feld. These authors have included several valuable tables collating the various systems that have been studied with the experimental methods.

Only in recent years with the advent of ultrahigh-vacuum techniques has it been possible to carry out surface studies on clean single-crystal surfaces. Gabor Somorjai reviews the experiments on surface structure, surface dynamics and gas–surface interactions in his article on "Surface Chemistry." Lewis Friedman's review on "Ion-Molecule Reactions" emphasizes the new experimental techniques with tandem mass spectrometers (measurements of the product-ion energies and angular distributions have recently been made for several reactions), ion cyclotron resonance for studies of reaction mechanisms and photoionization as a means of producing reactant ions in known internal-energy states.

The review "Mass Spectrometry" by Kenneth Rinehart Jr and Thomas Kinstle attempts to cover too large a topic for a short review article. The emphasis is on high-resolution mass spectrometry and structure of organic positive ions. Alan Haught writes a very instructive review on "Lasers and their Applications to Physical Chemistry." This is followed by reviews on "Gas Reactions Yielding Electronically Excited Species" by B. A. Thrush, "Statistical Mechanics—A Review of Selected Rigorous Results" by Joel Lebowits, "Vibrational Spectroscopy" by Herbert Strauss and "Nuclear Magnetic Resonance" by J. Jonas and H. S. Gutowski.

D. W. Urry's review "Optical Rotation" is centered on applications to peptides and polypeptides. This is followed by an article on "Quantitative Conformational Analysis; Calculation Methods" by James Williams, Peter Stang and Paul Schleyer and one on "He^3–He^4 Solutions" by Norman Phillips.

The editors are to be congratulated on their selection of authors for this volume, for each is an acknowledged expert in his field. These authors have treated their subjects not only in a comprehensive but also a critical fashion. In the current era of a burgeoning literature, good reviews such as these are filling a role that is becoming more and more essential.

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Machine calculations

COMPUTING METHODS FOR SCIENTISTS AND ENGINEERS. By L. Fox and D. F. Mayers. 255 pp. Oxford Univ. Press, New York, 1968. $6.25

by NORMAN A. BAILY

The authors, members of the Oxford University Computing Laboratory, state that the primary purpose of this book is to enable its users to improve their use of the computer and to obtain more accurate and meaningful solutions. If one restricts its application to that of a handbook, it should have no difficulty in achieving the authors' aims. However, the mathematics are complex enough that even physical scientists who are primarily experimentalists would have to spend considerable time studying the suggested methods to determine the proper one for a particular problem.

The field of automatic computation is of prime importance in all branches of science, and the book emphasizes the proper selection of methods for the numerical solution of many different mathematical forms. The book, therefore, makes a very valuable contribution because a vast majority of computer users have not ordinarily delved deeply into the problems discussed. Sections of the book are quite sophisticated and possibly would be difficult for the occasional machine user to apply properly. It is specifically designed for persons thoroughly familiar with computing but who perhaps do not have either the training or experience to obtain the best results. In general, the book is an excellent review of the methods for handling common difficulties.

Some of the more important topics covered are: error analysis, floating-point arithmetic, recurrence relations, finite differences and the usual common operations such as polynomials, matrices and numerical integration. The authors have stressed the important difference between inherent and induced stability and have treated fundamental theory where they felt that it was not well known by most computer users. The book does not em-

The Lincoln Laboratory of the Massachusetts Institute of Technology conducts research in selected areas of advanced electronics with emphasis on applications to national defense and space exploration. *Radio Physics* is a field of major interest. The program includes radio propagation studies leading to systems for satellite and deep-space communications, as well as investigations of the sun and the planets, utilizing new techniques of radar astronomy. All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. Lincoln Laboratory, Massachusetts Institute of Technology, Box 15, Lexington, Mass. 02173.

Solid State Physics
Information Processing
Radio Physics and Astronomy
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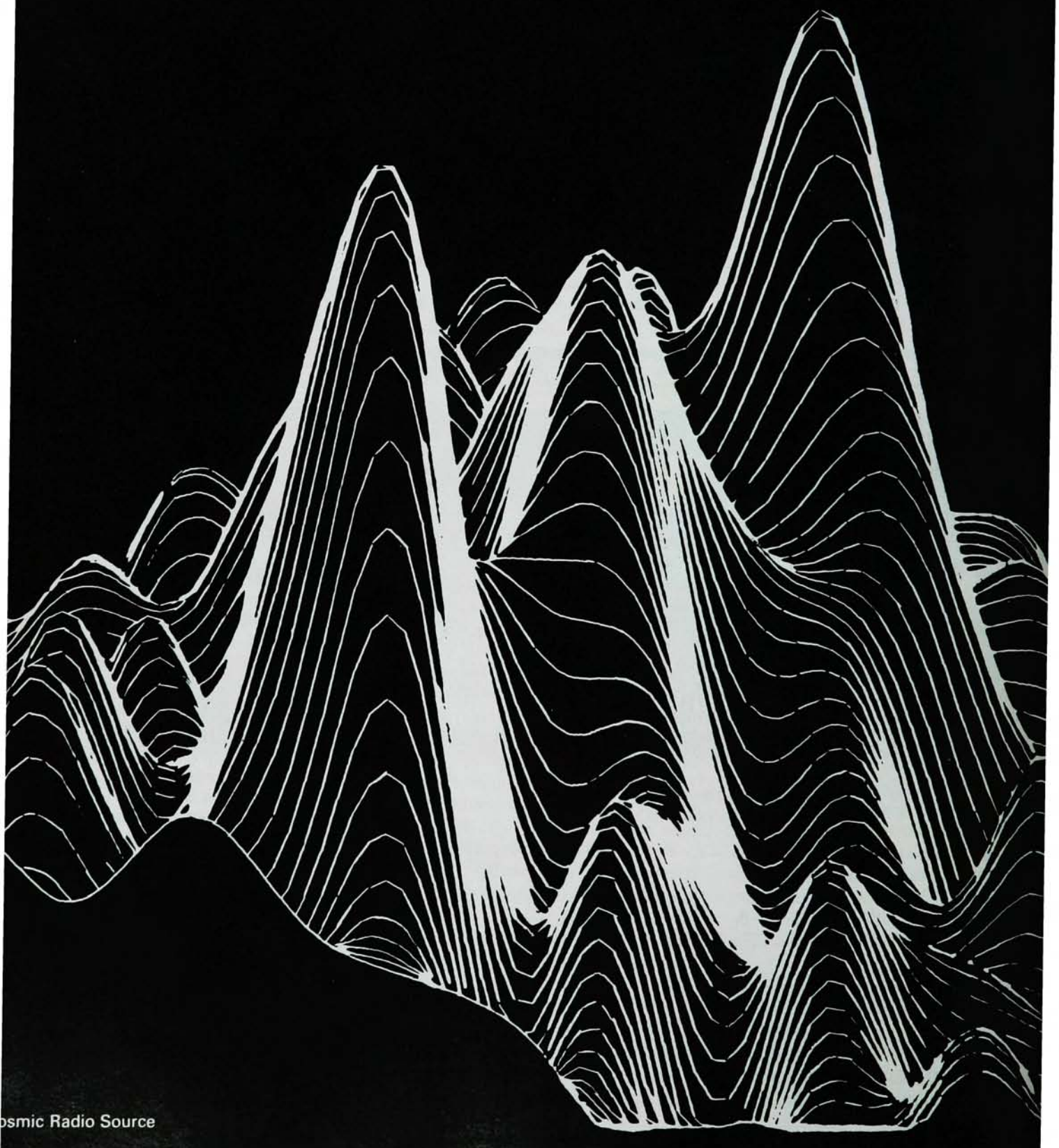
Computer Applications
Space Surveillance Techniques
Re-entry Physics
Space Communications

A description of the Laboratory's work will be sent upon request.



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phasize derivations but rather provides detailed procedures for testing and arriving at a specified computational error that might be caused by rounding errors and degree of approximation. Even though its treatment is limited, the book provides a much needed compendium of computational methods applicable for the solution of many common problems.

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The reviewer is with the University of California, San Diego, and is a machine user both for the numerical evaluation of theoretical expressions and for the practical applications of radiation dosimetry.

NEW BOOKS

ELEMENTARY PARTICLES

Phenomenological Theories of High Energy Scattering: An Experimental Evaluation. By Vernon D. Barger and David B. Cline. 201 pp. W. A. Benjamin, New York, 1969. Cloth $15.00, paper $6.95

Theory and Phenomenology in Particle Physics, Part A and B. A. Zichichi, ed. 315 pp. Academic, New York, 1969. $14.00

Springer Tracts in Modern Physics, Vol 49: Electron Scattering, Photoexcitation and Nuclear Models; Baryon Current Solving SU(3), Charge-Current Algebra. G. Höhler, ed. 146 pp. Springer-Verlag, New York, 1969. $11.00

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Introduction to Nuclear Physics and Chemistry. (2nd edition). By Bernard G. Harvey. 463 pp. Prentice-Hall, Englewood, N. J., 1969. $14.95

Advances in Nuclear Physics, Vol 3. Michel Baranger and Erich Vogt, eds. 480 pp. Plenum, New York, 1969. $22.50

Induced Radioactivity. By Marcel Barbier. 424 pp. Wiley (Interscience), New York, 1969. $21.00

ELECTRICITY AND MAGNETISM

Francis Bitter, Selected Papers and Commentaries. T. Erber and C. M. Fowler, eds. 551 pp. MIT Press, Cambridge, Mass., 1969. $20.00

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Magnétodynamique des Fluides. (2nd edition). By Henri Cabannes. 289 pp. Centre de Documentation Universitaire, Paris, 1969.

Nonlinear Plasma Theory. By R. Z. Sagdeev and A. A. Galeev. 122 pp. W. A. Benjamin, New York, 1969. Cloth $12.50, paper $4.95

Flow Equations for Composite Gases. J. M. Burgers ed. 332 pp. Academic Press, New York, 1969. $18.50

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Tunneling In Solids: Solid State Physics Supplement 10. C. B. Duke, ed. 353 pp. Academic Press, New York, 1969. $16.00

Applied Solid State Science, Vol. 1: Advances In Applied Solid State Physics. Raymond Wolfe, ed. 404 pp. Academic Press, New York, 1969. $15.00

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Geophysics and Space Data Bulletin, Vol. 6. Anne L. Carrigan, ed. 359 pp. US Air Force, L. G. Hanscom Field, Mass.

Annual Review of Astronomy and Astrophysics, Vol. 7. Leo Goldberg, ed. 717 pp. Annual Reviews, Palo Alto, Calif., 1969. $8.50

Eclipse Phenomena in Astronomy. By F. Link. 271 pp. Springer-Verlag, New York, 1969. $19.50

BIOPHYSICS

Biology and the Physical Sciences. Samuel Devons, ed. 379 pp. Columbia Univ. Press, New York, 1969. $12.50

THEORY AND MATHEMATICAL PHYSICS

Springer Tracts in Modern Physics, Vol. 50; Current Algebra and Phenomenological Lagrange Functions. (Papers from 1st International Summer School for Theoretical Physics, Univ. of Karlsruhe, 22 July–Aug., 1968). G. Höhler, ed. 156 pp. Springer-Verlag, New York, 1969. $11.00

Stochastic Theory and Cascade Processes. By S. Kidambi Srinivasan. 216 pp. American Elsevier, New York, 1969. $12.50

Men of Physics: L. D. Landau, Vol. 2: Thermodynamics, Plasma Physics and Quantum Mechanics. By D. Ter Haar. 198 pp. Pergamon, New York, 1969. Cloth $5.50, paper $3.25

Fruhgeschichte der Quantentheorie, 1899–1913. By A. Hermann. 181 pp. Physik Verlag, Mosbach in Baden, 1969.

Quantum Chemistry: Elementary Principles and Methods. By N. V. Riggs. 243 pp. Macmillan, Toronto, Canada. 1969. $9.95

Elements of Advanced Quantum Theory. By J. M. Ziman. 269 pp. Cambridge Univ. Press, New York, 1969. $9.50

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