LETTERS

History of Science: Perceptions: C. C. Gillispie; R. E. Kohler; Occupational Lead Exposure and Cancer: H. K. Kang, P. F. Infante, J. S. Carra ............................................. 934

EDITORIAL

The Oil Price Spiral ............................................. 937

ARTICLES

A Simple Description of the 3 K Cosmic Microwave Background: P. S. Henry .......... 939
Modeling the Climatic Response to Orbital Variations: J. Imbrie and J. Z. Imbrie .... 943
DNA Gyrase and the Supercoiling of DNA: N. R. Cozzarelli ................................. 953

NEWS AND COMMENT

MX Faces Stiff Political Test in Nevada ............................................. 961
Briefing: Hazardous Wastes Cause International Stink; Science Groups Consider a Soviet Boycott; EPA Receives First Prod on Toxic Substances ................................. 962
Museum and Patron at Odds over Sub ............................................. 964
Congress Moves to Relax Curbs on CIA ............................................. 965

RESEARCH NEWS

Testing for Cancer Risk ............................................. 967
Genes and Cancer: The Story of Wilms Tumor ............................................. 970

BOOK REVIEWS

Citation Indexing, reviewed by R. McGinnis; Herbivores, M. D. Rausher; The Properties of Diamond, F. P. Bundy; The Soil-Root Interface, W. R. Gardner; Books Received ............................................. 972
REPORTS

Hektor: The Largest Highly Elongated Asteroid: W. K. Hartmann and D. P. Cruikshank ......................................................... 976

Electron Spin Resonance Dating of Animal and Human Bones: M. Ikeya and T. Miki ............................................................... 977

Isotopic Disequilibrium of Uranium: Alpha-Recoil Damage and Preferential Solution Effects: R. L. Fleischer ................................ 979

Viscous Flow Circulation of the Solar Wind Behind Venus: H. Pérez-de-Tejada .......................................................... 981

Nutrient and Oxygen Redistribution During a Spring Neap Tidal Cycle in a Temperate Estuary: K. L. Webb and C. F. D’Elia .... 983

Inhibition of Cellular Proliferation of Imaginal Epidermal Cells by Diflubenzuron in Pupae of the Stable Fly: S. M. Meola and R. T. Mayer 985

Phosphorus Sources for Aquatic Weeds: Water or Sediments?: R. Carignan and J. Kalf ................................................ 987

Carbon Dioxide Sensitivity in Mosquitoes Infected with Sigma, Vesicular Stomatitis, and Other Rhabdoviruses: L. Rosen ................ 989

Elevated Superoxide Dismutase in Black Alcoholics: B. C. Del Villano et al ................................................................. 991


Tissue Specificity of Enzyme Expression Regulated by Diffusible Factors: Evidence in Drosophila Hybrids: W. J. Dickinson ......... 995

Chronic Arthritis in Goats Caused by a Retrovirus: T. B. Crawford et al .................................................. 997

Genetic Differences in Physiological Tolerances of Amargosa Pupfish (Cyprinodon nevadensis) Populations: M. F. Hirshfield, C. R. Feldmeth, D. L. Soltz .................. 999

Temperature Sensitivity of Tone in the Rabbit Facial Vein: Myogenic Mechanism for Cranial Thermoregulation?: R. J. Winquist and J. A. Bevan .................................................. 1001

High-Frequency Sensitivity in Infants: B. Schneider, S. E. Trehub, D. Bull .................................................. 1003


Covers

Nearly cloud-free view of Vatnajökull ice cap, which covers about 8400 square kilometers at 64°30′N along the southeastern coast of Iceland. Landsat image shows the extent of snow- and ice-free ground on 22 September 1973. See page 943. [R. S. Williams, Jr., U.S. Geological Survey, Reston, Virginia]
The Oil Price Spiral

Recent events, coupled with those of the last several years, point toward three conclusions:

- Supplies of Middle Eastern oil are subject to sudden interruption.
- Excessive dependence on such oil invites World War III.
- The oil cartel could easily further increase its revenues while cutting production.

Any one of these considerations should be sufficiently persuasive to induce the consuming nations to seek to limit dependence on imported oil. In practice, the most effective goal is likely to be high prices. Past experience indicates that the limit on what OPEC can charge has not yet been reached. A small shortfall of supplies can lead to a great increase in price. In 1973 and 1974, production of oil in the free world was cut by 10 percent. A quadrupling of the price of oil followed quickly. The revolution in Iran led to a decrease in production there, but increases elsewhere held the drop to about 5 percent. This shortfall gave rise to a doubling of the price of oil. Imports by the developed countries have been little affected by the doubling, although at the moment there is a softening of prices on the spot market.

It is obvious that OPEC could extract much more money from the consumers while extracting less oil from the earth. The questions become: When will the next major squeeze occur, and how high will the price go? Any estimate is a wild guess, but a further doubling could occur within a year.

Price increases might be avoided if demand for oil were curtailed substantially. For the short term, this could be achieved by drastic conservation in the developed countries—for example, by gasoline rationing—but at the moment meaningful conservation seems politically unfeasible. For the longer term, prospects for cutting the use of oil are better, and one can visualize how the price spiral might eventually be brought under control through conservation and by the development of renewable energy sources. For the intermediate term, the most feasible solution is enhanced substitution of coal for oil and natural gas.

The energy potentially available in the form of coal is more than an order of magnitude greater than in oil. Important amounts of coal are present in many countries, including all the continents. Most important, the cost of thermal energy from coal is already substantially less than that from oil. In some parts of the world, the contrast is a factor of ten or more. Prospects for steadiness in the price of coal are good, and the large number of potential sources frees coal from the kind of political instability that now characterizes oil.

Quick substitution of coal is feasible in only a limited number of situations where oil had previously replaced coal. But the current contrasts in costs and uncertainties are serving as powerful incentives for exercise of ingenuity in adapting to coal. Action or lack of action by the United States will be an important factor in determining how fast substitution of coal will occur. More coal could readily be produced for both domestic and foreign consumption, but actions to implement the switch to coal have been slow. Many foreign countries would like to obtain coal here, and delegations from France, West Germany, Japan, Spain, and Denmark have come to the United States during the last 2 months. However, concern has been expressed about the unreliability of supplies due to sudden domestic political moves and about the lack of infrastructure for experts. To make a really significant impact on world energy would require the existence of better rail transport, enlarged port facilities, and larger coal-carrying ships.

Switching toward use of coal will not be easy. However, new technology is being developed to improve the convenience and versatility of coal as a source of energy and chemicals. The United States can make many contributions to such developments. By moving resolutely this country could be crucial in helping to bring energy prices under control and in reducing dangerous tensions.—PHILIP H. ABELSON

Publisher
WILLIAM D. CAREY
Editor
PHILIP H. ABELSON
Managing Editor
Robert V. Ormes
Assistant Managing Editor
John E. Ringle
Associate Editors
Eleanor Murphy
M. Jean Boffman
Copy Editors
Linda Heiserman, Kaye Kegg
Production
Nancy Hartnagel, John Baker, Shelly Hackett
Book Review Editors
Katherine Livingston, Editor
Linda Heiserman, Kaye Kegg
Copy Editors
Isabella Boulind, Beatrice Hill
Reviews, Reprints, and Permissions
Gracie Finger, Editor
Corinne Harris, Margette Lloyd
Assistant to the Editor
Jack L. Ams
Membership Recruitment
Gwendolyn Huddleson
Member and Subscription Records
Ann Ragland
ADVERTISING CORRESPONDENCE:
Tenth floor, 1515 Broadway, New York, N.Y. 10036. Phone: 212-730-1050.