mathematical structure ('patterns')—for example, properties of natural, rational, real, and complex numbers 4. Judicious use of unifying ideas—sets, variables, functions, and relations 5. Treatment of inequalities along with equations 6. Incorporation with plane geometry of some coordinate geometry, and essentials of solid geometry, and space perception 7. Introduction in grade 11 of fundamental trigonometry—centered on coordinates, vectors, and complex numbers 8. Emphasis in grade 12 on elementary functions (polynomial, exponential, circular) 9. Recommendation of additional alternative units for grade 12: *either* introductory probability with statistical applications, *or* an introduction to modern algebra."

Acompanying this report is a publication called *Appendices,* in which some of the topics listed in the report are described in more detail.

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A New Method in the Theory of Superconductivity. N. N. Bogoliubov, V. V. Tolmachev, D. V. Shirkov. Translated from the Russian. Consultants Bureau, New York; Chapman and Hall, London, 1959. 121 pp. $5.75.

In the spring of 1957 came a major break-through in the microscopic theory of superconductivity with the announcement of the theory of Bardeen, Cooper, and Schrieffer. Almost immediately a stream of papers by N. N. Bogoliubov and his coworkers appeared, reflecting the fact that the preliminary announcements of the "BCS" theory indicated certain formal similarities between it and Bogoliubov's 1947 theory of superfluidity in liquid helium.

This book, completed in Russian in January 1958, is the culmination of this work—a synthesis of the previously published results and of several new contributions. As such, it is more a report of active research than a review of a body of theory that has withstood the test of time. Being highly technical and debatable, it is intended only for the specialist. A slightly condensed English version of the original Russian book, prepared in the Soviet Union, appeared in the *Fortschritte der Physik* and may be obtained from the authors, in preprint form, for the asking.

After a lucid introduction devoted mainly to a résumé of the 1947 superfluidity theory, three chapters are given to the Fröhlich model, in which the electron-phonon interaction is retained but the Coulomb repulsion between electrons is omitted. The treatment of the electrons is equivalent to that of Bardeen, Cooper, and Schrieffer, although mathematically it is much simpler, more elegant and convenient. The lattice is given a parallel treatment which is somewhat more satisfying and systematic, although the advantage of better convergence claimed for this procedure is not explicitly shown. The collective motions are also investigated by a method incorporating the features of recent work by Gell-Mann, Brueckner, Sawada *et al.* Unfortunately the omission of Coulomb repulsions is crucial here, and so the results are somewhat misleading.

In two later chapters appears for the first time Shirkov's formidable attempt to include the Coulomb repulsions. The development is formal and includes a number of approximations, some of which are neither discussed nor made explicit. Here the complete text is very helpful, since some material essential for understanding the mathematical details is omitted in the *Fortschritte* version. Among the results of this investigation are a less restrictive criterion for superconductivity than that of Bardeen, Cooper, and Schrieffer and the loss of the isotope effect—results which seem at best questionable.

In the seventh chapter Tolmachev studies the conditions for superconductivity in a many-electron system with general weak interactions, but without phonons. He shows that the "reduced Hamiltonian" is sufficient for study of the ground state and he also includes a treatment of collective motions in the presence of Coulomb interactions. Some of this analysis of collective motions has since been shown to be wrong. The concluding chapter shows that the partition sum calculated by Bardeen, Cooper, and Schrieffer is exact for the reduced Hamiltonian problem. This chapter also contains some comments on the electrodynamics but no treatment of the Meissner effect and the problem of gauge invariance, and no applications of the theory to specific problems.

Thus, this book contains several lasting contributions to the fundamental theory, together with some doubtful ones, but not the "unprecedented *complete* solution" described on the jacket.

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Progress in the Chemistry of Organic Natural Products. vol. 15. L. Zechmeister. Springer, Vienna, Austria, 1958. 244 pp. $9.75.

The 15th volume of this well-known review series covers four subjects for which review articles of this type are very timely.

The first review, written in German by Von H. H. Schluback, covers carbohydrate metabolism in the grasses. Although it is not a long review (30 pages), methods of isolation, analysis, molecular weight determination, and structural study are treated. Since the review is written primarily from the standpoint of those interested in agriculture and the production of food, data are given to show the change in carbohydrate and protein content during the growing period.

The second review, written in English by L. Zechmeister, is concerned with in vitro conversions of naturally occurring carotenoids. Although it was written to cover only a small segment of the chemistry of the carotenoids, it gives much information (in 52 pages) about the field in general, the nature of these substances, and the tools available for their study. N-Bromosuccinimide, a reagent investigated in recent years for many transformations in other fields, is shown to be a very useful reagent for the carotenoids. The same can be said of boron trifluoride, which forms a complex that yields useful and specific transformation products when treated in the proper way. Chromatography and spectroscopic examination of the fractionated products make it possible to interpret the transformations in a way very satisfying to the experimentalist.

The third review, on the chemistry of *Podophyllum,* written in English by J. L. Hartwell and A. W. Schrecker, gives (in 83 pages) an excellent coverage of the subject from the standpoint of organic chemistry. The interest in *Podophyllum,* which arose before chemistry was a science, has continued to the present—an interest aroused by a number of its demonstrated or alleged physiological properties. No therapeutic effect has been unequivocally demonstrated except in the case of condyloma acuminatum. However, certain of the drug's cytological effects have been more interesting for recent investigators. The type of structures found for the active principles is not unique as far as natural products are concerned, nor is any unusual experimental approach required for their study.

The fourth review, written in English by Dorothy Crowfoot Hodgkin, is a truly significant treatise, from a number of standpoints. It gives a concise account of the experimental data and the reasoning by which the investigators arrived at the complicated structure of vitamin B_{12}, and it gives, in addition, a good appraisal of the present state of development of the tools available—x-ray analysis in particular—for solving such a formidable problem. Modern isolation techniques are reasonably adequate for study of a fairly complex structure, whether or not the substance of interest will crystallize. However, the organic chemist has always preferred crystalline preparations, and this account shows how important it can be to obtain crystals of a derivative suitable for x-ray study. In the case of vitamin B_{12} it was possible to deduce the major features of the whole structure by x-ray studies, after approximately half the structure had been revealed by the methods of organic chemistry.

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Economics of American Forestry. Albert C. Worrell. Wiley, New York; Chapman and Hall, London, 1959. x + 441 pp. Illus. $9.75.

Integrating subject matter from the social sciences with that from the natural sciences is one of the most challenging and vital assignments in university teaching. Worrell's new book will be a valuable aid to those who undertake to combine the principles of economics and the practice of forestry.

Written for undergraduate forestry students, specifically for students who know something about forestry but very little about economics, the book analyzes the operations of people who are engaged in producing or enjoying the products of forests. To do this, the author uses a multitude of practical examples from almost every phase of forestry activity.

Within the framework and terminology of economic theory, the book discusses such topics as why people own forest land, why they manage it as they do, why they operate their sawmills and wood-procurement facilities as they do, why others buy forest products, and how product prices are determined and what makes prices change. It also suggests ways in which economic analysis can be used to determine more effective methods of using land, manpower, and capital in forestry activities.

The book effectively introduces the reader to the economics of forest production, marketing, valuation, and consumption. It also deals briefly with price theory and land economics. But with such a broad scope, the depth of treatment is necessarily shallow, and this quite clearly separates prospective readers into two groups. The book will be enthusiastically received by the student or practicing forester who is interested in an introduction to the workings of the forest economy. But the student, practicing forester, or researcher who wants a working knowledge of the tools of economic analysis must look beyond this text; this group will have to go directly to economics texts and journal articles.

Perhaps the most important single contribution of this book is the effective way in which it presents forestry in a broad frame of reference—giving forestry students a view of the people they are producing for, as well as information about the trees they are working with. It should also enable students to see more clearly how silviculture, protection, management, utilization and other forestry specialties fit together—how knowledge from each is needed if forest resources are to provide the products that people want most from them.

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Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Activities of the National Institutes of Health in the Field of Gerontology, January 1959. Center for Aging Research, National Institutes of Health, Bethesda 14, Md. 121 pp.

Adsorption, Dialysis, and Ion Exchange. Chem. Eng. Progr. Symp. Ser., No. 24, vol. 55, 1959. American Inst. of Physics, New York, 1959. 219 pp.

American Academy of Arts and Sciences, Records, 1958–1959. The Academy, Boston, Mass., 1959. 122 pp.

The Biographical Approach to John Dalton. Frank Greenaway. Portico Library, Manchester, England, 1959. 98 pp. £1 1s.

Chemistry and Biology of the Starch Granule. vol. 2 of *Protoplasmatologia, Handbuch der Protoplasmaforschung.* N. P. Badenhuizen. Springer, Berlin, 1959. 74 pp. $5.95.

Differenciation des cellules sexuelles et fecondation chez les Phanerogames. vol. 7 of *Protoplasmatologia, Handbuch der Protoplasmaforschung.* Bernard Varzart. Springer, Berlin, 1958. 158 pp. $10.50.

Educators Guide to Free Films. Compiled and edited by Mary Foley Horkheimer and John W. Diffor. Educators Progress Service, Randolph, Wis., ed. 19, 1959. 639 pp. $6.

Frost, Drought, and Heat Resistance. vol. 8 of *Protoplasmatologia, Handbuch der Protoplasmaforschung.* J. Levitt. Springer, Berlin, 1958. 87 pp. $5.95.

Die Gefässarchitektur der Niere. A. Von Kügelgen, B. Kuhlo, W. Kuhlo, Kl.-J. Otto. Thieme, Stuttgart, Germany, 1959. 111 pp. $8.95.

Laboratory Manual for General Bacteriology. Compiled by George L. Peltier, Carl E. Georgi, Lawrence F. Lindgren. Wiley, New York; Chapman & Hall, London, ed. 5, 1959. 295 pp. $4.50.

Nuclear Engineering pt. 5. Chem. Eng. Progr. Symp. Ser. No. 22, vol. 55. American Inst. of Physics, New York, 1959. 199 pp.

Ontogeny of the Inflorescence and the Flower in Drimys Winteri Var Chilensis. Publ. in Botany, vol. 30, No. 4, Shirley Cotter Tucker. Univ. of California Press, Berkeley, 1959. 80 pp. $1.50.

Publications of Field Museum of Natural History. Finding index. Zoological Ser., vol. 25, pt. 4. Reuben Myron Strong. Field Museum of Natural History, Chicago, 1959. 185 pp. $2.75.

Radioisotopes in the Service of Man. Fernand Lot. United Nations Educational, Scientific and Cultural Organization, Paris, 1959 (order from Columbia Univ. Press, New York). 84 pp. $1.

Les Regulations Physiologiques. Essai de revision biométrique du problème de l'homéostasie. Eugene Schreider. Office International de Documentation et Librairie, Paris, 1958. 89 pp.

A Review of the Genus Hoplomys *(Thick-Spined Rats), with Description of a New Form from Isla Escudo de Veragus, Panama.* Misc. Collections, vol. 139, No. 4. Charles O. Handley, Jr. Smithsonian Institution, Washington 25, 1959. 10 pp.

The Schoolhouse Disasters. Family and community determinants of the child's response to disaster. NAS-NRC Publ. No. 554. Helen Swick Perry and Stewart E. Perry. National Acad. of Sciences–National Research Council, Washington 25, 1959. 66 pp. $1.50.

Science for the Academically Talented Student in Secondary School. Robert R. Donaldson, chairman, National Education Assoc., Washington, D.C. 63 pp. $0.60.

Series of Syllabi in Social Gerontology. No. 1, "The economics of an aging population," Walter H. Franke and Richard C. Wilcock, 57 pp.; No. 2, "The psychological aspects of aging," Raymond G. Kuhlen and Woodrow W. Morris, 30 pp.; No. 3, "The sociology of aging and the aged," Irving L. Webber and Gordon F. Streib, 35 pp.; No. 4, "Social welfare and the aged," Gordon J. Aldridge and Fedele F. Fauri, 51 pp.; No. 5, "An interdisciplinary course in social gerontology," Bernice L. Neugarten, Robert J. Havinghurst, Claire F. Ryder, 40 pp. Inst. for Social Gerontology, Univ. of Michigan, Ann Arbor, 1959.