sity, have involved the use of much more technical language than was required in the present five volumes. Moreover, the beginning of the 20th century signalized a new technological revolution—hence, an essentially new story. It marked the beginnings of modern transport, by land and air; the great development of the electrical and eventually of the electronics industries; and, finally, the revolution that is stemming from control of the atom, of a magnitude not yet fully realized.

For this and similar reasons it was wise to end this huge project at the beginning of our own era. We must simply be grateful to the editors and the many writers for having so expertly and attractively produced these five outstanding volumes. Finally, a special vote of thanks must be extended to the Imperial Chemical Industries Limited, without whose thoughtful foresight and support this *History* would never have been written.

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East and West in India's Development. Wilfred Malenbaum. National Planning Association Washington, D.C., 1959. xi + 67 pp. $1.75.

The National Planning Association's project on the economics of coexistence was initiated in 1956 to investigate Soviet trade-and-aid programs in uncommitted countries of Asia and the Middle East and to evaluate, if possible, both the impact of this Soviet "competitive coexistence" drive and the capability of the Communist bloc for further expansion. As a preliminary to the preparation of a more general analysis, the project commissioned a series of studies of countries and areas, of which this one on India is the third to be published.

The crux of the Indian problem, according to Malenbaum, is whether or not the country can modernize itself by democratic means—in contrast to the totalitarian techniques used by the Soviet Union and China—and thus not only preserve its own form of government but also set an example for the rest of the underdeveloped world. To date, Malenbaum points out, the results have been mixed: progress during the first Five Year Plan was encouraging, but the country's financial resources were insufficient for the ambitious targets of the Second Plan period that began in 1956. Despite stepped-up aid from the West, the plan targets had to be cut back to a hard core. Now the question is whether this limited success, achieved with great effort, is the best that can be hoped for, and whether it is perhaps a Pyrrhic victory.

The Soviet Union, appearing on the scene in India at a critical moment with its own "trade-and-aid" program, emphasized what underdeveloped countries consider to be the hard prerequisite for rapid industrialization: steel, and other heavy industry, in addition to exploration of resources. This accent on hard prerequisites, according to Malenbaum, may warp the pattern of future development in India in two ways: by lessening the emphasis on greater productivity and by letting the effects of the exchange shortage fall most heavily on private industry, which has surprised the planners by a rigorous initiative that exceeded expectations and targets.

What is at stake, then, is not simply a minimal success but also the long-run prospects for economic development in India. The Soviet bloc might well benefit either from total failure in India or from resort to more authoritarian methods during a successful drive toward modernization. The West, on the other hand, can benefit only if a balance is maintained between economic achievement and democratic method.

Under these circumstances, Malenbaum feels, it would be highly desirable for the West to initiate, with India, a coordinated effort for ensuring a broad balance of development, both within the Second Five Year Plan and within the design for the forthcoming Third Five Year Plan. This is an argument which, in its own interests, the West cannot afford to ignore.

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Excursion Flora of the British Isles. A. R. Clapham, T. G. Tutin, E. F. Warburg. Cambridge University Press, New York, 1959. xxxiii + 579 pp. $4.50.

This is a condensation of the same authors' *Flora of the British Isles,* and, like that excellent volume, this one has already found an enthusiastic audience.

Artificial keys to family groups, keys to genera and to species, short descriptions of "all species that are generally common in lowland districts of the British Isles," a glossary, and an index make up the contents. Omitted from the *Flora* are text figures and descriptions of the less common species, as well as data of interest principally to the professional botanist.

The typography is exceptionally clear, and because of the light-weight paper used, this is a very small volume which will easily fit into the field packs and knapsacks of the astonishingly large number of amateur field botanists who study Britain's flora.

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Program for College Preparatory Mathematics. Report of the Commission on Mathematics. College Entrance Examination Board, Princeton, N.J., 1959. 63 pp. + *Appendices* (bound separately). 231 pp. $1 each.

The Commission on Mathematics was established by the College Entrance Examination Board in 1955 because "it felt that curricular reform in secondary school mathematics was long overdue, and that the Board, as an agency representing both colleges and secondary schools, could and should use its influence to improve the current situation." Accordingly, the commission, composed of representatives from universities and secondary schools and with the financial support of the Carnegie Corporation, presents, after intensive scrutiny and study, a proposed new program for secondary-school mathematics.

The commission does not claim that this is *the* new program, nor does it believe that a sudden change is either practicable or desirable. But this report does indicate the lines along which the commission feels progress should be made.

After describing the urgent need for curricular revision and stating the premises, the commission's report outlines the prerequisite mathematics assumed, gives proposed sequences for grades 9 through 12, and discusses the vital role of teacher education and the articulation of school and college mathematics.

In brief, they summarize their proposed program as follows: "1. Strong preparation, *both* in concepts *and* in skills, for college mathematics at the level of calculus and analytic geometry 2. Understanding of the nature and role of deductive reasoning—in algebra as well as in geometry 3. Appreciation of

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.