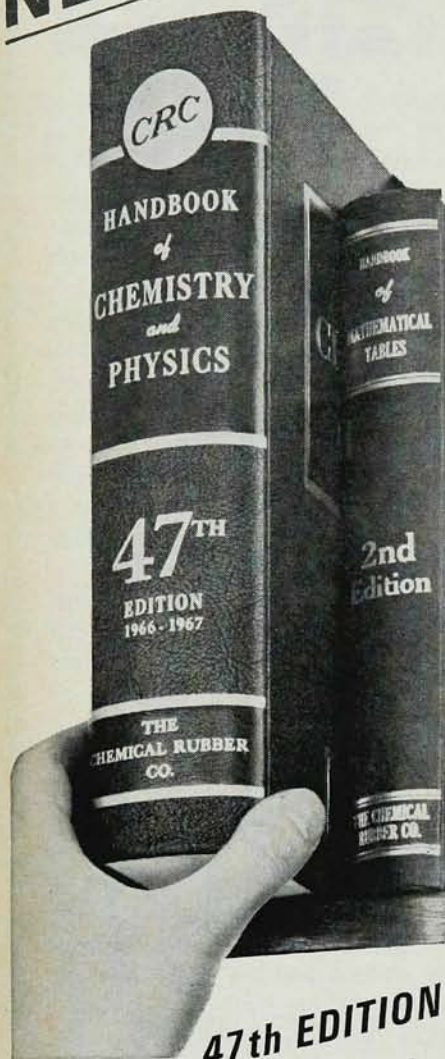


NEW!



47th EDITION HANDBOOK OF CHEMISTRY & PHYSICS



- The world's most "reached for" scientific source book for over half-a-century!
 - Now off the press. Over 1800 pages of chemistry, physics and mathematical tables!
 - Completely revised and expanded!
 - 110 newly added pages!
 - Up-to-date data on:
 - Gravimetric Factors — Elementary Particles — Magnetic Materials — Electron Affinities — Heat Capacity of Aqueous Solutions — Dimensionless Groups . . . and Much More!
 - Order this valuable reference today!
- Cat. No. 66-447\$17.50 each
(Outside U.S.A. add 50¢)

THE CHEMICAL RUBBER CO.
Dept. PT-63, 2310 Superior
Cleveland, Ohio 44114

A-5518

the optical depth and source function through the equations for the rate of change of state population. The fourth and fifth lectures treat the solution of the coupled equations for the states of gas and radiation. Following a demonstration that a small perturbation calculation based on the LTE configuration as an unperturbed state is inadequate, the equations for the two-level atom are solved to display line profiles of several atmospheric models. The last two lectures indicate how the more general problem containing the continuum and additional levels may be approached. The classes into which the resulting spectral lines fall are categorized according to the processes dominating the sources and sinks of excitation of the upper level of the transition. This morphology, termed "The New Spectroscopy", holds the promise, as yet incompletely realized, of extracting from stellar spectra all of their clues about the atmospheres of stars.

As shown by recent conferences on radiation transfer, problems in radiation transfer hold interest for a large number of workers in such fields as astrophysics, oceanography, plasma physics and space physics. Now that the fundamentals of the subject are understood, this burgeoning interest would be well served by a book in which the subject is systematically developed, criteria for approximations are presented, techniques are outlined, and sample solutions are examined. Thomas has not attempted so comprehensive a program. He has, however, given a survey of the subject, with particular attention to the structure of the equations. Such an evaluation, based on many years of pioneering and participation in the field, is very valuable.

Concise categorized references to the literature and a reasonable price add to the attractiveness of the book. Unfortunately, the style and organization of the book do not serve the purpose well. Perhaps due to the deficiencies of committing the give and take of lectures to print, this book makes for hard going. The terminology is occasionally pompous and obscure; lengthy qualitative arguments are belabored; and not a single graph to visualize the solutions is used!

In spite of these shortcomings, this book will amply reward the scientist seriously interested in radiation transfer with new insight into his field.

* * *

The reviewer is a member of the General Atomic Special Nuclear Effects Laboratory where he has engaged in radiation-hydrodynamic investigations.

A high-level introduction

FOUNDATIONS OF THE NON-LINEAR MECHANICS OF CONTINUA. By L. I. Sedov. Transl. from Russian by Rebecca Schoenfeld-Reiner. 252 pp. Pergamon, New York, 1966. \$2.50.

by Jacques E. Romain

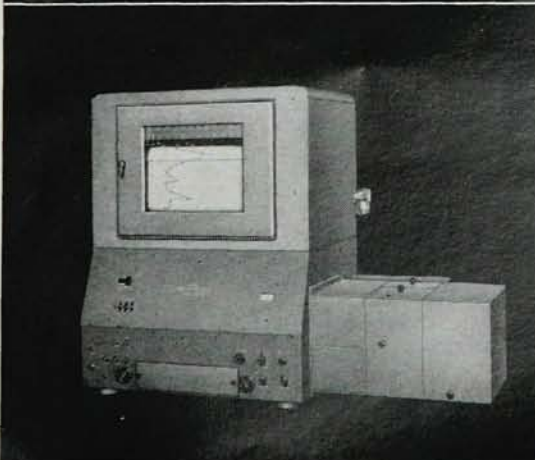
The nonlinear mechanics of continuous media (in which the deformations of the material elements are not assumed to be infinitesimal) has been a subject of investigation for many years, but its systematic development is fairly recent. The year 1962 was an important one in this field, as it was the date of publication of the first two (to the reviewer's knowledge) general treatises on that particular subject: the book under review (first edition in Russian) and A. C. Eringen's *Nonlinear Theory of Continuous Media*. The two books come into comparison from several points of view. Each arose from a course of lectures by its author (L. I. Sedov is a professor at the Moscow State University); their coverage is broadly similar, but the emphasis is definitely different. Whereas Eringen's book is more formal in exposition, involves a more advanced mathematical background and goes into more detail in particular applications, Sedov's starts essentially from physical principles and develops general concepts and models rather than specific applications. This does not imply that the treatment is elementary. Quite the contrary, the exposition is based on general tensor formalism in arbitrary coordinate systems. To this purpose, the first two chapters are devoted to a thorough exposition of the theory of tensors (with a systematic recourse to base vectors), including a detailed presentation of nonlinear tensor functions in three dimensions. The rest

of the book contains a general exposition of the dynamic and thermodynamic behavior of continuous media and the application of the theory to the principal cases: ideal or viscous liquids and gases (including the case of physiochemical interactions between the components of a mixture), elastic bodies, plasticity.

The exposition is remarkably clear and to the point; the properties derived are neatly stated. The book is all the more enjoyable as the translation is very good, even though there are occasional slips, such as (page 117) "[a tensor] is a tensor *greater by one* than [another tensor]." The reviewer feels there must be a (minor) slip imputable to the author: on page 47, it is stated that, in a coordinate system coinciding with the principal axes of a tensor P_1 , if the components of another tensor P_2 are P_{ik} , then "the vanishing of one of the components P_{12} , P_{13} , P_{23} means geometrically that one of the principal axes of the tensor P_2 lies in a plane containing two of the principal axes of the tensor P_1 ." The opportunity offered by this translation could have been taken to do away with occasional odd notations for cross and dot products. The book is concluded with a good choice of references from both Western and Eastern literature. An index of notations would have helped.

To summarize, the book ranks among the best introductions to the topic. As the author chose to refrain from discussing the solutions of specific problems, it should be supplemented by specialized reading related to the user's particular field of interest. If the reviewer had to advise a student who is completely unfamiliar with the subject, he would suggest Sedov as a first reading, and then either Eringen for the transition to particular problems or (if the reader wishes to become a specialized theoretician in the field) Truesdell and Noll's monumental "Nonlinear Field Theories of Mechanics" in the *Handbuch der Physik*. For the scientist who is already familiar with the field, Sedov's book is good reading as a unified and synthetic presentation of a broad class of problems. In view of its low price, it would be a shame for anyone

make what you want of the CARY 14



(MOST PHYSICISTS DO ANYWAY)

Looking for a versatile spectrophotometer? Then consider the CARY 14. Choose your own configuration—and solve almost any problem from absolute radiometry to reflectance studies. It's that versatile. Here's why.

Modular construction, for one. In addition, light sources or detectors can be interchanged for a variety of applications, a variety of configurations. Plus a large sample compartment permits special cells and special sample handling equipment from magnets to polarizers.

Basic modifications are available. The 14H, for high temperature samples, measures transmission accurately to over 1300°K. The 14RI for water overtone studies—has exceptional performance from 2250Å to 3.0 microns. The CARY 14 Spectroradiometer is designed for absolute source calibration.

Accessories extend the CARY 14's abilities: Diffuse reflectance...scattered transmittance...liquid helium dewars for cryogenics.

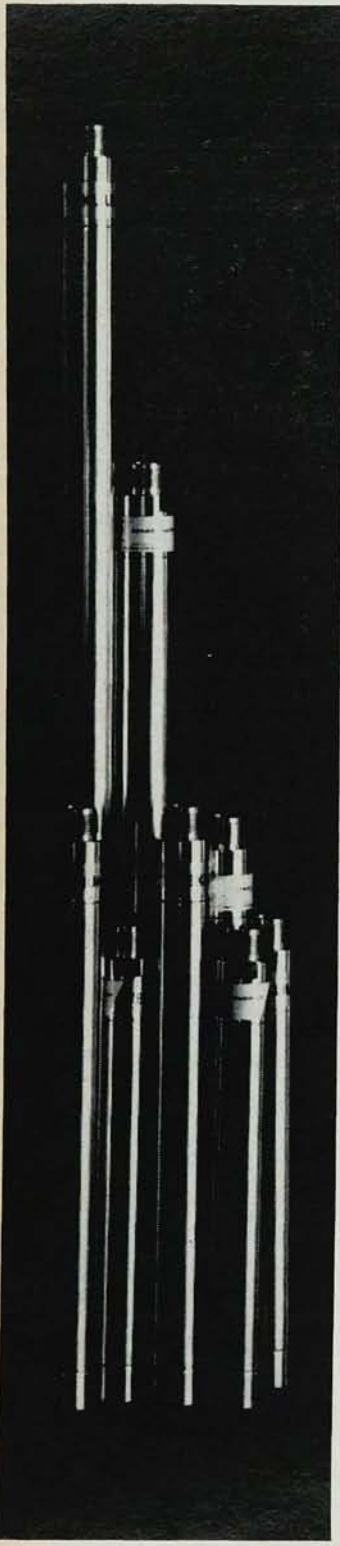
Performance is an essential part of versatility—and the CARY 14 has it to spare. This means obtaining good results even with inherently inefficient accessories such as micro cells, gonireflectometers and large integrating spheres.

Make what you will of the CARY 14... and make the most of it. For specifications and other information, write today for Data File P606-96.

CARY INSTRUMENTS

APPLIED PHYSICS CORPORATION
2724 S. PECK RD., MONROVIA, CALIF.

UV/VIS/IR/Raman Recording Spectrophotometers
Manual Spectrophotometers • Spectropolarimeters
Vibrating Reed Electrometers & Amplifiers



What really counts is what's behind these TexliumTM neutron detectors.

Careful, competent help in all phases of neutron detection—that's the important plus you can count on from Texas Nuclear. No matter what or where or when your problem is, we'll work with you to develop the answer. Whether it's a single detector or a complete system for detection, readout, and analysis.

After all, we make the Texlium neutron detector. And it shows up nearly everywhere—from oil-well logging to space research. This sensitive, highly efficient, He³-filled detector operates at temperatures up to 200°C, over voltage plateaus up to 200 volts, and with high resistance to radiation damage. It's available in active lengths of 4, 6, and 12 in., with filling pressures from 1 to 10 atm.

Of course, you may have a special application that requires a special detector. Consult Texas Nuclear's home office. You'll find our experience in meeting the requirements of a broad range of applications quite helpful.

We've also got the related equipment you need. Such as a preamplifier that precisely matches the detector you pick. And amplifiers, scalars, ratemeters, or you-name-it from the RIDL® Research Series of AEC standard modules. As well as analysis and readout components from Nuclear-Chicago's complete line.

For detailed information on Texlium detectors and related equipment, call your Nuclear-Chicago sales office (there's one close to you). Or write directly to us.

NUC/N-240



TEXAS NUCLEAR

A SUBSIDIARY OF NUCLEAR-CHICAGO CORPORATION
373 Howard Ave., Des Plaines, Illinois 60018 U.S.A.
Donker Curtiusstraat 7, Amsterdam W, The Netherlands

who is interested in the topic to do without the book.

The reviewer, a scientific advisor for the Centre de Recherches Routières in Sterrebeek, Belgium, is currently engaged in research on viscoelastic layered systems.

Radio astronomy report

PROGRESS IN RADIO SCIENCE 1960-1963. VOLUME V, RADIO ASTRONOMY. Report of Commission V during the XIV URSI General Assembly (Tokyo, Sept. 1963). E. Herbays, ed. 140 pp. American Elsevier, New York, 1966. \$12.50.

by H. J. Hagger

The progress and the overall development in radio astronomy during the period 1960 through 1963 are reported in this booklet. It contains the opening papers to each subject in full and a review of the discussions and the shorter contributions. Commission V of URSI (Union Radio Scientifique Internationale) has always been a very active commission and very interesting reports have been presented at URSI General Assemblies.

For galactic radio astronomy the investigation of the 21-cm line with the largest radio telescopes available is of topmost interest. Still very important, but of lesser interest are the discrete galactic sources and the background radiation and its polarization. In the first section of the booklet a good survey is given of what has been done in this field in the period under consideration. In the second section both experimental and theoretical results of investigations of radio sources are summarized. Chapters 3 and 4 report on the quiet and the active sun respectively. In the case of the quiet corona the resolving power of the radio instruments is inadequate, and in this field much work has to be done in the future for a better understanding of solar physics. In the case of the active sun the radio spectrum has been extended down to 25 MHz. In our days of space explorations with manned or unmanned spacecraft the radio astronomy of the moon and of the planets has gained in importance. Moon, Venus, Mars are under radar observation to measure the exact distances from the earth and to gain more