



In the above experiment, the engineer is punching a hole in a thin foil window at the end of a twenty foot long vacuum system. An oscilloscope detects the operation of silicon controlled rectifiers triggered by signals from gages spaced at intervals down the vacuum pipe. The velocity of propagation of the shock wave down the pipe is calculated directly from the system dimensions and the time intervals measured from the oscilloscope trace. This velocity is three times the speed of sound.

This information is needed for the design of a fast acting high vacuum gate valve to protect the delicate accelerator components from damage in the event of a vacuum failure.

This experiment is just one of the many challenging problems under investigation at High Voltage Engineering Corporation, the foremost leader in the research, development and manufacture of particle accelerators. Engineers and Scientists with experience in the following fields are invited to investigate career opportunities:

PULSE CIRCUITRY
CONTROL SYSTEMS
STABILIZATION SYSTEMS
MAGNETIC FIELD MEASURING DEVICES

PLEASE CONTACT:

Mr. Louis P. Ennis, P. O. Box 98,
Burlington, Mass.

**HIGH VOLTAGE
ENGINEERING CORP.**



Burlington, Massachusetts
An Equal Opportunity Employer

sufficient understanding "to avoid mistakes in the applications". Perhaps the most important usefulness of Jackson's book (and a very important one at that) is the guidance it can provide the student in selecting the subjects he should study by using the books given in the completely adequate list of references. However, the need for a book on the mathematics of quantum mechanics at the beginner's level has not yet been met. Can it ever?

Operational Calculus in Two Variables and Its Applications. By V. A. Ditkin and A. P. Prudnikov. Transl. from Russian by D. M. G. Wishart. Volume 24 of Internat'l Series of Monographs on Pure and Applied Mathematics, general editors: I. N. Sneddon, S. Ulam, M. Stark. 167 pp. Pergamon Press, New York, 1962. \$8.50. *Reviewed by J. Gillis, Weizmann Institute of Science.*

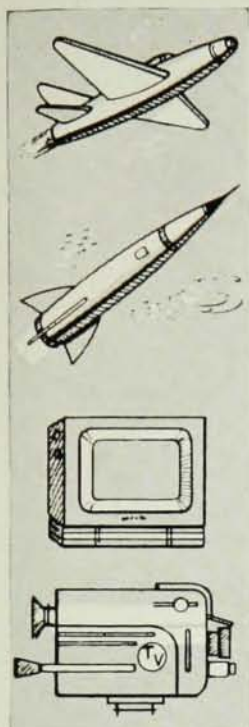
THIS stimulating little book can be a valuable introduction to the transform theory of functions of several variables. Most of the ideas are set out clearly and well and we are given quite exciting glimpses of the clever tricks which can be performed and of the wealth of results obtainable. It is strongly recommended both as an introduction to the subject, and as a small handbook for convenient reference when more compendious works are not needed.

There already exists some literature on the subject, of which perhaps the best known is the monograph by Voelker and Doetsch. Comparison of the two works brings out the fact that the new one is much less explicitly " ϵ -conscious" than the older book. This would seem to be an advance. In this day and age competent mathematicians should be sufficiently familiar with ϵ to recognize whether or not a proof is correct and, if necessary, supply the ϵ 's themselves. After all, we no longer bother to quote the multiplication table explicitly each time we use it. To do so might make an argument appear more precise; it would certainly make it less intelligible.

Another thought which occurs to the reviewer is that the degree of urgency indicated in the publisher's notice at the beginning of the work appears to be slightly exaggerated. The book is a good and useful one but contains very little not already to be found somewhere in existing Western literature. Under these circumstances, it is difficult to understand the hectic need for emergency production methods which led to lowering the printing standard and raising the price.

Thermodynamics of Solids. By Richard A. Swalin. 343 pp. John Wiley & Sons, Inc., New York, 1962. \$12.50. *Reviewed by Stuart A. Rice, Institute for the Study of Metals, University of Chicago.*

IT is difficult to know for whom this book was written. The publisher's blurb indicates that it is suitable for anyone who has had a course in thermodynamics and physics and knows something about the



PHYSICISTS

Expansion of our Electron Tube operation in commercial, industrial and military markets has created several outstanding opportunities for qualified candidates. Physicists with experience or interest in R&D, Product Design, Manufacturing Engineering, or Application Engineering are invited to explore immediate openings in the following areas:

IMAGE TUBES. Storage tubes and devices, image display devices, pick-up tubes, circuitry.

CATHODE RAY. Black and white picture tubes, industrial and military, radar display devices.

POWER TUBES. Radiation detectors, industrial R.F., mercury pool, high vacuum switch, communication.

MICROWAVE TUBES. Magnetrons, klystrons, TWT's, special electron devices, fundamental study programs on interaction circuits, beam study programs.

Write or send resume to: Mr. Wm. Kacala, Technical Recruiting
P.O. Box 284, Elmira, New York
or phone collect REgent 9-3611

An Equal
Opportunity
Employer



Westinghouse
ELECTRONIC TUBE DIVISION ELMIRA, NEW YORK

JUST PUBLISHED
Volume 12 (Dec. 1962)

ANNUAL REVIEW OF NUCLEAR SCIENCE

Editors:

E. SEGRÈ
G. FRIEDLANDER
W. E. MEYERHOF

Editorial Committee:

R. CREUTZ
H. M. PATT
L. I. SCHIFF
E. SEGRÈ
E. H. TAYLOR
C. S. WU

Author & Subject Indexes

\$8.50 postpaid (U.S.A.)

\$9.00 postpaid (foreign)

Contents:

633 pages

Inelastic Electron Scattering, W. C. Barber
The Polarization Measurements on Beta and Gamma Rays, Lorne A. Page
Compound Statistical Features in Nuclear Reactions, David Bodansky
Recoilless Nuclear Resonance Absorption, R. L. Mössbauer
Preparation of Thin Films, Sources, and Targets, L. Yaffe
Semiconductor Particle Detectors, G. L. Miller, W. M. Gibson, and P. F. Donovan
Technology of Research Reactors, Thomas E. Cole and Alvin M. Weinberg
Atomic Displacements in Solids by Nuclear Radiation, Allen N. Goland
Electron Exchange Reactions, N. Sutin
Isotopic Exchange Reactions in Nonaqueous Systems, Rolfe H. Herber
Dispersion Relation Methods in Strong Interactions, Daniele Amati and Sergio Fubini
High-Sensitivity Mass Spectroscopy in Nuclear Studies, Heinrich Hintenberger
Nuclear Astrophysics, Geoffrey Burbidge
Free Radicals in Irradiated Biological Materials and Systems, Douglas E. Smith

ANNUAL REVIEWS, INC., Grant Avenue, Palo Alto, California

Research Opportunities for *PHYSICISTS*

- Radiation and Hydrodynamics in Plasmas
- Upper-atmosphere Optical Phenomena
- Physical Optics and Optical Maser Technology
- Fast-Discharge Phenomena
- Effects of Nuclear Detonations
- Gamma-ray Transport

We are addressing this to physicists who are interested in becoming associated with a small, informal research organization that has a working environment more nearly academic than is generally found in industrial laboratories. TECH/OPS is a private research and development company doing work in the physical sciences, with a staff of 150 scientists. The TECH/OPS Physics Group numbers about 30, including 12 Ph. D's.

We believe we have several advantages that are worth considering if you are contemplating a job change. We like to think we operate with a minimum of red tape. A staff member's progress is tied to achievement rather than length of service. We have an impressive record of stability and orderly growth. Lastly, and we think most important, our projects, by and large, are interesting and not run-of-the-mill. The following is somewhat representative of the work of the Physics Group.

Experimental and theoretical studies of the propagation and uses of coherent optical radiation, using laser, optical-antenna, and interferometric techniques.

Two-dimensional hydrodynamics of hot expanding gases in real atmospheres, including radiation transport.

Airglow and auroral studies, and the effects of nuclear explosions and chemical releases on these phenomena.

Generation of extremely high temperatures using ultra-fast capacitor-discharge systems.

Measurement of the transport of gamma-rays in full-size and model structures.

TECH/OPS laboratories are located on Route 128 in Burlington, Mass., 12 miles from downtown Boston.

For further information write: ROBERT L. KOLLER

TECHNICAL OPERATIONS RESEARCH

Burlington, Massachusetts

An equal opportunity employer

important defects which appear in crystalline solids. If these words have their usual meaning, I find it difficult to believe that the content of the first 108 pages is necessary. If, on the other hand, this book is intended to be an introduction to thermodynamics for people interested in metallurgy, then I consider it to be inadequate, misleading, and replete with abbreviations which can only cause confusion. For example, on page 3, the First Law of Thermodynamics is introduced but neither heat nor internal energy is defined in terms of mechanical processes. It has always been my experience in teaching thermodynamics that great care must be exercised in making the First Law clear and not just superficially acceptable. Similarly, there are many pages devoted to essentially trivial thermodynamic manipulations, if the student has had previous exposure to them, but mysterious thermodynamic manipulations if this is a first course. In an amusing error, on page 52 of Chapter 3, we learn, much to our surprise, that G. N. Lewis was an active scientist during the latter half of the nineteenth century. I am sure that this would have been surprising to Lewis himself.

There are parts of the book which I feel will be of value to metallurgists. Certainly the emphasis on examples of thermodynamic processes using inorganic reactions, the discussion of the quasi-chemical approach to solutions, the interpretation of phase diagrams, etc. will be of use. I cannot escape the feeling, however, that a more thorough treatment would have been of much greater value.

Determination of Organic Structures by Physical Methods, Volume 2. F. C. Nachod and W. D. Phillips, eds. 771 pp. Academic Press Inc., New York, 1962. \$16.00. *Reviewed by D. M. Coulson, Stanford Research Institute.*

THE use of physical methods in the determination of the structure of organic molecules has developed rapidly in the past eight to ten years. This book contains an excellent coverage of several instrumental methods of organic-structure analysis with chapters on each by recognized authorities. The fields that are covered are optical rotary dispersion, infrared and Raman spectra, electronic spectra, nuclear-quadrupole-resonance spectra, NMR, and EPR. In each field, there is a limited discussion of the theoretical background, delving deeply enough to capture the interest of the theoretician. The description of instrumentation is generally brief and incomplete. An attempt is made in each chapter to demonstrate the applicability of a physical method of organic determination, mainly through examples. NMR and EPR are covered more completely, with contributions from several authorities in their fields, than are the other topics.

For a thorough appreciation of this compilation, a strong background in physical organic chemistry is needed. The combined use of the techniques described in the several chapters of this book for the solution of a single organic structural problem is not as adequately