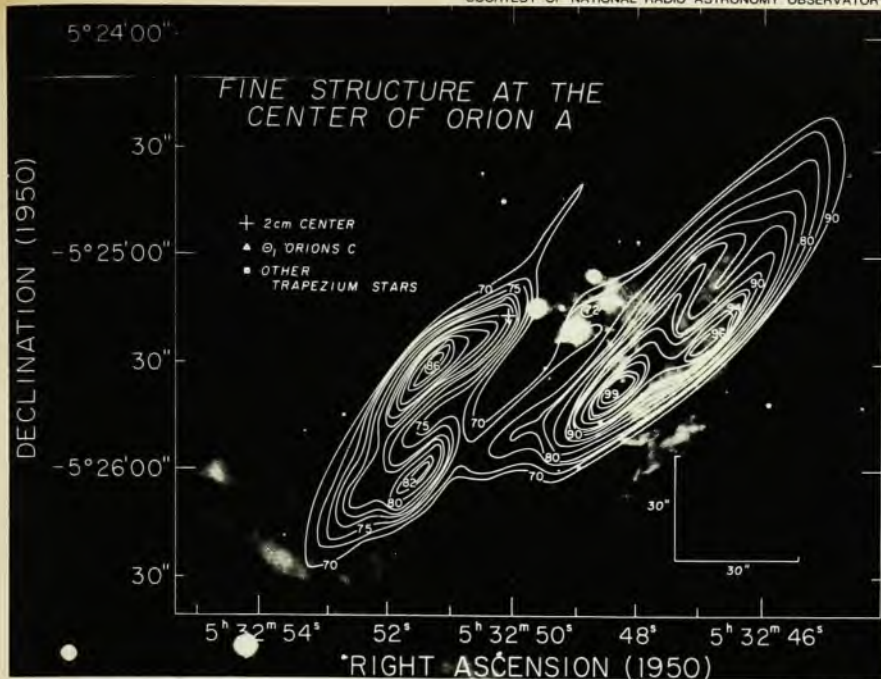




Radio map depicts thermal emission from Orion Nebula. White blocks on the superimposed optical photograph of the nebula mark the bright stars that heat up diffuse surrounding matter.

ry, and why does the book cost so much? For a book that is so expensive, the buyer might expect the material to be written by authors chosen for their expertise and writing ability, without regard to their affiliation. One argument for this restricted choice of authors might be to insure a high degree of uniformity in the chapters. However, the editors point out that such uniformity was not a goal (nor was it achieved). Another argument might be that the authors were chosen to provide articles written from a different viewpoint than one might expect to get from

standard review articles, which often tend to be written by the same author. At the student level for which the book is intended, this diversification would not appear to be justified.

The book is recommended to all serious students of astronomy. It provides a great deal of information and would serve as a source for those undertaking a more extensive study of any of the subjects covered.

ROBERT W. HOBBS

NASA-Goddard Space Flight Center
Greenbelt, Maryland

Positional Astronomy

D. McNally

375 pp. Halsted, New York, 1975. \$15.95

It seems that this book has its origin in the author's frustration. After lecturing on the subject for several years with no really up-to-date text available, the British astronomer Derek McNally, well known through his contributions to astrophysics, decided to try to write one himself. But he remarks in the preface that "It might therefore cause surprise that one who has made no contribution to astrometry should have the temerity to write a book on Positional Astronomy," and he also realizes that in doing so he may have run... "the risk (undoubtedly) of arousing the wrath of my astrometric colleagues..."

Yes, both times.

Although positional astronomy is in-

dispensable for obtaining many data without which there would be no astrophysics, its practice is often tedious and requires the most painstaking attention to detail. Furthermore, the nature of this fundamental field is such that there is very little chance for an astrometrist to become famous overnight by some spectacular discovery. For this and other reasons, it is not a very widely practiced branch of astronomy, and many (especially young) astronomers have the totally mistaken notion that astrometry is not only intrinsically old-fashioned or even obsolete, but that virtually any good astrophysicist can learn in two weeks all there is to positional astronomy, teach meaningful courses and write a book about it. McNally's *oeuvre*, I fear, may be somewhat the outgrowth of this attitude.

This is sad, because the author has missed a golden opportunity—unfortunately so far also missed by the fraterni-

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N. BOGOLUBOV, A. A. LOGUNOV,
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Authorized translation from the Russian by
Stephen A. Fulling and Ludmila G. Popova

The book provides a systematic, self-contained, and modern exposition of axiomatic quantum field theory. It does not require much preliminary knowledge of either mathematics or quantum field theory and leads the reader to the present-day frontiers of the subject. It includes some original methods and results to which the authors have made substantial contributions. A significant amount of this material has been specially written for the English edition.

1975, xxviii, 708 pp., hardbd., \$32.50

Foundations of Quantum Physics*

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This book gives a unified formulation of "quantum" physics, avoiding the commonly accepted division between classical and quantum mechanics. The formalism presented is obtained by taking seriously Einstein's point of view and describing a physical system in terms of "elements of reality."

Chapter 1 describes classical mechanics from this point of view, before introducing a language which is adequate for the purpose of this book. This new language is developed and explained in detail in Chapter 2. Chapter 3 is essentially of a technical nature: it justifies the introduction of Hilbert space as a natural realization of the more abstract structures discussed in the first two chapters. The fourth chapter exposes the theory of measurement and gives the "calculus" of probability which is characteristic to quantum systems. Chapter 5 discusses various applications, including those of different models of Galilean particles. Index.

1976, xii, 123 pp., illus., hardbd., \$17.50;
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1974, xviii, 432 pp., illus., hardbd., \$22.00;
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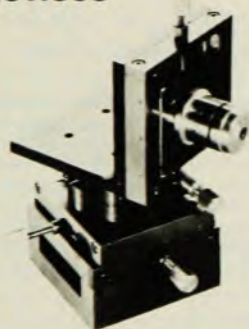
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ty of competent astrometrists—to close a serious gap in the undergraduate literature on this subject. It would have been nice if McNally had managed to show the student that most of positional astronomy consists basically of the relationships between the various coordinate systems that astronomers use. The notation of matrices and vectors, which is an ideal and very simple tool for describing these, has unfortunately not been used. Instead, the student finds a heterogeneous hodge-podge of actually quite useful cook-book type formulas for the solutions of assorted problems, but without revealing their common structure. I feel that thereby the undergraduate, for whom the book was written, is deprived of a lot of potential insight. He will fail to see the beauty and the elegance of the field and thus may be discouraged from pursuing it any further.

Fortunately, at least those formulas adapted for the use with logarithms are gone. They have persistently plagued the astrometric literature even during the last several decades when all computing was done either with a mechanical desk calculator or an electronic computer. Beyond this, we find almost no innovation in the treatment of the subject. Most disturbing are some mistakes that originate in certain misconceptions of the author, for instance, his definition of the geoid. Although he ostensibly counts the azimuth positive from 0° to 180° through either East or West, the formulas that involve the azimuth fail to carry any indication that this will in certain circumstances necessitate the use of different signs for E and W azimuth.

The excellent diagrams (a sore point in almost all other books) and the selection of the topics are this book's strongest features. Through the latter, McNally reveals himself as a competent astronomer who knows which areas are important. The first four chapters deal with the customary relationships between astronomical coordinate systems, including the system of galactic coordinates. A chapter on time is followed by chapters on the differential effects of spherical astronomy and a very welcome one on eclipses and occultations. Most unfortunately, the next chapter on plate measurements is not only useless but misleading. A lot of space is wasted on the totally obsolete dependence method but no consideration is given modern developments. One also finds several false statements there, which again reflect the misconceptions the author has about the field.

The last three chapters deal with certain aspects of the two-body problem and give brief (and completely outdated) instructions on how to compute the orbital elements of visual doubles from observations. The useful treatments of

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spectroscopic and photometric double stars at the end of the book transcend the traditional framework of positional astronomy, although one may well argue that they belong to this field.

The "Useful Data" in the appendix would be even more useful if the currently agreed-upon values of certain astronomical constants were not hidden in an appendix to the appendix.

This reviewer cannot recommend that this book be used as the basis of any course. Considering, though, that it will have cornered the market until someone writes a good book, it will most likely sell quite well.

HEINRICH EICHHORN

University of Florida

Gainesville

and University of South Florida

Tampa

Semiconducting Temperature Sensors and Their Applications.

H. B. Sachse

380 pp. Wiley, New York, 1975. \$22.95

Resistance thermometry, a very significant contributor to the art of temperature measurement, depends for its realization on two basic types of resistance elements. Metallic sensors, fabricated typically from platinum, nickel or copper, represent one class. Equally important are semiconductor sensors, which normally exhibit temperature coefficients of resistance as much as an order of magnitude greater than those of the metal units. Herbert Sachse's book is concerned with this second category of resistance thermometers.

In the course of his many years as a research director of the Keystone Carbon Company, Sachse became well known for his technical involvement with thermistors (a term used in the book to convey the same meaning it has come to have in the technical community: a metal-oxide semiconductor sensor with a very high temperature coefficient of resistance). As might therefore be expected, the book deals principally with these devices. Thermistor materials and their properties are described, along with sensor production methods. After a chapter on their basic characteristics, about a hundred pages are devoted to applications of thermistors. These are by no means limited to temperature measurement; they include a wide variety of electronic circuits, level, pressure and flow measurement, gas analysis, radiation sensing and power measurement.

There are, of course, many other kinds of semiconducting temperature sensors, including germanium, silicon

and carbon resistance thermometers, as well as diode, superconducting, capacitance and pyroelectric devices. The author deals with all of these in about forty pages, a section which is surprisingly complete for its length. However, considering the generality implied by the book's title, the chapter could have been expanded, possibly at the expense of some of the rather specialized material on production methods.

The book has many good things going for it. It is well written, well organized, and well edited, although a more comprehensive subject index would have

been desirable. The more than 700 references, extending to late 1974, will prove extremely useful. Such a judgment may also be applicable to the international patent literature index of 183 entries. The author is to be congratulated for a presentation that appears to be properly balanced between the uses and the limitations of thermistors. There is a tendency among authors to emphasize only the advantages of a circuit or apparatus to which they have devoted a substantial part of their professional careers. Sachse resists this temptation, which should increase the

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