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**ATOMICS
INTERNATIONAL**

A DIVISION OF NORTH AMERICAN AVIATION, INC.

Mr. G. W. Newton, Personnel Office, Dept. PT-6,
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(In the Suburban San Fernando Valley,
Los Angeles)

Thus we find under Cryogenics a discussion of the third law of thermodynamics, the liquid helium temperature scale, and anti-ferromagnetism; under Heterogeneous Equilibria and Phase Diagrams, emphasis on vapor-liquid equilibrium of organic substances; under Quantum Theory, an extensive discussion of crystal field theory; under Polymers, a treatment of rates of initiating of polymerization in homogeneous vinyl polymers; under Thermochemistry and Thermodynamics of Substances, a summary of developments in the equation of state at very high pressures and temperatures; under Solid State, a discussion of point imperfection in metals and properties of germanium and silicon; and under Magnetic Resonance, emphasis on electronic and nuclear magnetic resonance. The remaining chapters provide broad coverage under such general headings as: Solutions of Nonelectrolytes, Statistical Mechanics, Radiation Chemistry, Kinetics of Reactions in Solutions, Kinetics of Reactions in Gases, Isotopes, Surface Chemistry and Catalysis, Molecular Electronic Spectroscopy, Rotation Vibration Spectroscopy, Experimental Molecular Structure, and the three new chapters cited earlier.

The representation on the reviewers' list of Universities of Oxford, Cambridge, Leeds, Sheffield, Liverpool, and Tokyo is indicative of a welcome trend toward a truly international review publication.

Physical Chemical Techniques. Vol. II of Physical Techniques in Biological Research. Edited by Gerald Oster and Arthur W. Pollister. 502 pp. Academic Press Inc., New York, 1956. \$12.80. Reviewed by J. G. Hoffman, Roswell Park Memorial Institute.

Books on physical chemistry are usually big, thick and have over 800 pages. By contrast this book has 478 pages covering nine chapters on selected techniques pertinent to biological research. Each chapter is (as the preface states) "a comprehensive introduction to the field and, in conjunction with the extensive bibliography, should inform the reader of the scope of the technique and its potentialities for his particular research".

There are many different physical chemical techniques in the borderlands of biological research. Therefore, it is interesting to see the editors' choice of the most important ones, which are: Tracer Techniques: Stable and Radioactive Isotopes, Measurement and Properties of Ionizing Radiations, Sedimentation, Diffusion, and Viscosity, Surface Film Techniques, Absorption and Chromatography, Electrophoresis and Ionophoresis, Electrical Potential Differences, Magnetic Methods, X-ray Diffraction and Scattering.

The first and third volumes of the three-volume series have a wealth of how-to-do-it information of which this volume has somewhat less, perhaps because of the magnitude of the subjects undertaken. For example, there is a section under Ionizing Radiation entitled: "The Mechanism of Radiobiological Action" to which are devoted less than two pages. This permits only a

NUCLEAR NEWS FROM ATOMICS INTERNATIONAL

AI develops reactors for largest power plants and smallest research labs

A wide selection of nuclear reactors, ranging in size from a 75-megawatt nuclear power plant to generate electricity, to a 5-watt laboratory instrument, have already been completed, or are at present under construction by ATOMICS INTERNATIONAL.

The Sodium Reactor Experiment, part of the Atomic Energy Commission's program to develop economical nuclear power, now undergoing tests in the Santa Susana Mountains near Los Angeles, will have an output of 20 thermal mw and will generate about 6.5 mw of electric power. It is the prototype of a full-scale sodium graphite reactor design, which will have a power output of 75 to 125 mw. ATOMICS INTERNATIONAL regards it as a promising reactor type for economical power generation.

The Organic Moderated Reactor, a relatively new approach to economical nuclear power, is particularly appropriate for smaller plants. ATOMICS INTERNATIONAL is completing construction of the Organic Moderated Reactor Experiment for the Atomic Energy Commission at the National Reactor Testing Station in Idaho, part of a development program for the OMR. Basic advantages of the OMR include compact core with good neutron economy, low pressure coolant system, and freedom from corrosion problems. The OMR is also considered promising for ship propulsion, and ATOMICS INTERNATIONAL is making a design study of this reactor type for maritime use.

Research Reactors are now being built by ATOMICS INTERNATIONAL for Japan, Denmark, West Germany, and West Berlin. They are similar to the ATOMICS INTERNATIONAL reactor now in service at Armour Research Foundation, Chicago—the first to be designed specifically for private industrial research.

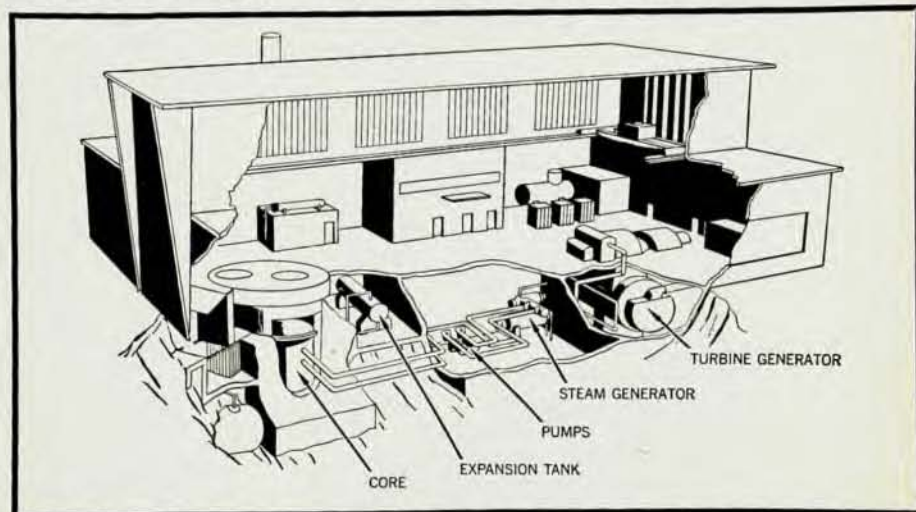
The Laboratory Reactor is a new, low-cost instrument designed specifically to meet the needs of universities and industrial laboratories for nuclear training and research.

ATOMICS INTERNATIONAL, one of America's major builders of nuclear reactors, is staffed and equipped to help you with any phase of reactor development. Please write: Director of Technical Sales, Dept. PT-73, ATOMICS INTERNATIONAL, P. O. Box 309, Canoga Park, Calif. Cable address: ATOMICS.



Reactor "heart". An AI technician installs zirconium "cans" containing the graphite moderator in the core of the Sodium Reactor Experiment. The use

of a sodium coolant allows a high-temperature, low-pressure heat extraction system with high thermal efficiency of power conversion.



Typical OMR Central Station Power Plant. Basic advantages of OMR include small size, compact core, low-

pressure system, and freedom from corrosion problems. This also makes it a promising reactor for ship propulsion.



Armour Reactor is a 50 kw water-boiler unit for industrial research. It has nine beam tubes for experimental purposes.



Nuclear Nutshell. Laboratory Reactor operates at 5 watts of power and produces more than 100 isotopes. It can be operated by one trained man.



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scant statement of the problem along with references to some literature. Likewise, the very last section of the book describing x-ray diffraction results for some bio-macromolecules provides a teaser in six brief pages taken up mostly by diagrams.

In spite of the drastic condensation of material the eleven contributors have presented a convenient description of techniques for the uninitiated. Also, explicit and practically useful material on Surface Films, Absorption and Chromatography, Electrophoresis, and on Electrical Potential Differences is especially commendable. The inclusion of Magnetic Methods is noteworthy since these promise to become increasingly important in the study of the solid and liquid states of living matter.

Even where the essayists have confined themselves to broad outlines they manage to raise stimulating questions as they go along. For instance, Sacks points out that the observed effect of isotope mass on reaction rate is far less than predicted (p. 53). This presents an intriguing physical problem whose bases are not discussed in the text. Or, in another direction, Rothen describes how a 100-A-thick Formvar film, or monolayers of proteins, can shield antigen molecules against inactivation by alpha particle bombardment. The loss of alpha particle energy in such a thin layer seems to be negligible, yet the startling fact is that the layer causes the particles to lose their damaging effect. These two examples are but minor aspects of the larger picture. The material as a whole should prove stimulating to those trying to find new ways of approaching the ramifications of the living process.

The experienced reader will see how the subject matter could be expanded into many volumes, like Aberhalden's *Handbuch der Arbeitsmethoden*. In its present form it is a concise, well-documented survey. The pictures and diagrams are good. There are excellent author and subject indices. The book is a welcome addition to the libraries of workers in biology and its borderland sciences.

Transport Processes in Applied Chemistry. By R. C. L. Bosworth. 387 pp. John Wiley & Sons, Inc., New York, 1956. \$12.00. *Reviewed by I. Amdur, Massachusetts Institute of Technology.*

Dr. Bosworth has extended to a wide variety of transport processes the unified presentation which was developed earlier in his *Heat Transfer Phenomena*. Thus all transport processes and certain scalar processes, such as chemical reaction, are described in terms of a driving force, flux, resistance, and rate of dissipation of energy. As might be anticipated, this presentation permits the liberal use of simple electrical analogues in treating relatively complicated transport phenomena.

Three of the concepts treated in the book seem to merit special mention: the concept of a carrier to help elucidate the detailed mechanism of the transport process; the coupling of transport processes under conditions when a process proceeding at a given point in