ical or economic interest. Gas-liquid chromatography and electron-capture detectors probably could provide accurate qualitative and quantitative assays of the volatile halogen compounds in oils, and variations in the organic solutes of formation waters, which may define the proximities of oil deposits, could most likely be determined chromatographically and spectroscopically. Such reliable and effective analytical methods, however, were not employed by the Russian investigators who report their work in this volume, and the findings generally lack the sound experimental foundations that characterize constructive scientific endeavors.

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A Comprehensive Résumé

Ferromagnetic-Relaxation Theory. Marshall Sparks. McGraw-Hill, New York, 1964. xii + 227 pp. Illus. $12.50.

It is now almost 20 years since J. H. E. Griffiths discovered ferromagnetic resonance, and nearly 10 years since the appearance of yttrium iron garnet. The discovery of that admirable material made it possible to do a variety of experiments whose interpretation was for the first time reasonably clear-cut. The subject entered on its liveliest phase, and many of the main insights into relaxation processes, instability phenomena, and the resonant spectrum date from that period. During the intervening years, great activity has centered on refining experiments and the working out of the theory in detail (the present work provides a selective bibliography of approximately 250 references).

The stage has now been reached at which it is reasonable to produce a survey of the entire field. Sparks, who has contributed extensively to the theory, has written an admirably lucid and comprehensive account of these developments, which appears to include work done up to mid-1964. It contains a good account of all the assortment of relaxation mechanisms that have been suggested and carefully relates them to the experiments.

One of the author's objectives was to provide an account of the subject which can be read by a newcomer to the field. Thus, the first four sections describe ferromagnetic resonance, relaxation, and spin waves in relatively simple language, with emphasis on the acquisition of a set of operating concepts. In particular, the picture of relaxation as a series of processes involving the splitting and fusion of various quasi-particles (magnons and phonons) is emphasized. Methods of measuring relaxation times are also treated.

In the next section two-magnon and three-magnon processes are discussed in general, with a full exposition of surface scattering by pits. Some specific relaxation mechanisms operative in insulators are considered in sections 6 and 7. The valence exchange process operative in spinels is discussed in terms of Clogston's theory, which probably has a wider validity. The effects of impurities, such as the rare earths, are treated under the somewhat controversial headings of "slow" and "fast" relaxers. (The dust has not yet settled on this part of the subject.) The effects of atomic disorder, the dipole narrowing of inhomogeneously broadened lines, the Kasuya-Le Craw process, and eddy current broadening are also considered. The present experimental evidence in yttrium iron garnet is interpreted in terms of the various available mechanisms. High power instabilities and parallel pumping are considered in the final section.

The book is well produced, and the only errors that I noted were one or two liberties (in the bibliography) with the initials of some authors.

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Cytogenetics and Radiobiology

Mammalian Cytogenetics and Related Problems in Radiobiology. C. Pavan, C. Chagas, O. Frota-Pessoa, and L. R. Caldas, Eds. Pergamon, London; Macmillan, New York, 1964. xviii + 427 pp. Illus. $15.

This volume contains the proceedings of two symposia held in Brazil—one at São Paulo and the other at Rio de Janeiro—in October 1962. Of the 27 chapters, 19 are devoted to cytology and cytogenetics, and 8 deal with diverse topics in radiobiology. A few of the articles are short useful reviews of the status of particular areas—for example, Eagle's brief discussion of mammalian cell nutrition in vitro and Gartler's evaluation of the utilization of mammalian cell culture for somatic cell genetics. This type of article forms the main strength of the book. Many of the contributions are research reports which, for the most part, are too brief, narrow in focus, and fragmentary to be of much help to a reader who is trying to gain a general picture of the field. Papers of this type should be published in a regular journal rather than in a book.

The subject matter of the papers is even more diverse than one usually encounters in a symposium volume (varying from "The chromosomes of the Brazilian opossum" to the "Action of streptomycin on phage development in *Staphylococcus albus*," and to the "Modification of radiation effects in Ehrlich ascites tumors by oxygen or sodium azide"); a central theme is at best only vaguely developed. Although the symposia most likely succeeded in stimulating communication and were useful to the participants, the justification for publishing the papers is certainly less clear. Much of the information and many of the ideas are available in other reviews; there is in fact very little that is new in the volume. Moreover, in a field that is progressing as rapidly as mammalian cytogenetics, a long delay between the preparation of a manuscript and its publication is a serious fault. The meetings were held in late 1962, and the volume was published late in 1964. There are almost no references to work published after 1962. Although 25 percent of the references cite 1962 publications, virtually no 1963 references are cited, all of which suggests that the book was much out of date at the time of its appearance. The volume is, in addition, cluttered by discussions of papers (which were made from the floor) and by the proceedings of a round-table session.

The delay in publication will seriously decrease the usefulness of the volume to the specialists in the various areas, and the diverse, fragmentary nature of the subject matter will probably discourage the nonspecialist from reading more than a few of the chapters.

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