

- INVESTIGATION OF PHYSICAL PHENOMENA
- BASIC SENSORS
- APPLICATIONS OF NEW MATERIALS & TECHNIQUES
- INSTRUMENTATION SYSTEMS

EXPERIMENTAL PHYSICISTS AND PHYSICAL CHEMISTS

for expansion of a group concerned with the development of basically new techniques and with the solution of advanced instrumentation and measurement problems.

The nature of the problems solved by this group varies widely, so that the principal qualifications required are an inquiring intelligence and a sound background in physics, physical chemistry, and mathematics. Positions are available for both recent graduates and experienced people capable of accepting primary responsibility for specific programs. Present programs include work in the following areas:

- SPACE PHYSICS
- MEASUREMENT OF GEOPHYSICAL AND METEOROLOGICAL PARAMETERS IN AND ABOVE THE ATMOSPHERE
- VISIBLE AND ULTRAVIOLET RADIATION
- NEW TYPES OF ELECTRON MULTIPLIERS
- MASS SPECTROMETRY

Final engineering and packaging are normally carried out by other groups in the organization.

The work is stimulating and satisfying in comfortable and pleasant surroundings in suburban Detroit.

Opportunities for advanced study.

Write or wire **A. Capsalis,**
Research Laboratories Division,
The Bendix Corporation
Southfield, Michigan

**Research Laboratories
Division** SOUTHFIELD, MICHIGAN



temperatures, and their practical application to the techniques used in basic research. It is hoped, in this way, not only to provide critical and up-to-date information in the various branches of cryogenics, but also to acquaint workers in one field of low-temperature research with the techniques developed in others."

Although it is fashionable to complain about the plethora of book series, this reviewer welcomes the cryogenic series. Dr. Mendelssohn has obviously obtained first-rate authors for his initial volume and established an appropriate balance among physics, techniques, and applications.

Formation and Trapping of Free Radicals. Edited by Arnold M. Bass and H. P. Broida. 522 pp. Academic Press Inc., New York, 1960. \$16.00. *Reviewed by D. J. E. Ingram, University College of North Staffordshire.*

THE study of free radicals, and the possibility of trapping high concentrations of them, has been the subject of much intensive investigation over the last few years, particularly so amongst the large group of scientists that were gathered together in the free radical program of the National Bureau of Standards at Washington. The two editors of this book were both active initiators of this project and a large number of the authors were also associated with the program in one way or another. In one sense this volume may therefore be taken as the distilled essence of all the thought and work that went into the three years research at Washington, and, as such, it contains a great deal of very interesting and authoritative data.

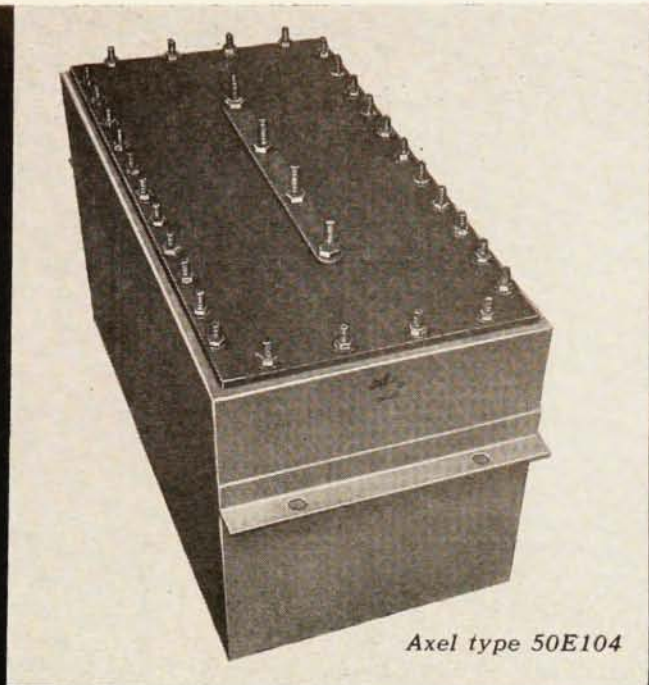
It would be unfair to suggest, however, that the content matter is entirely limited to the work carried out by these research groups. Professor Rice provides a short introductory chapter on the early history of "radical trapping", and this is followed by a chapter on radical formation and trapping from the gas phase by B. A. Thrush of Cambridge, England. There are, in fact, a total of sixteen chapters by different authors, all of whom are experts in their own particular fields. The general grouping of these chapters seems to fall under the three main headings of (1) methods and experimental techniques associated with radical formation and trapping, (2) methods of investigation and analysis of the trapped species, and (3) the theory and possible applications of studies on trapped radicals. The first group includes detailed descriptions of radical trapping from the gas phase and from gas discharges, as well as a consideration of the techniques for radical production in situ in the solid such as by electron bombardment, photolysis, and higher-energy irradiation.

The chapters on methods of investigation include authoritative accounts of the applications of optical spectroscopy, electron resonance, mass spectrometry, and x-ray diffraction. These are all very well illustrated by specific examples of analysis and interpretation, and the basic theories and experimental techniques of each

NEW DEVELOPMENT IN...

LOW INDUCTANCE CAPACITORS

1.0 MFD-50KV
Ringing Frequency
1.3 Megacycles



Axel type 50E104

- Inductance 15 millimicrohenries
- Energy storage 1250 joules
- Life—10,000 shots (minimum) at 50 KV with 100% reversal
- Low cost per joule for Low Inductance Capacitors
- Multi-high voltage studs allows use of multiple gaps or transmission lines for low external inductance

Axel

AXEL ELECTRONICS, INC.

134-20 Jamaica Ave. • Jamaica 18, N.Y.

High Voltage Capacitors, Pulse Magnetic Components, Pulse Network, R.F. Suppression Filters

RESEARCH ENGINEERS & SCIENTISTS

Kollsman

Instrument Corporation

Announces
the Formation of a

NEW RESEARCH DIVISION

This division will undertake basic and applied research related to advanced tracking, computing, communications, control, instrumentation and display systems. The scope of these programs will include theoretical work in the basic sciences and experimental verification in the areas of:

SOLID STATE PHYSICS • SYSTEMS ANALYSIS
SPECTROSCOPY • DIGITAL TECHNIQUES
SYSTEMS SYNTHESIS • MICROMINIATURIZATION
GEOMETRICAL & PHYSICAL OPTICS
ELECTRO-CHEMICAL TECHNIQUES
CIRCUIT SYNTHESIS & IMPLEMENTATION
LIGHT GENERATION, MODULATION & DETECTION

The creation of this new research division provides qualified Engineers and Scientists an opportunity to join a recognized leader in automatic navigation and flight instrumentation... a dynamic organization in which "growth is based on technological superiority in our areas of interest."



To arrange a confidential interview, please forward a brief resume to Mr. John Whitton.

Kollsman
Instrument Corporation

80-08 45th AVE., ELMHURST 73, QUEENS, NEW YORK
A Subsidiary of Standard Kollsman Industries Inc.

method of investigation are summarized in a precise and intelligible manner. The final section deals with such topics as the role of radicals in astrophysics, polymerization, radiation damage, biological and chemical processes, and possible applications to rocket propulsion. These chapters are necessarily more speculative, but each subject is treated in a responsible way and the present position in the field is carefully outlined. Probably one of the greatest disappointments of the whole of the Washington research program was the conclusion that it is impossible to increase the concentration of stored free radicals much above 1%, and that this effectively rules them out for any type of practical rocket fuel. On the other hand, the far greater insight into biochemical systems that is now being achieved by simultaneous radical and enzyme studies suggests that any disappointment on the purely applied side will be more than compensated by the long-term implications in the biophysical field arising from these new studies.

Radiation Pyrometry and Its Underlying Principles of Radiant Heat Transfer. By Thomas R. Harrison. 234 pp. John Wiley & Sons, New York, 1960. \$12.00. *Reviewed by Peter L. Balise, University of Washington.*

ITS long title is an accurate description of this book, which is an analytical treatment of the subject. Radiation principles are rigorously developed and clearly explained, and then applied to practical pyrometry. The book is aimed at the instrument designer and user, rather than the physicist, but the theory is presented more thoroughly, and fewer practical details are given, than will appeal to many users.

The first third of the book is devoted to general radiation principles. The basic laws (by Planck, Wien, and Stefan-Boltzmann) that are commonly derived in physics texts are merely stated and discussed, but other relations are derived with each step explicitly given. The topics are as would be expected in a comprehensive treatment of black-body and nonblack-body radiation, including geometrical principles, relations between total radiation and that within limited wavelengths, and the interrelation of emission, absorption, reflection, and transmission, with practical illustrations. It is recommended that "emittance" rather than "emissivity" be used to designate radiant intensity of a nonblack body, even though the latter term is probably most often used. This recommendation is made to conform to the convention that the ending "ance" shall refer to properties dependent on size, surface, etc., rather than to intrinsic properties of the material.

The middle third is a chapter entitled "Radiation Pyrometers". A few industrial instruments are shown, but most effort is devoted to analyses of the general pyrometer equation, ambient temperature compensation, lens and mirror design, and calibration. To insure clarity, relations are derived, stated, and then often