SCIENCE

27 October 1972

Vol. 178, No. 4059

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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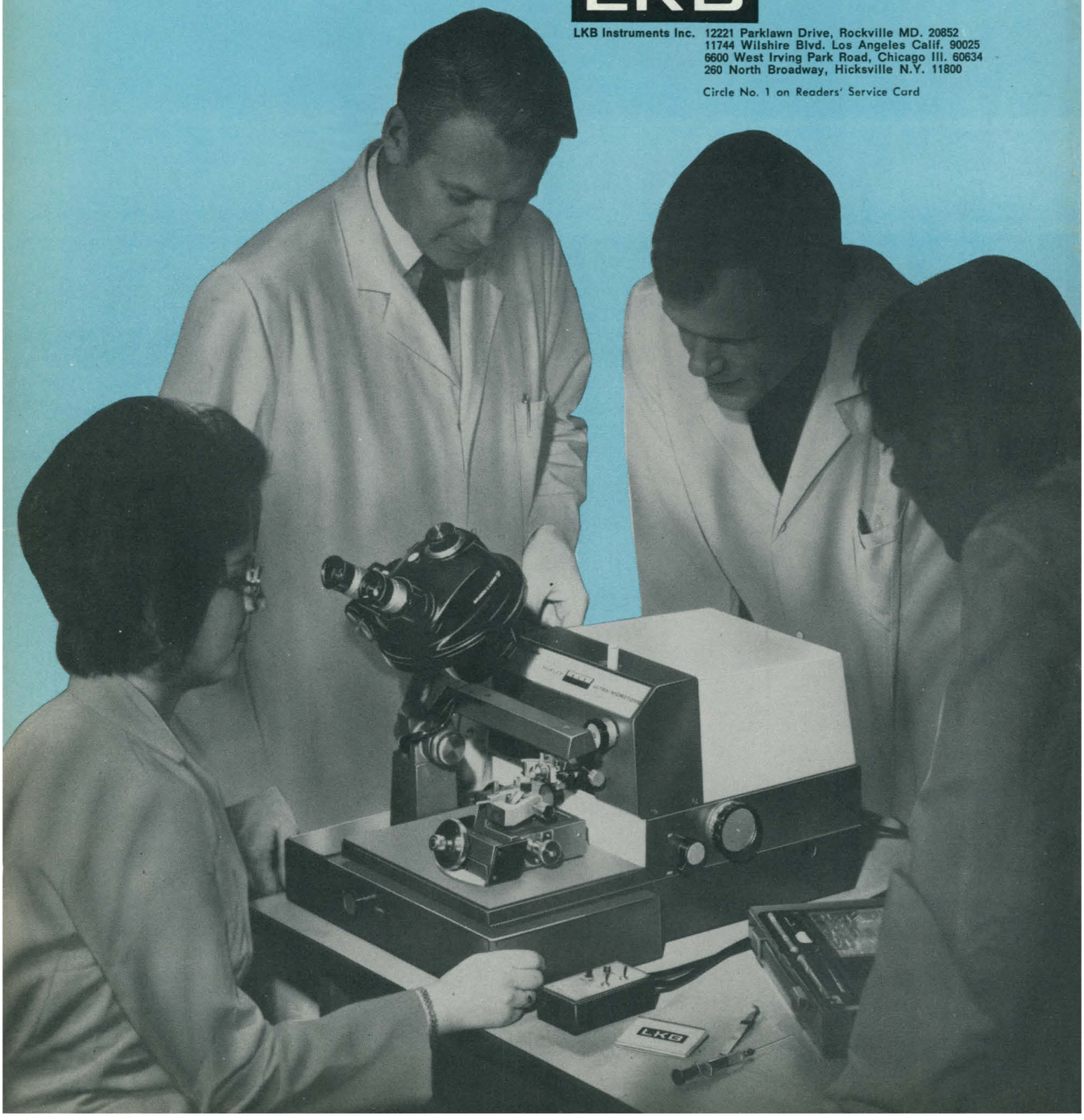

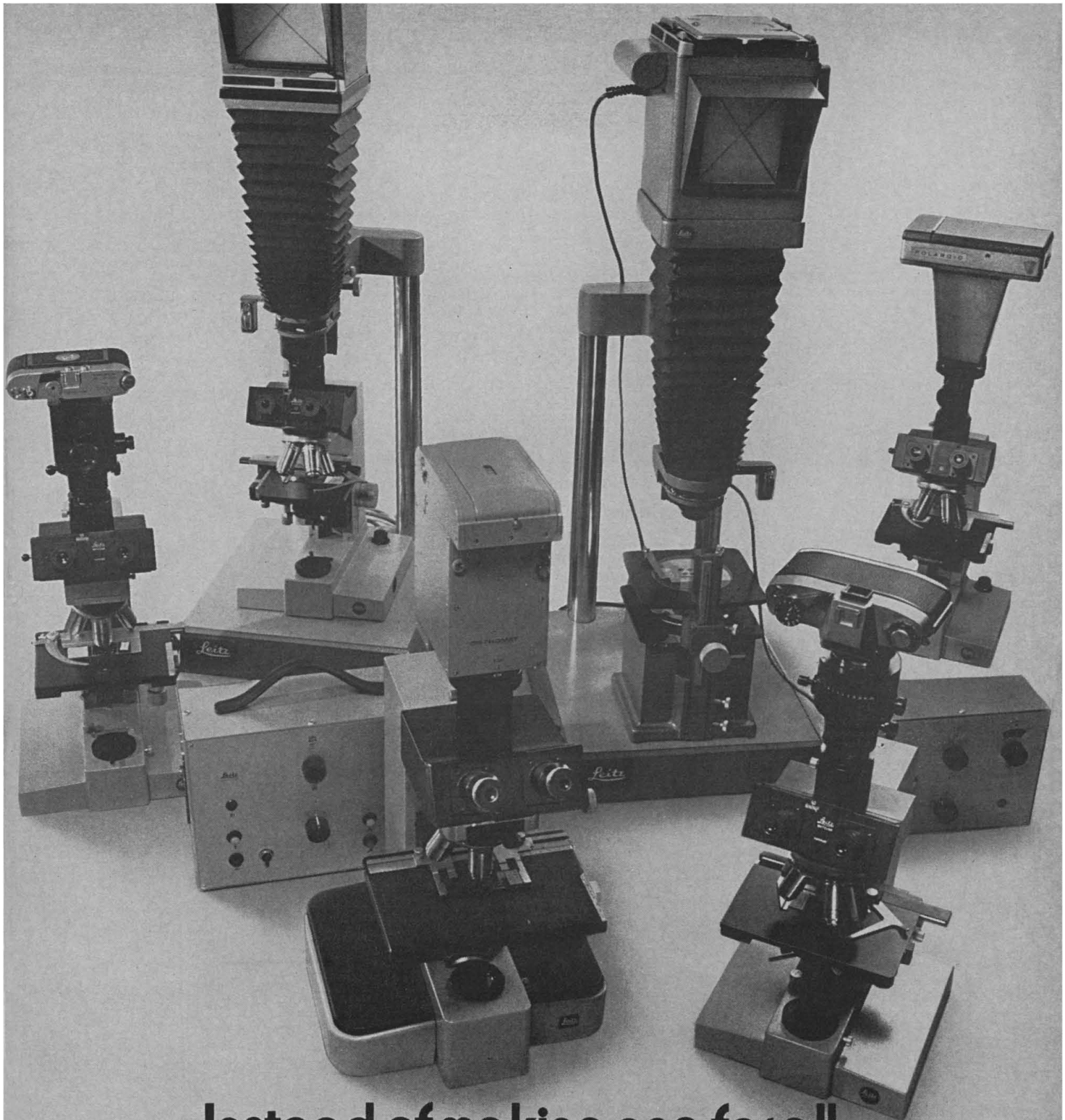

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# SCIENCE





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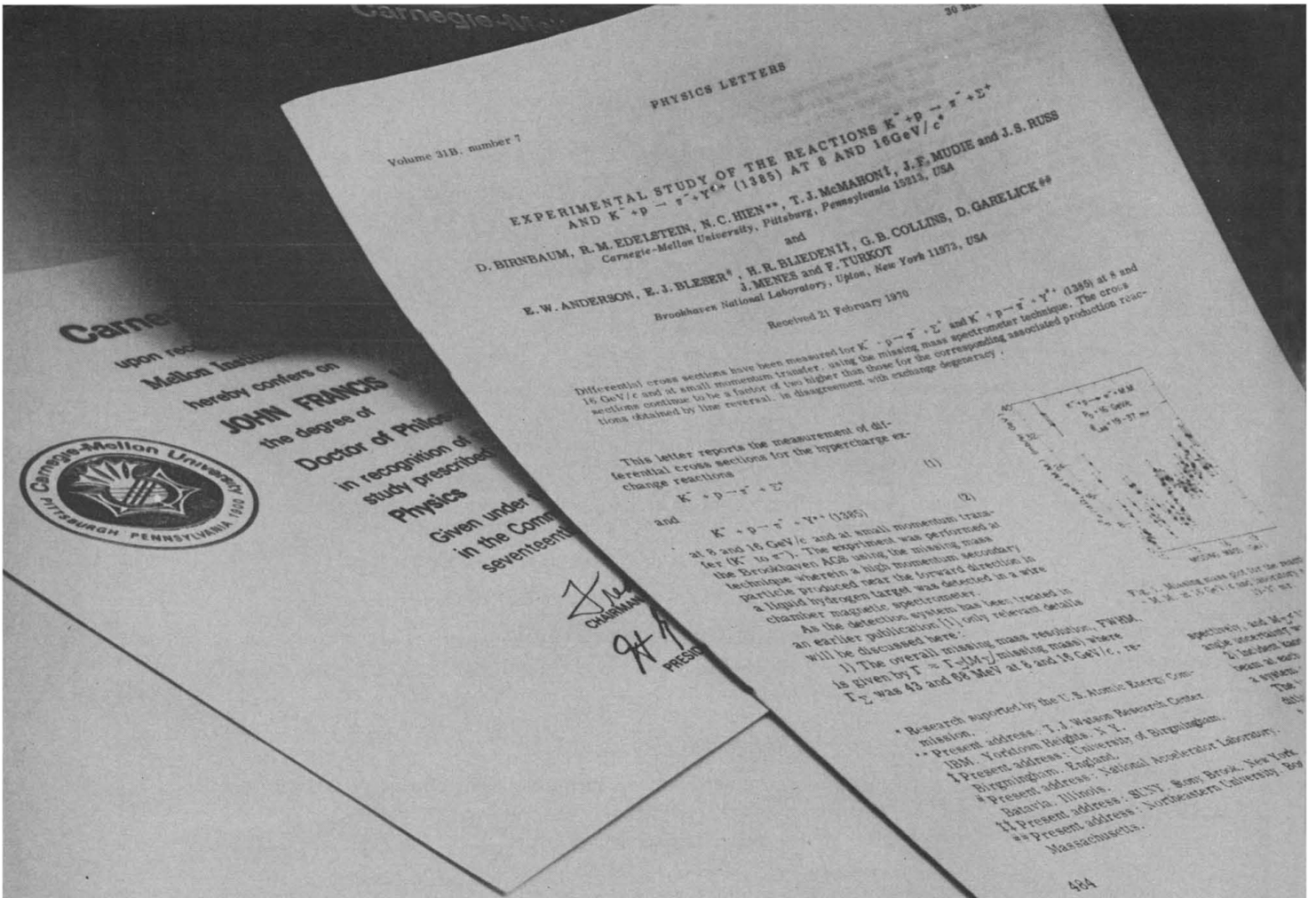
**COVER**

"Frozen-thawed" mouse pups and the albino foster mother who gave birth to them. The pups developed from eight-cell embryos that had been surgically removed from brown genetic mothers, frozen to −196°C for 21 hours, thawed, and then transferred to the oviduct of the foster mother. See page 411. [P. Whittingham, S. Leibo, and P. Mazur, Oak Ridge National Laboratory]




| | |
|---|---|
| 1964 | B.S. in physics, summa cum laude, Pennsylvania State University |
| 1966 | M.S. in high-energy physics, Carnegie Mellon University |
| 1970 | Ph.D. in high-energy physics, Carnegie Mellon University |
| 1967-69 | High-energy physics research, Brookhaven National Laboratory and Argonne National Laboratory. |
| 1966-72 | Co-author of 10 papers, including: "Experimental Study of the Reactions $K^- + p \to \pi^- + \Sigma^+$ and $K^- + p \to \pi^- + Y^{*+}(1385)$ at 8 and 16 GeV/c" "Upper Limits on Rare Two-body Processes in $K^- p$ and $\bar{p}\,p$ Scattering at High Energies" |
| 1970 | Marketing manager, Digital Equipment Corporation |

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that it is the cause of all our urban woes, a thesis lacking empirical support.

Humphreys is incorrect in asserting that I claimed freedom of choice now exists. I said that it is a value which should be given primacy, under the aegis of voluntaristic information and contraception programs. The work of implementing that value has hardly begun.


DANIEL CALLAHAN
*Institute of Society, Ethics and the Life Sciences,*
*Hastings-on-Hudson, New York 10706*


## Research Natural Areas

In his article "Natural areas" (4 Aug., p. 396), William Moir refers briefly to a publication that should receive more attention. *A Directory of Research Natural Areas on Federal Lands of the United States of America* (*1*) is a list of more than 300 research natural areas with their descriptions, locations, and individual information sources. It is cross-referenced by type, state, and species of note and serves as an announcement of the availability of natural areas for appropriate use by scientists and educators.


STEPHEN D. VEIRS
*Redwood National Park,*
*Drawer N,*
*Crescent City, California 95531*


### Reference


1. Federal Commitee on Research Natural Areas, *A Directory of Research Natural Areas on Federal Lands of the United States of America* (Government Printing Office, Washington, D.C., 1968).


## Safety at Rocky Flats

Donald Michels (Letters, 21 July, p. 208) takes issue with Deborah Shapley's disturbing report (News and Comment, 5 Nov. 1971, p. 569) on safety at Dow Chemical Company's Rocky Flats plutonium plant in Colorado. Michels is on the Rocky Flats staff (an affiliation not mentioned in his letter) and thus is hardly a disinterested observer.

Michels appeals to the reader to imagine that plutonium plant safety has evolved somewhat over the past 25 years and that there is no inconsistency in the claims of the Atomic Energy Commission (AEC) that the Rocky

Flats plant is safe and the AEC request for funds to make it safer. However, most improvements at Rocky Flats have been made since the nearly disastrous plutonium fire of May 1969 and the discovery of off-site plutonium contamination. Despite improvements, both plant safety and public safety remain uncertain because (i) the AEC has not complied with the request of the Environmental Protection Agency for a detailed plant-safety analysis, and (ii) neither the National Committee on Radiation Protection and Measurements nor the International Commission on Radiation Protection has recommended plutonium inhalation standards applicable to the general public, including children.

In comments on reports by me and my associates (*1*, *2*) Michels is careless with facts and makes statements out of context, based largely on unpublished sources. Michels claims that plutonium soil data must show a bimodal distribution to establish the presence of plutonium from Rocky Flats. This unsubstantiated speculation is incorrect because it is at odds with unequivocal evidence from $^{239}Pu/^{90}Sr$ ratio data for soils (*2*). Duplicate small soil samples, obtained using carefully tested procedures, have variations attributable to differences in the size and number of plutonium particles present (*2*). Without basis, Michels implies that our data are unreliable because of such variations. Our experimental methods and results have been reported (*2*). If, as Michels suggests, members of the Health and Safety Laboratory of the AEC take exception to some of our conclusions, they should publish their own views.

In January 1970, I attributed the off-site plutonium to the May 1969 fire at Rocky Flats (*1*). The possibility that the off-site plutonium resulted from a 1957 fire or a plutonium-contaminated oil spill was first admitted by Dow representatives on 10 February 1970. Subsequently it was shown (*2*, *3*) that most of the off-site plutonium was due to the oil spill.

Michels incorrectly states that only 17 percent of the winds at Rocky Flats have an easterly component. Possibly he was misled by uncritical consideration of the wind data in Figure 1 of HASL Report No. 235 (*3*), in which the wind frequency scale is incorrect. About 35 percent of the winds have an easterly component, justifying my statement that about one-third of normal stack effluent is carried to the west. Further-

more, I have never questioned the fact that the most frequent winds in Denver over the Platte River valley are southerly to southwesterly. I only question the argument that such winds somehow protect Denver from Rocky Flats plutonium contamination.

In justifying the few Rocky Flats employees on the Transuranium Registry (450 of 7700) Michels makes indefensible statements: "Studies of exposures to workers must naturally be restricted to those persons involved in incidents" and ". . . few of those [plutonium workers] collect significant exposures during their tenure." Cancer risks applicable to the maximum permissible lung burden (MPLB) for plutonium are very uncertain (*4*), and chronic effects of low level plutonium exposure are unknown. Cancer from inhaled plutonium may be due to the irradiation of cells within the short range of alpha radiation around each plutonium particle. If so, the lung cancer risk would depend on the number, size, and persistence of plutonium particles in the lung. On this basis the MPLB is a meaningless concept, and plutonium lung burdens below detectable levels would involve significant risk. Not only plutonium workers, but all others exposed to airborne plutonium at Rocky Flats and its environs, have received plutonium exposures of uncertain consequences.

If the AEC is to be allowed to pursue a plutonium fast breeder program, we must first obtain an adequately comprehensive evaluation of the chronic effects of low levels of plutonium on man. I agree with Shapley that the limited program of medical follow-up of past and present employees of Rocky Flats falls woefully short of the mark.

E. A. MARTELL
*National Center for Atmospheric Research, Laboratory of Atmospheric Research, Post Office Box 1470, Boulder, Colorado 80302*

**References**

1. "Report on the Dow Rocky Flats fire: Implications of plutonium releases to the public health and safety" (Colorado Committee for Environmental Information, Boulder, 1970).
2. S. E. Poet and E. A. Martell, *Health Phys.* **23**, 537 (1972).
3. P. W. Krey and E. P. Hardy, "Plutonium in soil around the Rocky Flats plant" (Report No. HASL-235, Health and Safety Laboratory, Atomic Energy Commission, New York, 1970).
4. A. B. Long, *Nucl. News* **14**, 69 (1971).

## Understanding Science

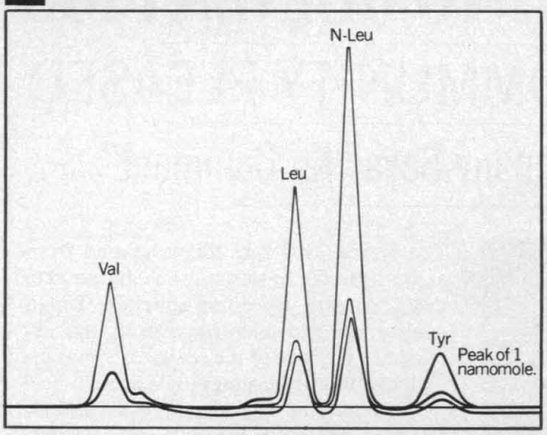
The important effort reported in the editorial "Understanding of science" by Amitai Etzioni (4 Aug., p. 391) needs more than the membership of the AAAS to be successful. Those disenchanted with technology may view the explanations of scientists as propaganda, while similar activities by attorneys, educators, bankers, and other nonscientist professionals could be meaningful to them. A start was made in 1966, with the pamphlet "Education and the spirit of science" issued by the National Education Association (*1*). Why not work with other friendly groups?

MORRIS GORAN
*Roosevelt University, Chicago, Illinois 60605*

**Reference**

1. Educational Policies Commission, "Education and the spirit of science" (National Education Association, Washington, D.C., 1966), now out of print.

# Peak performance.

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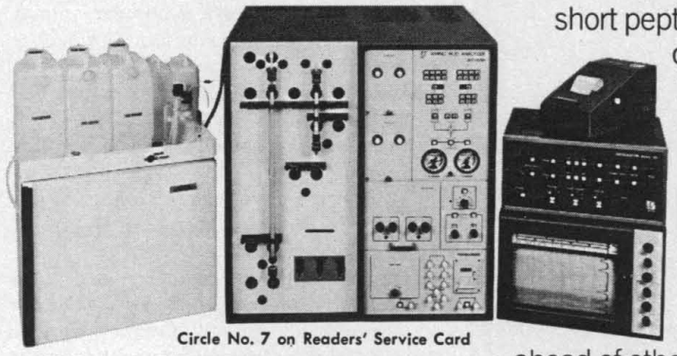

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# The New City Times

Late City Edition

*NEW CITY, ROCKLAND COUNTY, N.Y.*

## THE NEW CARWORTH CATALOGS

### MYTH OR REALITY?

In the course of this newspaper's investigations into the new Carworth guinea pigs, our reporters have also uncovered the fact that Carworth is about to release two new catalogs.

The first of these catalogs presumably deals with Carworth rats and mice and, we suspect, the "secret" guinea pigs, too.

The second catalog seems to cover Carworth's extensive line of laboratory animal care equipment including: animal housing systems, contamination control products like laminar flow devices, bedding, cleaning materials and other accessories and supplies.

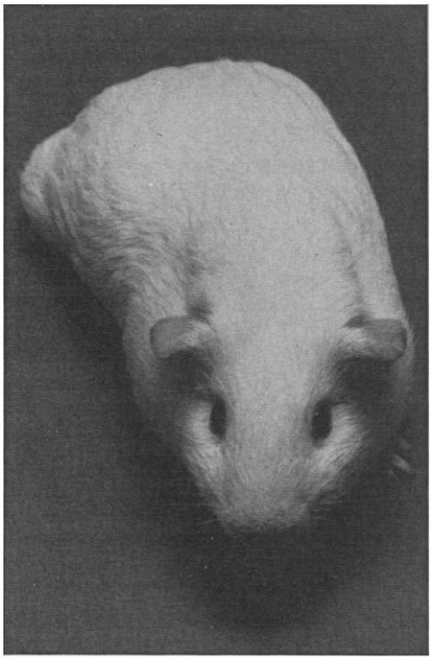
We queried the Carworth advertising agency about the existence of these new catalogs and were told by a representative that they know nothing (Editor's Note: an unusual agency admission!), but that if Carworth *were* to issue new catalogs soon, "they would be likely to be beauties," they stated with characteristic immodesty.

The New City Times can't help but wonder what other surprises these Carworth people have in store for us. In any event, for now we suggest that you write Carworth, New City, (Rockland County), N.Y. 10956 (or call 914/634-8931) and say: "if these new catalogs are not a myth, please send!"

# CARWORTH INTO GUINEA PIGS

## RESEARCH COMMUNITY PLEASED

### Surprisingly, Company Says "No Comment"



**The guinea pig, believed to be a tame form of the cavy, *Cavia cutleri*. The capybara, the largest rodent alive (or even dead, for that matter), is also a well-known cavy.**

The New City Times today learned from an unidentified but usually reliable source, that Carworth, a leading supplier of high quality rats and mice since 1935, has expanded its service to the research community by adding guinea pigs to its line.

Calls by this newspaper to a random selection of research people indicate that the guinea pig, always a popular animal for bacteriologic and vitamin C work, is now also being widely used in immunologic, pharmacologic, virologic, and endocrinologic studies of all types.

Thus, it seems obvious to this paper that the entry into this field of a quality house like Carworth provides researchers with a valuable new source for this important laboratory animal.

Our investigative reporters have also uncovered the fact that the Carworth guinea pigs are actually Dunkin/Hartley animals from a closed colony meticulously maintained for over 15 years.

Carworth personnel have routinely responded to our inquiries about this development with enigmatic smiles and "no comment" and will neither affirm nor deny any of the above allegations.

Despite this uncharacteristic reticence, our reporters are firm in their conviction that all researchers interested in Carworth-quality guinea pigs are entitled to know more. The New City Times suggests, therefore, that interested parties demand more data. Write CIA (Carworth Information Agency), c/o Carworth, New City, (Rockland County), New York, 10956 (or call 914/634-8931). They'll get the message.

## *Rats and Mice by the Thousands*

### THOSE OTHER CARWORTH ANIMALS

Surreptitious investigation of the multiple Carworth facilities indicates that the company's apparent entry into guinea pigs has in no way diminished their activity in—or apparent enthusiasm for—supplying researchers with quality rats and mice.

Carworth mice include the well-known CF 1, CFW, and BALB/c CF inbred strain. The Carworth rats are the widely-used CFN and CFE strains.

Rumor also has it that Carworth supplies researchers with surgically-modified mice and rats at prices far below that which can be achieved by the purchaser in his own institution. (Can that be?)

The New City Times has learned that if you write to Carworth, New City, (Rockland County), New York 10956 (or call 914/634-8931) and ask for further information on their rats and mice, you'll get it.

27 October 1972, Volume 178, Number 4059

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# Energy Conservation

The series of articles on energy appearing currently in *Science* points up the long-range importance of this topic and many problems connected with it. If we are to solve our energy problems, the public and the government must give these matters an enduring high priority. This is chancy. When there is a dramatic crisis, the public usually behaves well. For example, during some of the recent power shortages, the public responded to pleas for conservation. Once the immediate crisis passed, though, the public returned to its old habits. Consumption of energy continued to grow exponentially. And use of gasoline is growing at a fast rate because emission controls are making automobiles less efficient.

Importation of petroleum and its products has been increasing rapidly. The Bureau of Mines now estimates that by 1985 imports alone will amount to 15 million barrels a day, which is our current total use. Such a volume could only be met by drawing heavily on the Middle East. Demand from Europe and Japan has already created a seller's market. Recently the Oil Producing and Exporting Countries have obtained substantial increases in their take. The most aggressive has been Libya, which in 2 years has doubled its return per barrel.

What will the Middle Eastern countries do with the enormous wealth that they will extract? The example of one is disquieting. Libya has chosen to devote part of its revenues to financing terrorist activities. The largest petroleum reserve is found in Saudi Arabia. That country has a small population and limited demand for goods. It has already begun to move toward controlling interest in some of the great International Petroleum companies. At the moment it seems to be a force for stability in the Middle East. However, who knows for how long? Prudence dictates that we examine alternatives to massive dependence on foreign oil.

One alternative that has not had much attention is conservation of energy. A recent useful 250-page government study* points to many possible measures that could be taken to reduce energy demand without great interference with life styles. It provides data on the various categories of energy consumption—transportation (25 percent), industry (29 percent), electric utilities (25 percent), and residential/commercial (21 percent) as well as the many components of these categories. The report discusses in detail possible short-term and mid-term savings in energy. For example, better insulation of houses provided at nominal cost would save very substantial amounts of both energy and money. The study suggests that energy conservation measures could reduce U.S. energy demand in 1980 by as much as the equivalent of 7.3 million barrels of oil per day. To achieve these economies in energy would require voluntary public cooperation on a scale that has heretofore not been sustained for long.

The surest way of obtaining public cooperation in the expenditure of energy is to make energy costly, and this is likely to occur whether we wish it or not. If present trends continue, a doubling or trebling in cost of oil and gasoline could occur in this decade.

Ultimately we will find that we must rethink our attitude about automobiles. Most of us would be reluctant to part with our mobile castles. But must these castles weigh 2 tons or more? If the government can dictate exhaust standards, safety features and more, why can't it exert pressure for lighter weight and greater mileage. Indeed it is likely that history will record that instead of its push on manufacturers to cut emissions, the government should be pressing now for sharply better fuel economy.—PHILIP H. ABELSON

* "The Potential for Energy Conservation," A staff Study, October 1972 (Office of Emergency Preparedness, Executive Office of the President).

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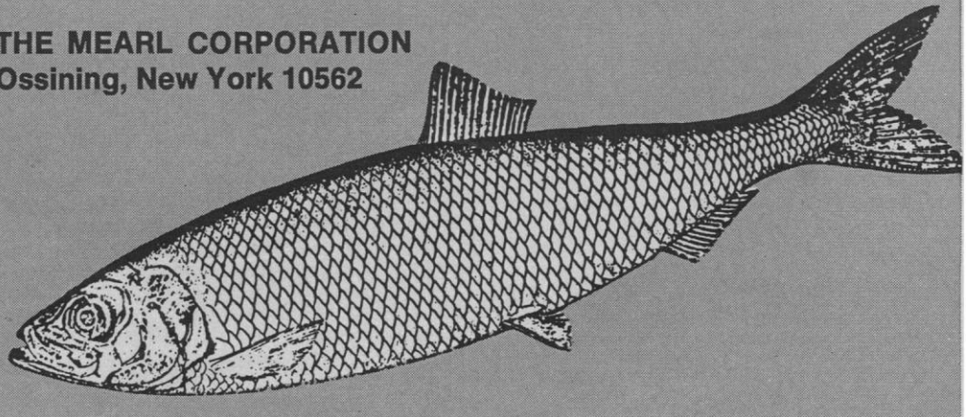

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## BOOKS RECEIVED

(*Continued from page 395*)

of Environmental Consultants, P.O. Box 8002, St. Louis, Mo. 46 pp. Paper, $6.

**Documentation Manual**. J. Van Duyn. Auerbach, Philadelphia, 1972. xvi, 158 pp., illus. Paper, $6. Auerbach Computer Science Series.

**The Early Transition Metals**. K. L. Kepert. Academic Press, New York, 1972. x, 500 pp., illus. $25.

**Electric Melting Practice**. A. G. E. Robiette in collaboration with A. G. Allen, I. George, and J. Ravenscroft. Halsted (Wiley), New York, 1972. x, 412 pp., illus. $35.

**Elements of Geology**. James H. Zumberge and Clemens A. Nelson. Wiley, New York, ed. 3, 1972. xiv, 432 pp., illus. + maps. $11.95.

**The Encyclopedia of Geochemistry and Environmental Sciences**. Rhodes W. Fairbridge, Ed. Van Nostrand Reinhold, New York, 1972. xxii, 1322 pp., illus. $49.50. Encyclopedia of Earth Sciences Series, vol. IVA.

**Encyclopedia of Library and Information Science**. Vol. 7, Derunov to Egypt, Libraries in. Allen Kent, Harold Lancour, and William Z. Nasri, Eds. Dekker, New York, 1972. viii, 588 pp., illus. $50; to subscribers, $40.

**Errors of Observation and Their Treatment**. J. Topping. Chapman and Hall, London, ed. 3, 1972 (U.S. distributor, Barnes and Noble, New York). 120 pp., illus. Paper, $2.50. Reprint of the 1962 edition.

**The Evolution of Population II Stars**. Proceedings of a conference, Stony Brook, N.Y., Dec. 1970. A. G. Davis Philip, Ed. Dudley Observatory, Albany, N.Y., 1972. viii, 216 pp., illus. Paper. Dudley Observatory Report No. 4.

**Evolutionary Biology**. Stanley N. Salthe. Holt, Rinehart and Winston, New York, 1972. x, 436 pp., illus. $11.50.

**Exobiology**. Cyril Ponnamperuma, Ed. North-Holland, Amsterdam; Elsevier, New York, 1972. xx, 484 pp., illus. $32. Frontiers of Biology, vol. 23.

**Experiments in Molecular Genetics**. Jeffrey H. Miller. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1972. xvi, 466 pp., illus. Spiral bound, $11.95.

**Exploring the Ocean World**. A History of Oceanography. C. P. Idyll, Ed. Crowell, New York, ed. 2, 1972. viii, 296 pp., illus. $14.95.

**Family, Marriage, and the Struggle of the Sexes**. Hans Peter Dreitzel, Ed. Macmillan, New York; Collier-Macmillan, London, 1972. 350 pp. $2.95. Recent Sociology, No. 4.

**Gene Mapping in Laboratory Mammals**. Part A. Roy Robinson. Plenum, New York, 1971. viii, 152 pp. $15.

**Geochemical Environment in Relation to Health and Disease**. A conference, Oct. 1971. Howard C. Hopps and Helen L. Cannon, Eds. New York Academy of Sciences, New York, 1972. 352 pp., illus. Paper, $25. *Annals of the New York Academy of Sciences*, vol. 199.

**Geography**. A Modern Synthesis. Peter Haggett. Harper and Row, New York, 1972. xxii, 484 pp., illus. $10.95. Harper and Row Series in Geography.

**The Geology and Paleontology of the Marine Pliocene of San Diego, California (Paleontology: Pelecypoda)**. Leo George Hertlein and U. S. Grant, IV. San Diego Society of Natural History, San Diego, 1972. viii pp. + pp. 143–410 + plates. Paper, $15. Memoir 2 (Part 2B).

**A God Within**. René Dubos. Scribner, New York, 1972. x, 326 pp. $8.95.

**A Health Care Plan for East Harlem—Now**. A workshop, Dec. 1970. Margaret C. Olendzki and Charles H. Goodrich, Eds. New York Academy of Sciences, New York, 1972. 136 pp., illus. Paper, $14. *Annals of the New York Academy of Sciences*, vol. 196, article 2, pp. 39–175.

**Horizons of Bioenergetics**. Proceedings of a symposium, Bloomington, Ind., Oct. 1970. Anthony San Pietro and Howard Gest, Eds. Academic Press, New York, 1972. xii, 290 pp., illus. $9.50.

**How Computers Affect Management**. Rosemary Stewart. M.I.T. Press, Cambridge, Mass., 1972. x, 244 pp. $12.50.

**How Long Have We Got?** Ritchie Calder. McGill-Queen's University Press, Montreal, 1972. x, 88 pp. Paper, $2.95. Beatty Memorial Lectures.

**Interstellar Molecules and Cosmochemistry**. A conference, June 1971. Fred M. Johnson, Ed. New York Academy of Sciences, New York, 1972. 102 pp., illus. Paper, $18. *Annals of the New York Academy of Sciences*, vol. 194.

**Introduction à la Physique du Rayonnement Cosmique**. J. E. Dupuy. Doin, Paris, 1972. 2 vols. Vol. 1, Détection des Particules. Physique des Hautes Énergies (Grandes Gerbes de l'Air). pp. 1–174, illus., + table of contents. Vol. 2, Physique des Basses Énergies. pp. 175–338, illus., + index. Paper, each vol., 66 F.

**Introduction to Applied Quantum Chemistry**. S. P. McGlynn, L. G. Vanquickenborne, M. Kinoshita, and D. G. Carroll. Holt, Rinehart and Winston, New York, 1972. viii, 472 pp., illus. $13.95.

**Introduction to Biochemistry**. John W. Suttie. Holt, Rinehart and Winston, New York, 1972. xiv, 366 pp., illus. $11.

**Introduction to Magnetic Materials**. B. D. Cullity. Addison-Wesley, Reading, Mass., 1972. xx, 666 pp., illus. $19.95. Addison-Wesley Series in Metallurgy and Materials.

**Introductory Chemistry**. Edmund J. Leddy and Don Roach. Rinehart (Holt, Rinehart and Winston), San Francisco, 1972. xviii, 478 pp., illus. $10.95.

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**The Josephson Effect in Superconductive Tunneling Structures**. I. O. Kulik and I. K. Yanson. Translated from the Russian

# The interchangeable back. It's just as important as the interchangeable lens.

In the beginning the camera was a one-piece unit.

Then somebody had an idea. If the lenses could be made to change, then the camera could be made to see more. And the interchangeable lens was born.

Victor Hasselblad had an equally interesting idea when he set out to build his 2¼" single lens reflex. If the back could be made to change, he reasoned, then you could build other backs for other purposes.

Then if you could also change the viewer, and the focusing screen and the film advance mechanism, and then could add on all kinds of accessories, you'd have much more than a camera. You'd have a whole system of photography. And the Hasselblad System was born.

Today, many good cameras have interchangeable lenses. Some have interchangeable viewers. But few have interchangeable film magazines.

Which is puzzling. Because a fixed back really ties a camera down, by letting it do only one thing at a time.

For example, with other cameras you have to finish or waste your roll of black and white before you can change to color. With Hasselblad you can switch from black and white to color, or from color negative to color reversal film at any time, simply by switching backs. Each back is like having an extra camera.

And while other cameras can take only one size of film (such as 35mm), Hasselblad can take 120, 220 and 70mm film, as well as any of the cut films. It's all done with interchangeable backs.

And where other cameras take film in a limited number of shots per roll, there are Hasselblad backs that give you 12, 16, 24 and even 70 exposures per roll.

Other cameras take pictures in one size only. Hasselblad gives you three choices of picture size, 2¼"x2¼", 1⅝"x2¼", 1⅝"x1⅝" (for making superslides). It's all done with the same camera. Only the backs change.

With other cameras re-loading is time consuming. Which can cost you a lot of good shots. With Hasselblad you can carry a few extra pre-loaded backs and just snap them on as needed, for uninterrupted shooting. That's how the astronauts re-loaded their Hasselblads in space and on the moon.

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We even make three different Hasselblad bodies. A standard SLR, an electrically-driven SLR and a super wide angle camera with 38mm lens attached.

Many of these components are recent developments. But the interchangeable film magazine is as old as the Hasselblad itself. It was developed more than twenty years ago. Which has certainly given other cameras enough time to catch up.

In this day and age, if a camera has interchangeable lenses, but doesn't have interchangeable film magazines, then the back of the camera is behind the front of the camera.

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**The System**

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**Laser Interaction and Related Plasma Phenomena**. Vol. 2. Proceedings of a workshop, Hartford, Conn., Aug. 1971. Helmut J. Schwarz and Heinrich Hora, Eds. Plenum, New York, 1972. xiv, 584 pp., illus. $27.50.

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**Masks**. Their Meaning and Function. Andreas Lommel. Translated from the German edition (Zurich, 1970) by Nadia Fowler. McGraw-Hill, New York, 1972. 228 pp., illus. $17.95.

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**Pictures Out of My Life.** Pitseolak. From recorded interviews by Dorothy Eber. University of Washington Press, Seattle, 1972. Unpaged, illus. $9.95.

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**The Uruk Countryside.** The Natural Setting of Urban Societies. Robert McC. Adams and Hans J. Nissen. University of Chicago Press, Chicago, 1972. xii, 242 pp., illus. $17.50.

**Veterinary Handbook for Cattlemen.** J. W. Bailey. Springer, New York, ed. 4, 1972. viii, 532 pp., illus. $11.

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**What Happened in Between.** A Doctor's Story. William J. Welch. Braziller, New York, 1972. xiv, 208 pp. $6.95.

**Where Has All the Ivy Gone?** A Memoir of University Life. Muriel Beadle. Doubleday, Garden City, N.Y., 1972. xii, 396 pp. $8.95.

**Women in White.** Geoffrey Marks and William K. Beatty. Scribner, New York, 1972. 240 pp., illus. $6.95.

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**The Year of the Intern.** Robin Cook. Harcourt Brace Jovanovich, New York, 1972. x, 246 pp. $6.75.

(*Continued from page 383*)

University of New York, Brooklyn. . . . **James J. Feffer**, associate dean for clinical affairs, George Washington University, to vice president for medical affairs at the university. . . . **Herbert A. Stallworth**, assistant to the president, Florida Atlantic University, to vice president for academic affairs, Austin Peay State University.

## RECENT DEATHS

**Cyrus E. Burford**, 94; former director, urology department, St. Louis University; 10 July.

**Robert C. Caldwell**, 44; dean, School of Dentistry, University of California, Los Angeles; 6 July.

**Guy L. Carter**, 88; former chairman, social sciences department, Lynchburg College; 29 June.

**Kermit A. Cook**, 70; professor emeritus of education, West Virginia University; 15 June.

**George F. Donovan**, 70; professor emeritus of education, Marquette University; 16 July.

**Edgar S. Furniss**, 82; former dean, Graduate School, Yale University; 17 July.

**Mary F. C. Graustein**, 88; former professor of mathematics, Wellesley College; 18 July.

**Frank W. Hachtel**, 88; former chairman, microbiology department, University of Maryland School of Medicine; 13 July.

**Ben Kaplan**, 66; professor of sociology, University of Southwestern Louisiana; 15 July.

**Carl V. Moore**, 63; former chairman, medical department, Washington University; 13 August.

**J. Cecil Parker**, 64; professor emeritus of education, University of California; 21 June.

**John L. Parks**, 64; vice president for medical affairs, George Washington University; 5 July.

**Oscar E. Sette**, 72; fishery biologist, National Marine Fisheries Service, California; 25 July.

**Abraham A. Sherman**, 65; assistant professor of medicine and radiology, Albert Einstein Medical College; 15 August.

**Howard P. Simons**, 64; professor of chemical engineering, West Virginia University; 3 June.

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