although there is some duplication because references are listed at the end of each chapter. Up to about the end of 1964 the references are fairly complete. Thereafter the coverage is much less exhaustive—for instance, sometimes the author cites abstracts of papers presented at meetings rather than the subsequent published papers. It is claimed that the tables, which occupy more than eight pages, "list virtually every phosphonium ylid reported in the literature with the exception of [the] few in which the ylid bond is incorporated in a ring system." A casual check revealed that at least one is missing, namely α-triphenylphosphoranyl-γ-butyrolactone [S. Fliszar, R. F. Hudson, G. Salvadori, *Helv. Chim. Acta* **46**, 1580 (1963)]. An excellent feature of the book is the attempt by the author to find general principles governing ylid chemistry. Occasionally, however (as can be expected in such a fast-moving field), generalizations are made and conclusions drawn which are too sweeping and simply not correct—for example, on page 225, "Iminophosphoranes can be readily alkylated with alkyl halides." Unfortunately one can alkylate iminophosphoranes only with methyl or ethyl halides. Higher alkyl halides such as *n*-propyl halide are dehydrohalogenated by the phosphoranes, yielding alkylaminophosphonium salts instead. Since the concept of *d*-orbital resonance is often used to explain reactions and mechanisms, the lack of a chapter on *d*-orbital bonding is unfortunate (it may, however, be the result of an editorial decision, for Hudson's book in the series includes an excellent one). After taking note of these few errors, omissions, and ambiguities I felt I had just finished reading a good and solid book.

In summary, then, the author has presented ylid chemistry in a remarkably up-to-date and readable manner. Every chemist who is involved in organic and organometallic synthesis can benefit from this book. Graduate students, in our reaction-mechanism-emphasizing times, will find a host of new approaches to the synthesis of difficult structures by a method which so far has been mentioned only too briefly in their texts. Those already working in the field can use this book as a convenient key to its literature, and those who want to get acquainted with ylid chemistry will find it a good and trustworthy guide.

HANS ZIMMER
Department of Chemistry, University of Cincinnati, Cincinnati, Ohio

Catalog of Genetic Variations

Mendelian Inheritance in Man. Catalogs of Autosomal Dominant, Autosomal Recessive, and X-Linked Phenotypes. VICTOR A. MCKUSICK. Johns Hopkins Press, Baltimore, 1966. 364 pp. $8.

The conclusion expressed in several introductory textbooks that man is not a particularly suitable object for the study of genetics has lost a good deal of cogency. It is possible that mouse hemoglobins might have led to the concept of "molecular disease" as formulated by Pauling, had the mutation which produces sickle cell anemia occurred in *Mus musculus* instead of man. It is surely conceivable that the metabolic pathway for tyrosine metabolism would have been defined if man suffered no such infirmities as alkaptonuria, phenylketonuria, and albinism. Nonetheless, these diseases and many more have added the stimulus of medical responsibility to that of intellectual curiosity in studies that are providing important information about genetic mechanisms.

The need for a work like *Mendelian Inheritance in Man* has long been apparent. The most recent publication in English that has attempted to summarize all of the genetic variations in man, Gates's *Human Genetics,* was last published in 1946. When one considers that Gates's was a large, two-volume work and that 20 years of productive research in genetics has intervened, it is surprising that the present summary could be condensed to one volume of 364 pages.

McKusick has limited the entities covered in these catalogs to those which follow Mendelian patterns of inheritance with certainty (designated by an asterisk and totaling 574) and those for which the evidence seems sufficiently strong (totaling 913). He has further confined the catalog of recessives mainly to rare phenotypes, that is, those for which the homozygote frequency is 1 in 1000 or less. The total of 1487 have been separated into dominant and recessive as these terms were defined by Mendel and into autosomal and X-linked. In his foreword the author estimates that the 837 dominant, 531 recessive, and 119 X-linked phenotypes listed reveal only a small portion of the genetic loci of man, "perhaps only 1 per cent of the whole." He concludes his foreword with the statement: "I have no illusions of either the infallibility or the completeness of these catalogs. I will appreciate suggestions for increasing the usefulness of the catalogs and would like to have errors and omissions called to my attention."

This is a scholarly and thorough collection of knowledge, as of June 1966, of man's genome as manifested in the phenotypes which have been described. Shortcomings result largely from unavailability of information. The task of accumulating and judging that information which is available was sufficient to require a program for storage on magnetic tape in order to facilitate revision and republication. The bulk of the volume is made up of the IBM printout with its own idiosyncrasies, such as "Q" for "?" and parentheses to enclose material usually designated by superscripts or subscripts. Each entry includes: (i) the preferred designation (eponyms are cross-referenced in the appendix); (ii) a brief description of the phenotype with a résumé of genetic information; and (iii) key references. The descriptions of the phenotypes range from something as brief as the name of the entity, for example, "Radial heads, posterior dislocation of," to a seven-paragraph discussion of "Testicular feminization syndrome." Most, however, are brief and refer to more extensive descriptions in the references cited. I found little to quibble with in the material presented. The stated intention of describing manifestations in the heterozygote has not been carried out in the entries for several recessive conditions, for example, pyruvate kinase deficiency of erythrocytes and phenylketonuria. The hemoglobinopathies are all included in the dominant catalog, although the genetic mechanism that leads to production of tetramers of β-, γ-, or δ-chains is probably a complicated kind of recessive inheritance. Much more information is needed to complete the presentation of gene frequencies in order to make this collection as useful as it might be in genetic counseling. This body of data will surely change and grow in later editions.

McKusick is to be complimented on the arduous task well done. This book should be in the library of all biologists, medical or other, who are interested in genetics. A word of warning to any who choose to convert their filing systems to conform to the 1000, 2000, 3000 categories used by McKusick to number the alphabetized dominant, recessive, and X-linked entities, respectively: decimals and one or more additional significant figures in

the numerical code to accommodate new entries will surely be necessary by the time of the next edition. It is to be hoped that revised editions will be forthcoming at frequent intervals.

ROBERT D. KOLER
University of Oregon Medical School, Portland

Modern Physics for Students

Atomic and Nuclear Physics. DEREK L. LIVESAY. Blaisdell (Ginn), Waltham, Mass., 1966. 539 pp., illus. $10.50.

A Collection of Problems in Atomic and Nuclear Physics. I. YE. IRODOV. Translated from the second Russian edition by Stevan Dedijer. S. Doniach, Translation Ed. Pergamon, New York, 1966. 249 pp., illus. $9.50.

The course in modern physics has been for some time a standard feature of the undergraduate physics curriculum. Compared to the texts of a decade or two ago many of those now available are considerably more sophisticated in their presentation. Much of the material that was once presented in graduate courses has now been inherited by a senior or even a junior course. This "hardening" is natural. After all, the subject has grown considerably. New concepts and principles have been developed, new areas of investigation even in relatively old and exploited fields have been opened up. Our understanding of older concepts has deepened, and much that was once difficult has with time become both clear and "obvious." In addition, our first-year students arrive with greater resources of knowledge and technique. They know quite a bit of modern physics and are very eager to learn more. It would be a pity, of course, if the increased sophistication of today's modern physics courses was achieved simply by introducing more complication. It is more desirable, but much more difficult, to deepen the content of the course and yet in some sense keep it simple.

Atomic and Nuclear Physics covers the standard set of topics. Perhaps there is more material than usual on the quantum theory of solids. In addition, being the latest book, this one treats, in the chapter on particle physics, the various mesons and hyperon properties. But quantum mechanics, relativity, the atom, the nucleus, and so on—the traditional topics—are all included as well. The level of difficulty is intermediate. The Schroedinger equation, for example, is solved for various bound state situations, but very little attention is paid to a quantitative theory of scattering. The treatment is straightforward, in some places almost to the point of bluntness, although on occasion comparatively subtle points are uncovered. The gain in this style is the comparatively fast pace of the discussion. The material is there. The presentation is clear. It is left to the instructor to refine it, to deepen and broaden it, to point up what is profound. The production of the volume cannot be faulted. The page size is large, the type clear and legible and uncrowded.

The volume by Irodov contains some 850 problems, together with answers and hints for solution. The problems are broken up into chapters covering the usual modern physics material. Each chapter is preceded by a short but by no means complete list of fundamental concepts and formulas needed for the solution of the problems.

The problems are more or less standard in type. One would find similar problems at the end of the chapters of most textbooks on modern physics. There are a few problems in each chapter which essentially verify that the definitions of the symbols in various formulas have been understood. There are some problems that can be used to review a given topic. Not many of the problems require a great extrapolation of concepts to new or novel situations. There are no problems on scattering or reactions besides Rutherford scattering and various kinematic calculations. The problems in nuclear physics are few and quite elementary. The answers for the more complex examples seem to be sufficiently detailed.

HERMAN FESHBACH
Department of Physics, Massachusetts Institute of Technology, Cambridge

Avian Population Dynamics

Population Studies of Birds. DAVID LACK. Oxford University Press, New York, 1966. 247 pp., illus. $10.10.

There is little doubt that bird populations are regulated by density-dependent factors. Not only does the availability of food appear to be the ultimate factor regulating population size in most birds, but at least in many species it appears to be the proximate factor. In *Population Studies of Birds*, David Lack examines in the light of recent studies the theme of his earlier book *The Natural Regulation of Animal Numbers* (Clarendon Press, 1954; now out of print). The present book considers in critical detail work on birds which has appeared since 1952 and which does not duplicate the 1954 effort. Whereas the 1954 book included material on invertebrates and on vertebrates other than birds, the new one deals entirely with population studies of birds. Lack presents the pertinent material from 13 major studies, each of at least four years' duration and consisting of substantially more than an annual census, and from 11 minor studies, each relevant to a major study. The species included are 13 passerine birds, representing insectivorous, graminivorous, and fungivorous forms, and bigamous, promiscuous, and colonial species in addition to the more commonly treated monogamous, solitary nesters; eight other land birds, nearly all territorial nesters, some vegetarians and some carnivores, with nidicolous and nidifugous forms represented; and four sea birds, all colonial, including both inshore and pelagic species.

Eleven of the 13 major studies were done by British workers—nine in Britain and two in the tropics. None of the major studies was American, although four of the five major studies included in the 1954 book were done in North America. This bias in coverage reflects a paucity of such work in the Americas since 1952, not the author's choice.

Lack's decision to restrict the book to birds has permitted him to write in greater depth. He has been successful in baring critical, often limiting, factors for inspection. In summary of his present views he states "(a) that the reproductive rates of birds have been evolved through natural selection and so are in general as rapid as the environment and the birds' capacities allow; (b) that mortality rates balance reproductive rates because bird populations are controlled by density-dependent mortality; (c) that starvation outside the breeding season is much the most important density-dependent factor in wild birds (but not necessarily in other animals); (d) that breeding birds are dispersed broadly in relation to food supplies, through various types of behaviour which are as yet little understood, but which are to be explained by natural selection."

It is apparent that Lack finds food