ships between structure and crystal-chemical aspects of ordered ternary nonmetallic materials within the context of several major compositional families, namely, A_2BX_4, ABX_4 and ABX_3. The physical properties of these materials, which are in many cases of considerable technological importance, are not discussed in this volume. Perhaps such information will appear in volume 2. The final chapter (chapter 5) discusses other ternary structural families in the form of a table three pages long, which does not do justice to some phases (ABX_2 chalcopyrite phases, for example) and completely omits phases of stoichiometry A_3BX_4, AB_2X_3 and A_2BX_3.

Nevertheless, the book is encyclopedic and herein lies its value. It contains a wealth of structural information (lattice constants and other significant structural information), information pertaining to phase transitions and temperature, pressure, compositional ranges of stability, and the role of ionic size in determining phase stability for literally hundreds of phases belonging to the above compositional groupings. Much of the structural information is in the form of tables which comprise about one-half of the book. The formula and subject indexes are quite extensive and easy to use. The referencing is also extensive, although the latest references date only to 1971.

In summary, this volume is primarily bibliographical and will serve as a very useful source of factual information and guide to the literature for the materials covered.

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Classical Dynamics: A Modern Perspective

E. C. G. Sudarshan, N. Mukunda
615 pp. Wiley, New York, 1974. $24.95

This is a very interesting book. But its subtitle should have been "A personal perspective." E. C. G. Sudarshan has made contributions to a variety of areas of theoretical physics, and he has usually brought his own touch to bear on them. One of his prevading mathematical favorites has long been the use of group theory. As a result, we have a book here whose principal perspective is that of Lie group theory and Lie algebras as applied to classical dynamics. The stimulus for such an approach is, of course, the quantum theory, and many things done here have direct analogues in quantum mechanics and in quantum-field theory. The authors explicitly state in their concluding chapter: "We have, in this book, presented classical mechanics as a consistent and closed discipline. We have taken some care in demonstrating the intimate relationship between some of the modern developments like the analysis of the Galilei and Poincaré groups and the fundamental concepts of mechanics. These discussions and expositions are within the classical framework. But much of the inspiration for these efforts came from discoveries and developments in quantum theory, even from particle theory."

An example of the influence of quantum mechanics is the discussion of direct analogues of the Heisenberg, Schrödinger and Dirac pictures in classical mechanics. The phase-space density function in one case is fixed in time and the dynamical variables of the particles vary; in the second case, the density function at a fixed phase-space point depends on the time; in the third case both vary as in the interaction picture. If this example is perhaps a bit of a *tour de force*, others are more natural.

The first quarter of the book consists of an exposition of classical mechanics from the Lagrangian and Hamiltonian points of view. The authors present the variational principles carefully, and there is an excellent and detailed chapter on systems with constraints. The remainder of the book deals with groups and their applications to classical mechanics. Topological groups, Lie groups and Lie algebras are introduced and discussed at length, and so are their realizations as transformation groups. From the classical point of view the theory of group representations is, of course, much less important than it is in quantum mechanics. So there is little attention to representation theory here. However, about 65 pages are spent on the three-dimensional rotation and Euclidean groups, 70 pages on the Galilei group, and 120 pages on the Poincaré group and manifest covariance.

I said at the beginning that this is a very interesting and personal book. It is also, in some respects a rather peculiar one. Perhaps the two characteristics go together. There are practically no references, even when names of relatively recent authors are mentioned. And the price for "perspective" is omissions of some things one might have expected to be included. There is no mention of Emmy Noether. If that is too much to be expected, then how about the "little group" in the long chapter on the Poincaré group? That does not appear anywhere, either. Action-and-angle variables are never mentioned. The most astonishing omission, however, occurs in the discussion of canonical transformations. The view of the time development of a system as a continuously unfolding canonical transformation is, as one would expect, very congenial to the authors. In the course of this discussion they write down what amounts to a Hamilton–Jacobi equation, but there is no mention of those names.

It is clear that this is not a textbook for a graduate course in classical mechanics to compete with H. Goldstein's *Classical Mechanics* (Addison-Wesley, 1965) or Emil Konopinski's *Classical Descriptions of Motion* (W. H. Freeman, 1969). There are no problems, either given or worked out, and no guide to any further literature. On the other hand, I think that as a supplement it could be extremely useful for such a course, or to be read by a PhD or a graduate student after a thorough exposure to quantum mechanics.

The principal attraction of this book is that it is, as the authors say in their preface, "the public declaration of an 'affair of the heart' ... If true beauty implies that she is ever new, then classical dynamics is truly beautiful. And ... this book is an offering to this ever new, ever beautiful object of our love." If some of this passion for a subject sometimes treated too drily is communicated to the reader he will profit by it.

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Physics of Solar Cosmic Rays

K. Sakurai
428 pp. U. of Tokyo Press, 1974. $39.50

The study of solar cosmic rays is a good example of interdisciplinary research in contemporary physics. The active investigator in this field must be conversant with such diverse areas as the physics and morphology of the solar atmosphere, radiative transfer (extending across the spectrum from radio to x-rays, the physical mechanisms responsible for solar radio bursts and nuclear interactions between solar cosmic rays and the atmospheres of the Sun and the Earth. One might therefore anticipate that the story of the development of our current knowledge and understanding of solar cosmic rays would represent exciting reading to a wide range of physicists. K. Sakurai is to be complimented for attempting to bring such a diverse and extensive body of knowledge into one place.

But it is my feeling that Sakurai has not succeeded in describing the physics of solar cosmic rays in a manner that will appeal to the potentially broad readership that the field deserves. For the most part, he has chosen to present his material in the form of a scientific review paper, relying on extensive references to the published literature (over 1100 references are listed at the end of the book). But the reader is too frequently just presented with a reference to a published paper and a statement of the conclusion reached in that paper without any description of the scientific arguments that led to that conclusion. Thus, the uninitiated reader who wishes to approach solar cosmic-ray physics for the first time will gain little from this book except a summary of facts and conclusions. Unfortunately, Sakurai's book will also offer little to the worker who is already involved in one or several areas related to solar cosmic-ray physics, but who wishes to gain a familiarity with the field as a whole. The reason is that much of the material is treated only superficially. For example, the discussion of the solar atmosphere does not consider the chromosphere–corona transition region or magnetic filaments and the influence of flare-associated shock waves on cosmic-ray propagation is not considered. Also, Sakurai does not mention divergences in diffusion theory, and he does not discuss in depth wave–particle interactions as a means of accelerating cosmic rays. Thus, the principal usefulness of this book appears to be the extensive reference list. But here its usefulness is limited by the fact that only 17 percent of the references have been published since 1968, and the price of the book.

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Holography

M. Françon
143 pp. Academic, New York, 1974.
$11.00

The large growth in research and development effort in holography over the past ten years, and its present wide range of applications in optics, acoustics, computers and microwaves undoubtedly played a large part in the decision to award, in 1971, the Nobel Prize in physics to its discoverer Dennis Gabor. For those physicists seeking to broaden their activity to more applied fields in today's research climate, this *moderately* advanced presentation offers a stepping stone about half way between my nonmathematical one (*Lasers and Holography,* Doubleday, 1969) and George Stroke's more advanced one (*Introduction to Coherent Optics and Holography,* Academic, 1969).

M. Françon's first version (in French) of this book appeared in 1969. This translated version, expanded and revised from the French one, includes new