volumes contain a great wealth of valuable information for all categories of nutritionists and especially for those who are concerned with enzymology and intermediary metabolism. The discussions are extensively documented with tables, figures, and references to the literature. In general, the writing is clear, readable, and remarkably free from errors. The organization and format are good. All students of the science of nutrition in its many aspects will find the treatise of much value.

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Dvorine Pseudo-Isochromatic Plates. Israel Dvorine. Israel Dvorine, 2328 Eutaw Place, Baltimore, Md., ed. 2, 1953. $12.

This is a conventional type of color-vision test, identical in principle and similar in appearance to earlier pseudo-isochromatic plate tests, such as those of Stilling, Ishihara, and the American Optical Company. By way of explanation, it may be noted that a pseudo-isochromatic plate is a figure and ground composed of many small disks or dots of irregularly varied color and size; ideally, there is enough hue difference between the figure and ground to permit the color normal to distinguish the figure but not enough for the color blind.

The Dvorine test plates are assembled in a six-ring binder between hard covers about 7 in. square. The first section contains 15 number plates, including a demonstration plate with a number anyone can read. The second section, headed "Alternate testing plates," contains eight trial plates in which the figure to be identified is not a number but rather an irregular path to be traced by the testee. The sections of plates are preceded by instructions regarding illumination and administration and a sample score sheet. Incorrect responses to three or more plates of the first section or to two or more plates of the second section are said to indicate defective color vision.

An advantageous detail that is not found in most tests of this type is the loose-leaf binder, which permits rearrangement of the plates to baffle malingerers. The similarity of the dot patterns on all plates is designed to provide another stumbling block for the unscrupulous. Such devices augment the difficulty of responding to secondary criterions rather than to the test figures themselves. On the other hand, the Dvorine test lacks a valuable diagnostic feature of the Ishihara test, namely, the double identification plate. Such a plate is difficult to produce, but it affords the double check of presenting different figures that are readable, respectively, by persons with normal color vision and those with abnormal color vision.

The Dvorine test is similar to the new edition of the Ishihara test in respect to an especially important limitation—there remains to be published validation data to demonstrate whether or not, or how well, the test does detect defective color vision. In view of this limitation, several of the deviser's representations cannot be accepted, at least at the present time. They include the assertions that this is the most sensitive test yet devised for red-green color blindness, that certain specific critical scores (mentioned earlier) separate the normals from the color weak, and that as few as two or three plates suffice to diagnose specific protanoid and deuteranoid types.

A review of a test can scarcely be of value to readers interested in using tests unless it provides some indication of validity. Therefore, I sought to secure, by reference to a few unpublished data, some advance idea of what a proper validation of this test might eventually reveal. Number-plates tests of 47 color-deficient and 16 normal subjects (most of which were made by Louise Sloan and others at Eastman Kodak Company) seem to indicate that the Dvorine test compares quite favorably with better tests of this type. There was only a single case of misclassification and this particular case also had given trouble in other plate tests.

The relationships between the first and second editions are not without interest. The present edition includes four plates that, to persons with normal vision, appear to be essentially identical to the plates in the first edition. All the present plates, however, are said to be new printings. A more significant point, perhaps, is the fact that the first edition was associated with an abortive effort to improve color vision by training, whereas the present edition is presented simply as a test of color vision without any claim to a special capacity to modify the testee's status. As such, it may well prove to be a satisfactory screening test.

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Sea-Birds. An introduction to the natural history of the sea-birds of the North Atlantic. James Fisher and R. M. Lockley. Houghton Mifflin, Boston, 1954. xvi + 320 pp. Illus. + plates. $6.

This is a review of the sea-birds that nest on the shores of the North Atlantic from the Arctic Ocean to the equator, with special reference to their habits and place in nature. All must lay their eggs on land, and many do so in spectacularly crowded colonies at some favorable spot. The characters of at least their major nesting stations on the circumference of the North Atlantic, and the species pertaining to each, are considered, with somewhat greater emphasis on the northeast quadrant of the ocean, which is presumably most familiar to the authors.

A chapter on "Sea-birds, numbers and man" shows that man is their greatest enemy and introduces data on which the conservation of sea-birds may well be based. A companion chapter on "What controls the numbers of sea-birds?" sets forth the argument that food supply is the chief factor, and it undoubtedly is an obvious and very important factor and states that species, however closely related, when successful

in the same area, do not compete directly in food and feeding habits.

Sea-Birds is disappointing as a reference work. Related items of data are inextricably scattered throughout the book, and after reading them once, I found that the index, which is systematic and not alphabetical, was of little help in finding the items again. Both the vernacular (more or less local) nomenclature and the technical (apparently up-to-date) nomenclature are used confusingly and without explanation. Without previous knowledge of the subject, it would sometimes be difficult to know exactly which bird is being referred to.

However, it is a book that should stimulate interest and be enjoyed by any bird-minded reader to whom sea-birds are relatively little known. Its appeal is enhanced by many excellent portrait photographs of the diverse species and of their colonies. Furthermore, in browsing through its pages, a serious student of sea-birds can hardly fail to find data and ideas of value, especially where these are firsthand and not gleaned from the literature.

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The Structure of Metals and Alloys. Wilhelm Hume-Rothery and G. V. Raynor. Monogr. and Rept. Ser. No. 1, Institute of Metals, London, ed. 3, 1954. viii + 363 pp. Illus. + plates. $5.50.

This is really a new book, although it is called the third edition of Hume-Rothery's book, which was first published in 1936 as a brief book of some 120 pages (second edition in 1944). Hume-Rothery and Raynor are now the authors, and the text is about 3 times the size of the second edition. Whereas the first edition was addressed both to the research man and the practical metallurgist, the new edition is a survey of the modern approach to metallurgy, and as such it should help the practicing metallurgist to understand the electronic background and its consequences.

A brief chapter on the structure of the elements is followed by a chapter on atomic radii and some physical properties of the elements, these chapters are followed by some 70 pages on primary metallic solid solutions and some 40 pages on intermediate phases and alloy systems. Part 6 (some 50 pages) "The structure of the alloys of iron" is entirely new, and the last part, "Imperfections in crystals and deviations from the ideal lattice," has been considerably enlarged and brought up to date to give the main ideas of the theory of dislocations and their applications.

Both authors are well known, not only for their scientific research in the field, but also for their success in bringing the background of modern physics to the attention of the practicing metallurgist. An introduction to the *Electron Theory of Metals* by Raynor is Monograph No. 4 of this series, and Hume-Rothery has contributed in Monograph No. 3, *The Atomic Theory for Students of Metallurgy*. In 1948, Hume-Rothery also published, in the form of a dialogue, a discussion of the modern approach to metallurgy, entitled "Electrons, atoms, metals, and alloys." I am mentioning these monographs by Raynor and Hume-Rothery because I feel that the study of the present book would gain considerably if some of the background available in the other two books were available to the reader. I do not think that the mathematics that is used in the others is such that the practicing metallurgist would be frightened away, and it would help considerably in understanding the large amount of material that has been put together in this new work, which is entirely nonmathematical and more or less descriptive.

Therefore, it might be well to recall the cautious advice from the preface of Raynor's *Electron Theory of Metals*.

> The reader will not finish this monograph, therefore, with the feeling that he can immediately do research in metal physics. Nor will he necessarily be able to understand, without assistance or interpretation, probable future advances. He will, it is hoped, be more at ease with some of the more modern ideas, and the way they are being applied. He should have some idea of what has been achieved by their use in metallurgy, and in what directions future progress is likely.

The amount of material is so large and the number of references is so extensive that it should be possible for the reader to find out about almost any of the modern concepts that are of importance in present-day metallurgy. The book can be recommended for the physicist who wants to understand the problems of the metallurgist and the metallurgist who wants to become acquainted with the approach of modern physics to his problem.

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Linear Operators. Richard G. Cooke. Macmillan, London; St Martin's Press, New York, 1953. 454 pp. $10.

The theory of discrete and continuous eigenvalue expansions associated with Hermitian linear operators in Hilbert space has long been recognized as one of the mathematical disciplines fundamental to quantum mechanics. Five of the seven chapters of Cooke's book are devoted to an exposition of this important mathematical theory; the remaining two chapters contain brief discussions of various related topics.

Chapter 2 gives a somewhat hurried statement of the physical applications of the pure mathematics of the remainder of the book, treating several standard problems (harmonic oscillator, perturbation theory, anharmonic oscillator) from both the Heisenberg and the Schrödinger points of view, and giving a more careful description of the continuous spectrum than is ordinarily found in "physical" analyses.

Aside from Chapter 2, the first part of the book is organized around Chapters 4 and 5 and around the idea of giving a large number of different proofs of