traditional textboks, are covered in this book also. These include the anatomy and physiology of the speech mechanism, phonetics, acoustics, gesture and body movement in speaking, the organization of speeches, types of speeches, motivational appeals, and oral style.

The level at which the authors treat their subject is definitely introductory; they state in the preface that their coverage of subject matter is "general in nature and limited in detail" and that they assume the student will eventually take more advanced courses. It is a sobering comment on our high schools that a beginning textbook at the college level, even one written by authors whose sensitivity to the depths and ramifications of their field is clearly evident, would reflect as much regard as this one does for the representative freshman's unfamiliarity with anything resembling substantial knowledge and the discipline involved in theorizing.

The major purpose of the authors appears to be that of stimulating the student's interest in speech, and they provide an abundance of practical exercises, materials to be analyzed and evaluated, and suggestions for speaking performances. Moreover, as has been suggested, they introduce the student to ways of thinking about thinking and talking about talking that are decidedly likely to be corrosive of apathy and self-satisfaction. After studying this book it should be harder for the student to feel at home at home and easier for him to live comfortably, and even a bit creatively perhaps, in mid-air, which is where modern men seem to have taken up their abode for the foreseeable future.

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Methods of Quantitative Micro-Analysis. R. F. Milton and W. A. Waters, Eds. St. Martin's, New York, and Arnold, London, ed. 2, 1955. xi + 742 pp. Illus. $15.

Quantitative microanalysis has grown so rapidly that the editors found it necessary to revise and expand the first edition of this book, which appeared in 1949. Two chapters have been added: one dealing with chromatographic analysis and the other describing microbiological techniques, each written by specialists in the respective field. Of necessity only comprehensive presentations of typical examples of each experimental method have been included, but each has been augmented by fully referenced tables of similar published analytic procedures placed at the end of each chapter. Thus it has been possible to present a representative account of modern microanalysis in one volume.

The book consists of eight parts and covers the following topics: gravimetric and general microchemical techniques, microanalysis of organic compounds, volumetric analysis, colorimetric analysis, electrochemical methods of microanalysis, gasometric methods of microanalysis, chromatographic analysis, and biological methods of microanalysis. Apparatus and the presentation of data are well illustrated with figures. Author and subject indexes conclude the book. The printing, paper, and binding are good.

The second edition of this valuable book will be welcomed by all analysts who make use of microtechniques.

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Elementary Theory of Nuclear Shell Structure. Maria Goeppert Mayer and J. Hans D. Jensen. Wiley, New York; Chapman & Hall, London, 1955. xiv + 269 pp. Illus. $7.75.

This is a good book for those who want to evaluate the current status of the nuclear shell model and for those who want to get a short, clear summary of the fundamental concepts and salient facts of nuclear physics today.

Since the proposal of the shell model in its present form in 1949, mainly by the authors of this monograph, it has become a dominant idea in nuclear physics. Although it is not yet derivable from laws about nuclear forces, it nevertheless provides a satisfactory framework for systematizing hundreds of facts about both stable and radioactive nuclei. It is perhaps the concept most used by the nuclear scientist today in assimilating new data. Do they or do they not conform to shell-model expectations? If not, are they related to other misfits?

Here will be found comprehensive discussions of nuclear moments, beta decay, gamma radiation, and light nuclei in relation to the model. Conveniently collected in this one book are Schmidt diagrams, graphs showing variation as a function of nucleon number of quadrupole moments, isotope shifts, energies of first excited states of even-even nuclei, tables of ground state data, beta-decay data, stripping-process data, and so on. The authors realize that a possible step toward understanding why the shell model works so well is the assessment of its breakdowns. The failures of the model are carefully pointed out. Some of the individual chapters have interesting summaries, but there is no over-all summing up.

The experienced scientist may be disappointed at the lack of a fairly complete bibliography of theoretical papers related to the model. The authors excuse this deficiency on the grounds that the book is intended as an introduction and not as a compilation.

The brevity and compactness will appeal to the beginning student or nuclear technologist who wants to familiarize himself with ideas fundamental in all nuclear discussions today. For the newcomer this book offers many short, but beautifully clear, explanations of such concepts as parity, isobaric spin, pairing energy, nuclear matrix element. There is a convenient review of atomic structure to help with the nuclear ideas. Acquaintance with quantum mechanics is taken for granted. Mathematical details are not omitted but are collected in several appendixes. Indeed, as the authors clearly intend, the novice can gain, with the help of this book, a pretty good working knowledge of the main facts about radioactivity and stable nuclei. He will find quickly in what a spectacular way many of these facts are given order and meaning by the shell model and will learn certain of the limitations of this systematization. These perceptions will illuminate the whole field of nuclear physics for him and will perhaps lead him to the deeper understanding of nuclear structure we are all seeking today.

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Canadian Cancer Conference. vol. I. Proceedings of the first Canadian Cancer Research Conference, Honey Harbour, Ontario, 16 June 1954. R. W. Begg, Ed. Academic Press, New York, 1955. xii + 443 pp. Illus. $8.80.

The Canadian National Cancer Institute ensembled grantees and research fellows from all over the country to a 4-day informative conference in which 33 Canadian, one Danish, and seven United States scientists discussed results and methods of experimental cancer research. The main issues were induction and transplantation of tumors (8 papers), tumor-host relationship (9 papers), enzymes and metabolism (9 papers), and biological effects of ionizing radiations (3 papers). In some studies, developments in the respective fields were extensively reviewed (Andervont, Armstrong, Furth, Johns, McHenry, Mider, More, Parker, Quastel, Rossiter); in others impressive accounts were given on laboratory research in Canada (Allard, Begg, Cantero, Franks and associates, Goranson, McEwen, Selye, Skipper, Skoryna and others).

Four papers dealt with human cancer and cancer in general. The conference

got the most thorough up-to-date surveys on epidemiology of lung cancer (Hueper) and of lung cancer in Canada (Phillips). Engelbreth-Holm thoughtfully spoke on classification of tumors, but some of his statements are conflicting with facts—for example, "the presexual years are noteworthy in freedom from tumor development"—and some other statements are questionable—for example, "the differentiation may be changed, but always in the form of a decline." (In man, no age is free of cancer, and early childhood, up to 4 years, has even a higher frequency than later childhood. Differentiation may proceed in some tumors, for instance in sympathoneuroblastoma, up to the point of maturation.)

The most difficult problem—the nature of cancer—was reserved for P. E. Steiner. In his excellently organized paper, he diligently argued point for point against current theories such as embryonal rests, virus, mutation, and chemical theories, suggesting instead *parthenogenesis in somatic cells* as a theory that meets all objections. In my opinion the conference should have been told by Steiner that his theory is a revival of Boveri's 40-year-old concept, experimentally supported by Fr. Levy (see my *Cancer in Man* pp. 496–497).

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Letalfaktoren in ihrer Bedeutung für Erbpathologie und Genphysiologie der Entwicklung. Ernst Hadorn. Georg Thieme, Stuttgart, 1955. 338 pp. Illus. $9.30.

The study of hereditary lethal factors has since long occupied a position of particular significance in genetic investigations. Yet, Ernst Hadorn's book presents for the first time a monographic review and critical evaluation of our knowledge of this many-faceted subject. Following introductory terminological discussions, the early chapters of the book deal with types of evidence for and methods of demonstrating the presence of lethal factors, with ways and means of their maintenance, with their origin by natural or induced mutation, and with the chromosomal morphology of lethal factors. Brief discussions are devoted to dominant lethal factors, polyfactorial lethality, and the role of maternal and extranuclear agencies. More extensive reviews are concerned with penetrance and expressivity, modes of transmission and expression, stage specificity of action, specificity with reference to cell types and organs, pleiotropism, cellular autonomy as studied by transplantation and explanation, the evidence from phenocopy experiments, biochemical traits produced by lethal mutants, and metabolic changes in their presence. The question of economic losses caused by lethal factors is given brief consideration, and there is an interesting concluding discussion of the problem of developmental integration of mutations.

This sketchy enumeration of contents may suffice to indicate the comprehensiveness with which the subject has been treated, but it does not bring out the much greater merits of the book, namely, its exceptional clarity of exposition, its masterly integration of all aspects of lethal mutations, and its skillful disclosure of the most serious gaps in our present knowledge. The illustrations, especially a number of very successful diagrams, deserve particular mention.

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Radiation Biology. vol. II, **Ultraviolet and Related Radiations.** Alexander Hollaender, Ed. McGraw-Hill, New York–London, 1955. x + 593 pp. Illus. $8.

This series of three volumes is a present-day version of *The Biological Effects of Radiation* edited by B. M. Duggan, which was published in 1936. Volume II deals mainly with the effects of ultraviolet radiation, but it also includes some material dealing with ionizing radiation. The first half provides a general background of information on radiation, and the second half covers various biological effects of radiation. Topics not found in the earlier work include radiation of virus, photoreactivation, induction of cancer and sunburn.

The various subjects are covered very completely, for example the chapter on solar radiation includes a brief description of x-ray and radio emission from the sun. Most of the work of the period 1936 to 1951 is critically reviewed, and extensive lists of references are given. Several of the authors have made very skillful use of tables in presenting summaries of related papers. In addition, most of the authors present summaries of the present state of knowledge in their respective fields.

It is unfortunate that the publication of this volume required so much time; most of the articles are dated 1951 or 1952. The value of review articles decreases with a "half-life" of perhaps 7 years, so a 3-year delay causes a serious loss. With the present mass production of scientific literature, however, volumes such as this that summarize a vast quantity of information are indispensable.

Titles of the chapters are as follows: "Photochemistry," Robert Livingston; "Practical applications and sources of ultraviolet energy," L. J. Buttolph; "Sunlight as a source of radiation," J. A. Sanderson and Edward O. Hulburt; "Technique of study of biological effects of ultraviolet radiation," Jesse F. Scott and Robert L. Sinsheimer; "Ultraviolet absorption spectra," Robert L. Sinsheimer; "A critique of cytochemical methods," A. W. Pollister; "The effect of ultraviolet radiation on the genes and chromosomes of higher organisms," C. P. Swanson and L. J. Stadler; "The effects of radiation on protozoa and the eggs of invertebrates other than insects," Richard F. Kimball; "Radiation and viruses," S. E. Luria; "Effects of radiation on bacteria,' M. R. Zelle and Alexander Hollaender; "Radiation studies on fungi," Seymour Pomper and Kimball C. Atwood; "Photoreactivation," Renato Dulbecco; "Sunburn," Harold F. Blum; and "Ultraviolet radiation and cancer," Harold F. Blum.

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Aux Confins de la Vie. Perspectives sur la biologie des virus. P. Morand. Masson, Paris, 1955. 171 pp. F. 850.

This small French book, with the appropriate subtitle "Perspectives on the biology of viruses," appears to have been written for a sophisticated audience of nonspecialists by an exceptionally well-read nonspecialist. Both its merits and defects stem from the fact that its author is not a "practicing virologist." Its merits are unabashed enthusiasm, lack of axes to grind in any specific area of the subject, and willingness to make rapid transitions from the factual to the speculative and on to the philosophic. Its defects are the relative high incidence of minor factual mistakes and, more basic, the lack of informed discrimination among contributions and opinions of varying standing and actuality. Altogether, however, this is high-class, stimulating, semipopular science writing, deriving its appeal from the world of ideas rather than from the realm of practical interests, to which most popular science books seem to cater.

The subject matter is divided into three major sections, dealing with viruses as physical, chemical, and biological entities, respectively. These are preceded and followed by shorter, more speculative chapters. The author succeeds in condensing into these few pages an amazing amount of the information that biologists and biochemists today consider essential to the study of virology as a fundamental science. Much of the condensed material has been predigested somewhat hastily and is more likely to