LETTERS


EDITORIAL

The Spirit of Science

ARTICLES

Leaf Protein as a Human Food: N. W. Pirie

Leaf protein, known to be nutritionally adequate, now awaits efficient manufacture and wide acceptance.

A Theory of Ice Ages III: W. L. Donn and M. Ewing

The theory involving polar wandering and an open polar sea is modified and given a quantitative basis.

Components of Skilled Performance: M. I. Posner

Human limitations of attention and memory are basic to the analysis of skilled performance.

Science and the Space Program: F. Seitz

Technology and maintenance of peace have been enhanced at less cost to other endeavors than is often supposed.

Electrophoresis: An Accident and Some Precautions: E. W. Spencer, V. M. Ingram, C. Levinthal

New safety measures have been devised following a fatal accident with high-voltage electrophoresis apparatus.

NEWS AND COMMENT

Basic Research: Political Tides Are Shifting—Congress: New Deal for Narcotic Addicts—Hospital Integration: Deadline Approaching

BOOK REVIEWS

The Prehistoric Culture of Ecuador: E. N. Ferdon, Jr.

The Circular Functions, reviewed by D. J. Dessart; other reviews by F. E. Hunter, Jr., G. Hardin, R. H. Manville, R. C. Anderson, R. B. Merrifield, L. Kartman, J. M. Luttinger, R. L. Black; New Books
REPORTS

Surveyor I: Preliminary Results: L. D. Jaffe et al. ........................................ 1737

Homolanthionine Excretion in Homocystinuria: T. L. Perry, S. Hansen, L. MacDougall .......................... 1750

Lysosomal Nature of Juxtaglomerular Granules: E. R. Fisher ........................................ 1752

Lipids of the Living Coelacanth Latimeria chalumnae: J. C. Nevenzal et al. ............... 1753

Survival of Mammals Breathing Organic Liquids Equilibrated with Oxygen at Atmospheric Pressure: L. C. Clark, Jr., and F. Gollan ............... 1755

Actin: Volume Change on Transformation of G-Form to F-Form: T. Ikkai, T. Ooi, H. Noguchi ........................................ 1756

Versatile Perfusion Chamber for Living Cells and Organs: P. R. White ....... 1758

1-Adamantanamine Hydrochloride: Inhibition of Rous and Esh Sarcoma Viruses in Cell Culture: A. M. Wallbank, R. E. Matter, N. G. Klinikowski .......... 1760

Cytochemical Localization of Lactate Dehydrogenase in Muscular Dystrophy of the Mouse: H. D. Fahimi and P. Roy ........................................ 1761

Antarctic Asteroid Odontaster validus: Constancy of Reproductive Periodicities: J. S. Pease ........................................ 1763

Reserpine: Inhibition of Olfactory Blockage of Pregnancy in Mice: C. J. Dominic ........ 1764

Gibberellic Acid: Effects of Feeding in an Artificial Diet for Honeybees: J. L. Nation and F. A. Robinson ........................................ 1765


Visual Receptive Fields in the Cat's Retina: Complications: D. N. Spinelli ........ 1768

MEETINGS

Physiological Sciences: H. S. Mayerson; Great Lakes Research: B. M. McCormac and J. E. Ash; Forthcoming Events ........................................ 1770

COVER

Footpad of Surveyor I spacecraft resting on the lunar surface. Depression in soil caused by impact of pad is apparent. Surface material has been pushed up and thrown out to form a raised rim. The disturbed soil is apparently fine-grained and aggregates into chunks. At top of pad are television test target and an attitude-control jet which was used in test to blow gas against the surface. The photograph has been digitized and corrected by computer for the frequency response of the television system. See page 1737. [JPL-NASA photograph]
The Spirit of Science

School and college enrollments are increasing. Students are using better texts and teaching materials. Team teaching, television, language laboratories, and other innovations are coming into wider use. More attention is being given to how children learn and to how learning and teaching can be improved. Nations are helping other nations to reform and improve their educational systems. Now, into the midst of all this change, comes a proposal for a more fundamental and sweeping change than any yet seen. The Educational Policies Commission (of the National Education Association and the American Association of School Administrators) offers the radical proposal that education—all of education—be infused with the spirit of science.*

The spirit of science is defined in terms of seven underlying values: longing to know and to understand; questioning of all things; search for data and their meaning; demand for verification; respect for logic; consideration of premises; and consideration of consequences. The authors call these the values of science; one might also call them the values of rational thought.

In discussing these values, they are not talking about the education of scientists or the subject matter of science, but about the basic objectives or methods of thought that should characterize all education. What is advocated is "the understanding that the spirit of science applies to other facets of man's existence. . . . The values of which the spirit of science consists should permeate the educative process, serving as objectives of learning in every field, including the humanities and practical studies."

So great a change will require a revolution in attitudes and methods of teaching and in the methods of educating teachers. Perhaps the revolution will fail; the Educational Policies Commission speaks only for its 20 members. Some of their past statements, however, have become influential parts of the educational literature, and perhaps this one will also. If it does, the change will be revolutionary indeed, for the goal is no less than "the development of persons whose approach to life as a whole is that of a person who thinks—a rational person." The spirit and values of science "can enable each person to free himself from blind obedience to the dictates of his emotions, of propaganda, of group pressures, of the authority of others. . . . It can enable him to sift through the forces which act upon him and, to some degree, to determine and to become his own ideal self." The spirit underlying science "can enable entire peoples to use their minds with breadth and dignity and with striking benefit to their health and standard of living. It promotes individuality. It can strengthen man's efforts in behalf of world community, peace, and brotherhood. . . . Insofar as an individual learns to live by the spirit of science, he shares in the liberation of mankind's intelligence and achieves an invigorating sense of participation in the spirit of the modern world. To communicate the spirit of science and to develop people's capacity to use its values should therefore be among the principal goals of education in our own and every other country."

It is easy to criticize these lofty goals as being too idealistic, to say that other persons have espoused similar ideals, or to point out that we do not yet know how to foster the development of rational thought in all students and may never be able to do so in some. No matter, it is good to have a banner held high. And great significance can be attached to the fact that this banner has been raised in the heartland of the educational establishment.—Dael Wolffe

*The Spirit of Science can be obtained from the Educational Policies Commission, National Education Association, 1201 16th Street, NW, Washington, D.C. 20036.