to be the most important proximate factor in the density-dependent regulation of bird populations. He presents evidence of the direct influence on clutch size of food availability at the time of laying. He also shows that the availability of food during incubation and nestling life affects reproduction success. That starvation outside of the season of reproduction is an important factor is largely inferred rather than confirmed by actual data, but Lack argues strongly for the hypothesis.

Of more than usual interest is his critical approach to findings consistent with his own thesis and his efforts to represent other points of view. A useful 31-page appendix, in three sections, considers theoretical controversies concerning animal populations. The first section gives a chapter-by-chapter summary of his 1954 book and considers four major criticisms of it. He discusses agreements and differences expressed by E. M. Nicholson regarding the application of the density-dependent mechanisms. The second section deals with criticism by H. G. Andrewartha and L. C. Birch of the importance of density-dependent factors in population dynamics. The third section considers in critical detail dispersion and social interaction in population regulation as proposed by V. C. Wynne-Edwards.

I find the book well composed and provocative. It brings together in one place pertinent parts of significant population studies and treats them critically. Although it deals chiefly with birds, the underlying principles must apply widely to other vertebrate and to invertebrate animals.

L. RICHARD MEWALDT
Department of Biological Sciences,
San Jose State College,
San Jose, California

Temperature and Order

The Quest for Absolute Zero. The Meaning of Low Temperature Physics. K. MENDELSSOHN. McGraw-Hill, New York, 1966. 256 pp., illus. Paper, $2.45.

Until about 1900, the objective of low-temperature research was simply to liquefy gases with lower and lower boiling points and thereby obtain ever decreasing temperatures. In 1908 when helium was finally liquefied and a temperature of 1 degree absolute had been reached, it seemed neither feasible nor profitable to seek still lower temperatures. However, with the development of the quantum theory and the third law of thermodynamics, the situation changed rapidly and the investigation of the last few fractions of a degree above absolute zero assumed importance. It was known that there exist systems, such as paramagnetic salts, which from a statistical point of view are in a state of complete disorder even at 1 degree absolute, and consequently are still at a very "high" temperature.

In order to learn how such systems ultimately achieved order, it became necessary to study them at lower temperatures. At the same time it was realized that by virtue of their disorder these systems themselves furnish a means of reaching temperatures much below 1 degree absolute. The exciting discoveries of superfluidity in helium and of superconductivity in metals had already provided great incentive for investigating lower regions. Today the study of matter near absolute zero is not only one of the most flourishing branches of pure science but has also given rise to a new technology. In the words of the late Sir Francis Simon, it is a region where "man has considerably surpassed Nature herself."

The Quest for Absolute Zero is a fascinating account of the development of low-temperature physics. Starting from the liquefaction of oxygen by Cailletet in 1877, the author narrates, with many interesting details, the entire story of the liquefaction of gases, ending with the liquefaction of helium by Kamerlingh Onnes. He then discusses the origin of the quantum theory and of the third law of thermodynamics, explaining clearly how these developments influenced the progress of low-temperature research. This is followed by an up-to-date account of the phenomenon of magnetic cooling (which made it possible to obtain temperatures within a few millionths of a degree), superconductivity, and superfluidity in helium. Experimental and theoretical aspects of all these phenomena are discussed with the help of a large number of explanatory diagrams and pictures.

Mendelssohn has succeeded in conveying to the reader the atmosphere of excitement and mystery which accompanied the unexpected and challenging new discoveries near absolute zero. The narrative is enlivened by zestful anecdotes about the rivalries and clashes between personalities who competed with each other in this field. The book is intended both to serve as an introduction for university students and to be of interest to the general reader. It fulfills its dual purpose well.

M. YAQUB
Department of Physics,
Ohio State University, Columbus

Decision Makers in the U.S.S.R.

Managerial Power and Soviet Politics. JEREMY R. AZRAEL. Harvard University Press, Cambridge, Mass., 1966. 258 pp. $4.95.

Azrael lays the foundation for his analysis at the outset with a series of questions: "Is it true that the managers have acquired an increasingly powerful voice in the policy-making process? What truth is there in the view that the managers have served as representatives of the broader ranks of the technical intelligentsia or 'new class' within the political arena? Have the managers utilized their political influence to move the system in the direction anticipated by the liberal-democratic or the administrative-technocratic school?" (p. 5). To each of these provocative questions Azrael voices a cautious no. Important as the managerial elite in the Soviet Union is and has been, he does not find evidence that managers will be playing an innovating role in Soviet politics.

A careful and rewarding analysis of the Soviet managerial elite supports the reservations of the author on the imminence of a Soviet managerial revolution. He traces the Soviet manager through the various periods of development over the 50 years of Soviet power. In successive chapters he deals with the ideological background with which the Bolsheviks approached the managerial problem in the civil war; the "bourgeois specialists" of the New Economic Policy (1921–1927); the emergence of the "Red Directors" with the initiation of the Five-Year Plans in 1928; the managerial elite after the purges of 1937–38; and the new post-war, post-Stalin, developing managerial elite.

In his analysis of the political role of the manager, Azrael uses a definition of the manager similar to that employed by David Granick in *The Red Executive* and Joseph Berliner in *Factory and Manager in the U.S.S.R.*, that is, "those executives who have borne primary responsibility for the

administration of Soviet heavy industries" (p. 7). A judgment on Azrael's conclusion to his general questions turns on his definition of the managerial elite and the analysis of post-Stalin change in the Soviet decision-making process. Perhaps the group interested in economic efficiency and in the delegation of authority in economic matters to professionals should not be called simply managers. Albert Parry takes a much broader view in his reference to the New Class in his book on a similar topic (*New Class Divided*). In my opinion, the proper definition lies somewhere between Azrael's concept and Parry's. In the U.S.S.R. of today it should include such leading economists and mathematicians as Nemchinov, Novozhilov, and Kantorovich; central planners such as Malyshev; and certain heads of ministries. There is, to be sure, no monolithic view in this group; for each one named, others could be suggested with differing views as to the change and the political role of their professional group. The change they seek may be limited, involving mainly the use of familiar economic and mathematical techniques of analysis and for improvements in the data for various policy decisions; but because techniques such as input-output analysis, linear programming, and the like are complex, the character of the elite would change, and the possibility exists that the allocation of resources might also substantially change. In this context, the more broadly defined managerial-economist elite might well have an innovating role in the Soviet political process. Looking at it in this light we might identify elements of a new generation of economists-managers whose vested interest and professional standing would impel them toward basic change.

It is, however, not only the definition of the managerial elite that poses a problem in our acceptance of Azrael's negative judgments. Adding to our uneasiness is his focus on earlier periods in the evaluation of current change, which by its essence must draw from very current indicators that are, in many instances, only recently and somewhat ambiguously evident. Pluralism is a very new and tentative development in Soviet life. Azrael raises serious doubts of the imminence of an economic-managerial revolution in changing Soviet society. He characterizes the Soviet system (p. 179) as one that is "directed toward the creation and maintenance of a state of permanent revolution." The most recent evidence casts doubt on, if it does not entirely belie, this statement.

This book nevertheless represents a first-rate analysis and a substantive contribution to our knowledge of the Soviet system. Soviet society appears currently to be in flux, and the readers of *Science* would profit from reading the book in the light of the increasingly provocative evidence of change in the Soviet political scene.

JOHN P. HARDT
Institute of Sino-Soviet Studies, George Washington University, Washington, D.C.

New Books

The Selected Papers of E. S. Pearson. Issued by the *Biometrika* Trustees to celebrate his 30 years as editor. Univ. of California Press, Berkeley, 1966. 335 pp. Illus. $6.75. Twenty-one papers.

Semiconductor Circuits: Worked Examples. J. R. Abrahams and G. J. Pridham. Pergamon, New York, 1966. 220 pp. Illus. Paper, $5. Commonwealth and International Library.

A Simple Approach to Electronic Computers. E. H. W. Hersee. Gordon and Breach, New York, ed. 2, 1966. 273 pp. Illus. $7.50.

Skull Radiography: A Simplified System. Joseph Selman. Thomas, Springfield, Ill., 1966. 225 pp. Illus. $11.50.

The Social Organization of the Marri Baluch. Robert N. Pehrson. Aldine, Chicago, 1967. 143 pp. Illus. $5.

The Sociological Tradition. Robert A. Nisbet. Basic Books, New York, 1966. 361 pp. $7.95.

Solvent Effects on Reaction Rates and Mechanisms. Edward S. Amis. Academic Press, New York, 1966. 340 pp. Illus. $10.50.

Soviet Socialized Medicine: An Introduction. Mark G. Field. Free Press, New York, 1967. 253 pp. Illus. $6.95.

Stationary and Related Stochastic Processes. Sample function properties and their applications. Harald Cramér and M. R. Leadbetter. Wiley, New York, 1967. 362 pp. Illus. $12.50.

Stream Flow: Measurements, Records and Their Uses. Nathan Clifford Grover and Arthur William Harrington. Dover, New York, 1966. 387 pp. Illus. Paper, $2.25. Reprint, 1943 edition.

Steroid Dynamics. Proceedings of a symposium on the Dynamics of Steroid Hormones (Tokyo), May 1965. Gregory Pincus, Takeshi Nakao, and James F. Tait, Eds. Academic Press, New York, 1966. 595 pp. Illus. $20. Twenty-one papers.

Structure of High-Resolution NMR Spectra. P. L. Corio. Academic Press, New York, 1966. 560 pp. Illus. $15.

Structure of the Stratosphere and Mesosphere. Willis L. Webb. Academic Press, New York, 1966. 392 pp. Illus. $15.

Structures and Functions of the Human Body. Gordon Scott MacGregor. Oxford Univ. Press, New York, 1966. 664 pp. Illus. $8.

Summable Series and Convergence Factors. Charles N. Moore. Dover, New York, 1966. 113 pp. Paper, $1.50. Reprint, 1938 edition.

Symbolic Shorthand System. Hans Selye. Rutgers Univ. Press, New Brunswick, N.J., 1966. 89 pp. Illus. Paper, $3.50. Rutgers Series on Systems for the Intellectual Organization of Information.

Taiwan Aborigines: A Genetic Study of Tribal Variations. Chen Kang Chai. Harvard Univ. Press, Cambridge, Mass., 1967. 256 pp. Illus. $9.

Teacher's Guide and Systems Manual for Probing into Science. American Book Company, New York, 1967. 254 pp. Paper.

Technology, Economic Growth, and Public Policy. Richard R. Nelson, Merton J. Peck, and Edward D. Kalachek. Brookings Institution, Washington, D.C., 1967. 252 pp. Illus. $6.

Theories of Child Development. Alfred L. Baldwin. Wiley, New York, 1967. 630 pp. Illus. $8.95.

Theory of Crystal Defects. Proceedings of a Summer School (Hrazany, Czechoslovakia), September 1964. Boris Gruber, Ed. Czechoslovak Acad. of Sciences, Prague; Academic Press, New York, 1966. 415 pp. Illus. $15. Twelve papers.

The Theory of Equilibrium of Elastic Systems and Its Applications. Carlo Alberto Pio Castigliano. Translated from the French (Turin, Italy, 1879) by Ewart S. Andrews. Dover, New York, 1966. 424 pp. Illus. Paper, $3. Reprint, 1919 edition.

Theory of Motivation. Robert C. Bolles. Harper and Row, New York, 1966. 556 pp. Illus. $10.75.

Thermodynamics: Principles and Applications to Engineers. Ernst Schmidt. Translated from the third German edition by J. Kestin. Dover, New York, 1966. 552 pp. Illus. Paper, $3. Reprint, 1949 edition.

Thin-Layer Chromatography. Kurt Randerath. Translated from the German by D. D. Libman. Verlag Chemie, Weinheim; Academic Press, New York, ed. 2, 1966. 299 pp. Illus. $9.50.

Thorium: Its Industrial Hygiene Aspects. Roy E. Albert. Academic Press, New York, 1966. 236 pp. Illus. $7.

Topics in the Theory of Functions of Several Complex Variables. William Fogg Osgood. Dover, New York, 1966. 124 pp. Paper, $1.50. Reprint, 1914 edition.

Transcendental Functions: Satisfying Nonhomogeneous Linear Differential Equations. A. W. Babister. Macmillan, New York, 1967. 428 pp. Illus. $14.95.

Tribal and Peasant Economies. Readings in economic anthropology. George Dalton, Ed. Published for the American Museum of Natural History. Natural History Press, Garden City, N.Y., 1967. 600 pp. Illus. Paper, $2.95. American Museum Sourcebooks in Anthropology. Twenty-nine papers.

X-ray and Neutron Diffraction. G. E. Bacon. Pergamon, New York, 1966. 378 pp. Illus. Paper, $7.50. Commonwealth and International Library.