be limited to a few standard topics—meteorological optics, acoustics, solar and terrestrial radiation, and one or two others—that are immediately associated with obvious meteorological phenomena. The authors of this book have been more ambitious. In their discussion of atmospheric physics, they have included introductions to gravitation, atmospheric thermodynamics, and geomagnetics and, in two appendices, a review of mathematical functions and operations pertinent to meteorological physics as well as a few paragraphs on units, dimensions, and significant figures (the latter are misleadingly titled physical topics).

With this coverage, the authors have produced a text adapted to a two-semester course for either of two groups: (i) nonscience undergraduates who desire a single earth science course of balanced breadth and depth and (ii) first-year graduate students who are beginning their professional study without any undergraduate preparation in meteorology. Each subject is developed clearly, carefully, and in considerable detail, without immediate reference to other related phenomena. For this reason, the book is not particularly convenient for use as a refer-

ence work. On the other hand, it is a very readable book. Equations are well integrated with the text. The line drawings are excellent. Each chapter ends with an extensive set of problems and numerous pertinent and up-to-date references (all the references cited are readily available books or monographs). Best of all, the complete list of the symbols used in each chapter is a happy answer to the confusion in meteorological symbols, which has been drawn from many sources.

In a one-semester course in physical meteorology, this book would serve as an excellent introduction to selected topics when used with the cited references.

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Chemistry and Taxonomy

Chemical Plant Taxonomy. T. Swain, Ed. Academic Press, New York, 1963. x + 543 pp. Illus. $16.

In this symposium of 16 articles, all by different authors, a successful attempt is made to survey the "scope and usefulness" of chemical taxonomy. The several general chapters range from "Methods of classical plant taxonomy" to "Biosynthetic pathways." The more specific chapters, ten in all, deal mainly with the taxonomic distribution of certain substances—the flavanoid constituents, alkanes, acetylenic compounds, fatty acids, aliphatic polyols and cyclitols, glycosides, anthocyanins, alkaloids, and sulfur compounds. Most of the work reported involves vascular plants.

I suspect that many (perhaps most) taxonomic readers will flounder in the chemistry, and the chemist in the taxonomy, but this is not necessarily a negative criticism. The information content in the respective fields is so extensive that we can hardly expect to find any large number of scientists who can speak both languages with ease.

A firm bridge is currently being established between chemistry and taxonomy, and this volume will do much to reinforce the connection. It is clear that many chemists are now expanding their horizons into problems of plant evolution at the same time that taxonomists are seeking new evidence from chemistry to fortify their systematic correlations. The conjunctions of viewpoints are leading to a salutary intercommunication between the two fields. We can expect a growing teamwork that should reveal important new generalizations.

The papers in this volume include those which are highly detailed and of interest mainly to specialists and those which are broader and useful to the general student and teacher. The book will probably serve mainly as a reference work. The single appendix gives a list of orders and families in the Spermatophyta (after Engler), but there are three separate indexes—authors, plant genera and species, and chemical compounds. Approximately 1400 literature references are scattered throughout the book.

One can find some interesting parallelisms between chemistry and plant taxonomy in this volume. For example, Erdtman writes that "the days are gone when the reputation of a chemist was proportional to the number of structural problems he had solved, just as that of a Bornean headhunter used to depend upon the number of his trophies." Something like this could be said about the taxonomist of the past whose prowess was in terms of the number of new species he had described.

Taxonomists, after having tried vainly for so many years to define that all-important but so elusive concept of "species," should take courage from the chemist's effort to make a clean-cut definition of "alkaloid" (compare pages 390 to 397). In the latter, incidentally, we find discussed a class of compounds of a "general alkaloid character" described as "pseudoalkaloids." Taxonomists with a particularly difficult problem might well take a cue and interpret their troublesome populations as "pseudospecies."

I should like to call attention to one procedural detail which does not emerge from this book and may be overlooked, namely the need for "voucher specimens." Phytochemical researchers who make detailed studies of plant substances should realize the importance of documenting their work by placing good specimens of their research plants in institutional herbaria. In this way only can the year-to-year vagaries of identification and naming be overcome and the published data be reliably associated with a definite plant.

A researcher or teacher interested *only* in plant taxonomy, or one interested *only* in chemistry, may well find this book peripheral to his interests. To those, however, who are directly concerned with the joint problems of plant taxonomy and chemistry, this volume cannot fail to be of major usefulness.

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Group Resources

Problem-Solving Discussions and Conferences. Leadership methods and skills. Norman R. F. Maier. McGraw-Hill, New York, 1963. viii + 261 pp. Illus. $6.95.

"The objective of skilled leadership is to dissipate the forces in a group that make for frustration and to utilize the group resources that make for cooperative problem solving. Groups have two assets that exceed those of any individual in the group: they possess more knowledge and they can think in a greater variety of ways." In the preface Maier states that, to take advantage of these assets, the "principles of group behavior must be skillfully used by the leader. What these principles are and how they may serve to improve meetings is the subject of this little book."

This volume is a highly condensed summary of the author's extensive experiments in the use of small conferences as a method of problem solving in industrial management. Although the procedures described apply most directly to meetings between a superior and a group of subordinates in an industrial setting, the results have wider application, in many instances, both in theory and in practice. The author's conclusions are based on the results of experiments in which the participants —students, teachers, or other experimental subjects—played the role of supervisor and subordinates who are presented with typical management problems.

Maier contrasts the quality of a decision with its acceptance and states that the method for achieving quality differs from that for achieving acceptance; he considers the methods inherently in conflict. Throughout the book he emphasizes the virtues of combining group decision with conference leadership skills. He also distinguishes between leadership methods and leadership skills and says that ". . . the *skill* of the discussion leader tends to upgrade the quality of the decision while the *method* tends to ensure accept-