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.