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ISSN 0036-8075

21 September 1979

Volume 205, No. 4412

SCIENCE

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with **The Scientific Monthly®.** Domestic individual membership and subscription (51 issues): $34. Domestic institutional subscription (51 issues): $70. Foreign postage extra: Canada $12, other (surface mail) $15, air-surface via Amsterdam $40. First class, airmail, school-year, and student rates on request. Single copies $1.50 ($2 by mail); back issues $2.50 ($3 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. **Postmaster:** Send Form 3579 to *Science*, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

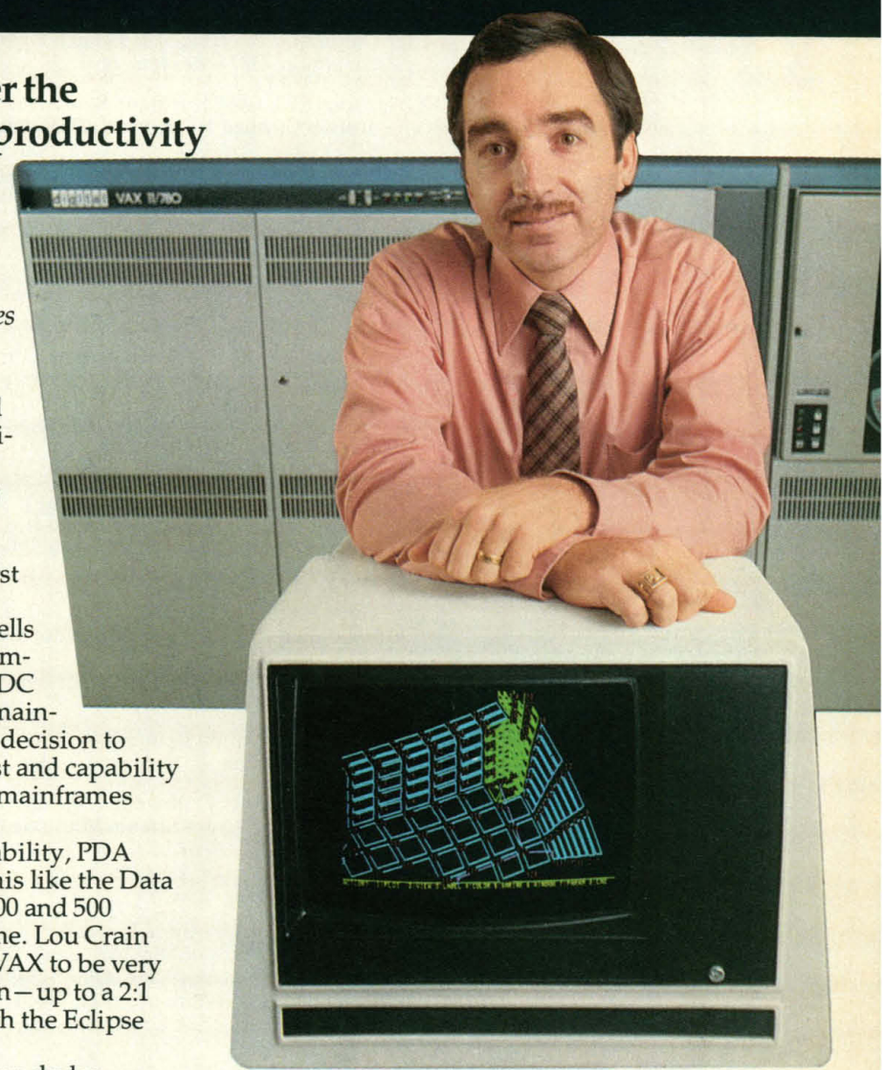
COVER

Male bank swallow singing to potential mate at the mouth of his burrow (note throat pouch bellowing and open mouth). Song is one of the nest advertisement displays. See page 1282. [M. D. Beecher, University of Washington, Seattle]

VAX Performance. Ask any user.

"VAX simply ran over the competition. In cost/productivity ratios, nothing even came close."

Lou Crain, Mgr. of Software Products
Prototype Development Associates
Santa Ana, California

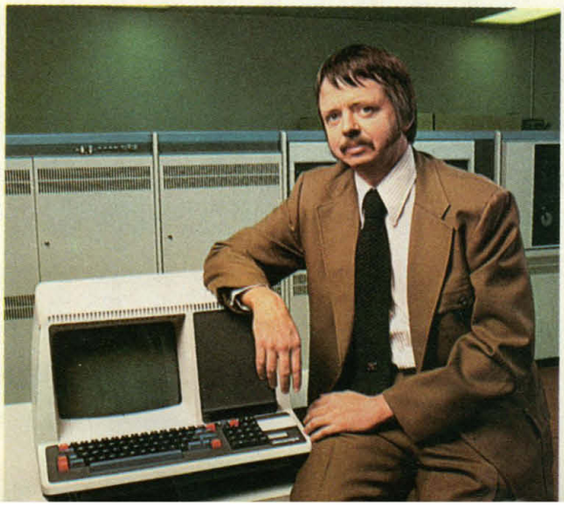


PDA is an employee-owned engineering concern whose business ranges from fundamental research in structural analysis to the manufacture of critical aerospace components.

The VAX-11/780 is PDA's first in-house computer. Lou Crain, Manager of Software Products, tells us, "We've been doing all our computing through utilities using CDC 6600, Cyber 74 and Univac 1108 mainframes. The key elements in our decision to acquire the VAX-11/780 were cost and capability — compared to service bureaus, mainframes and competitive minis."

From the standpoint of capability, PDA considered traditional superminis like the Data General Eclipse and the Prime 400 and 500 series, plus a used 1108 mainframe. Lou Crain says, "Our benchmark showed VAX to be very powerful against the competition — up to a 2:1 performance advantage over both the Eclipse and the 1108."

"After installation," Crain concludes, "VAX has lived up to our expectations and has performed impressively. It's resulted in better products for our customers, as well as improved cost-effectiveness. Having our own interactive capability in-house has meant an increase in engineering productivity of up to 300%."



"VAX turns out to be twice the machine for the same amount of money."

Roger Vossler,
Section Manager and Systems Engineer
TRW Defense and Space Systems Group
Redondo Beach, California

Sensor data processing and distributed processing systems in support of real-time embedded applications are among the specialties of TRW's Defense and Space Systems Group.

To find the right computer, TRW continues to evaluate numerous machines—including Digital's VAX-11/780. They've also conducted numerous FORTRAN and PASCAL benchmarks.

In every test, VAX stands out as a clear winner.

Roger Vossler, Section Manager and Systems Engineer, says, "VAX is one of the best implementations we've seen of a successful integrated hardware and software system."

Since TRW's sensor data processing applications require enormous memories—over a million bytes to store a single image, for example—VAX's true 32-bit address space is vitally important. In addition, says Vossler, "VAX's I/O bandwidth capabilities are extremely important for effectively moving large quantities of real-time data at very high data rates."

Because TRW already had an investment in Digital technology, Vossler is particularly impressed with the relative ease of moving PDP-11 series programs onto VAX.

"But," says Vossler, "Even if I were starting all over again—without our Digital experience—I would still pick VAX, on the basis of its architecture, both hardware and software, and its impressive performance."

"Implementation was faster on VAX than on 25 other machines."

Brian Ford, Director
Numerical Algorithms Group
Oxford, England/
Downers Grove, Illinois

The Numerical Algorithms Group develops and maintains mathematical and statistical software libraries for customers in industry, science and academia.

Before VAX, NAG had implemented their complex Mark 6 Library on 25 major machines, including the Burroughs 6700, CDC 7600, Univac 1100, and the IBM 370. The average implementation time was 13 man-weeks.

VAX took five.

In Dr. Ford's words, "A successful implementation requires the correct functioning of the 345 library routines to a prescribed accuracy and efficiency in execution of NAG's suite of 620 test programs. Whilst the activity is a significant examination of a machine's conformity to the ANSI standard of the FORTRAN compiler, its main technical features are file creation, file comparison, file manipulation and file maintenance."

And implementation performance was just the start. Dr. Ford comments on VAX's impressive record of reliability after the program was up and running: "No problems were encountered in the VAX/VMS software even though approximately 3000 files were being handled. The operational availability time for the machine was close to 100%, an outstanding statistic for new hardware and a new operating system.

"VAX," Dr. Ford concludes, "is an implementor's dream."

Digital's VAX-11/780 has re-defined the level of performance you can expect from computers in its price range.

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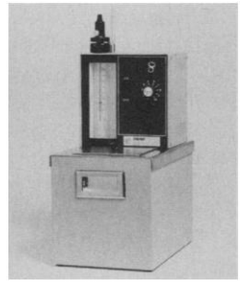

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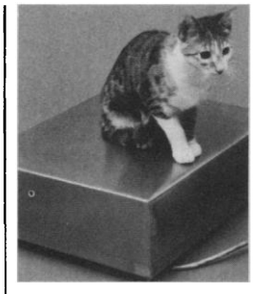

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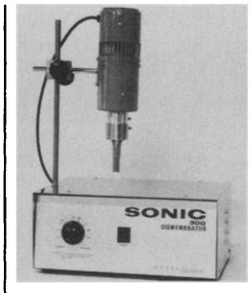

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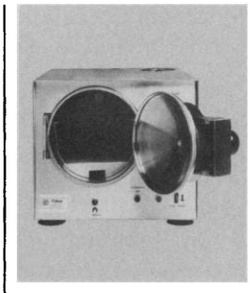

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Photo by Prof. Klaus Weber, Max-Planck institute for Biophysical Chemistry, Goettingen, West Germany.

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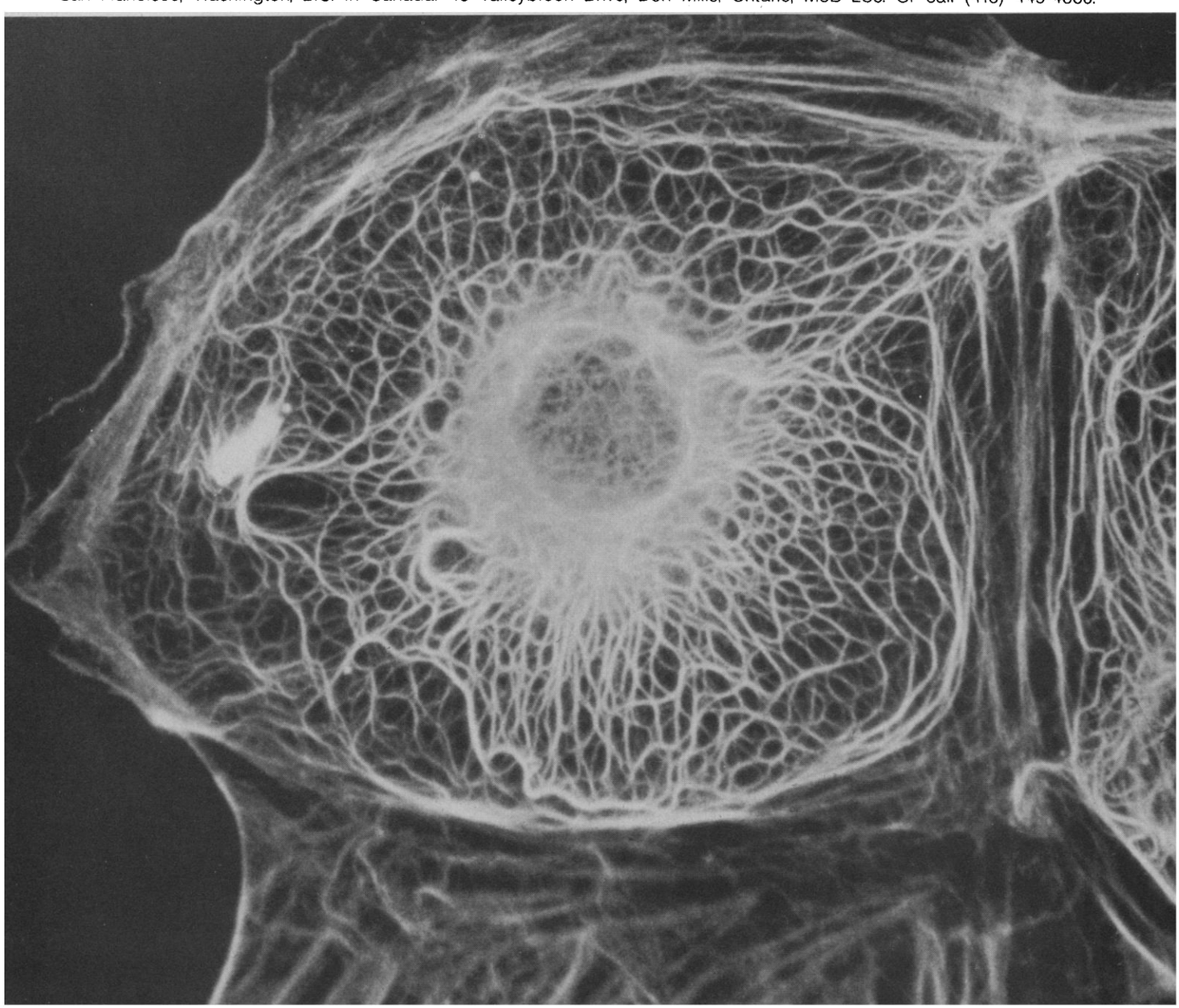
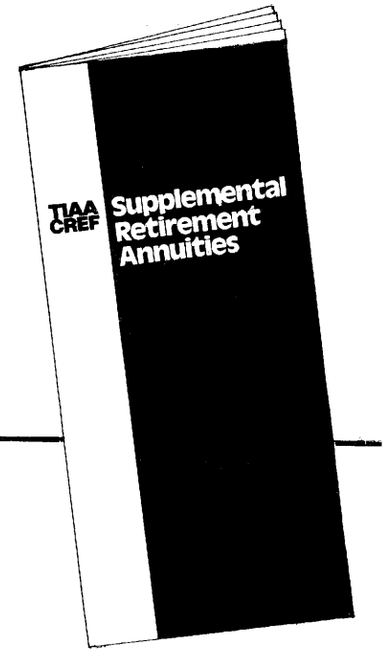


TIAA-CREF Supplemental Retirement Annuities



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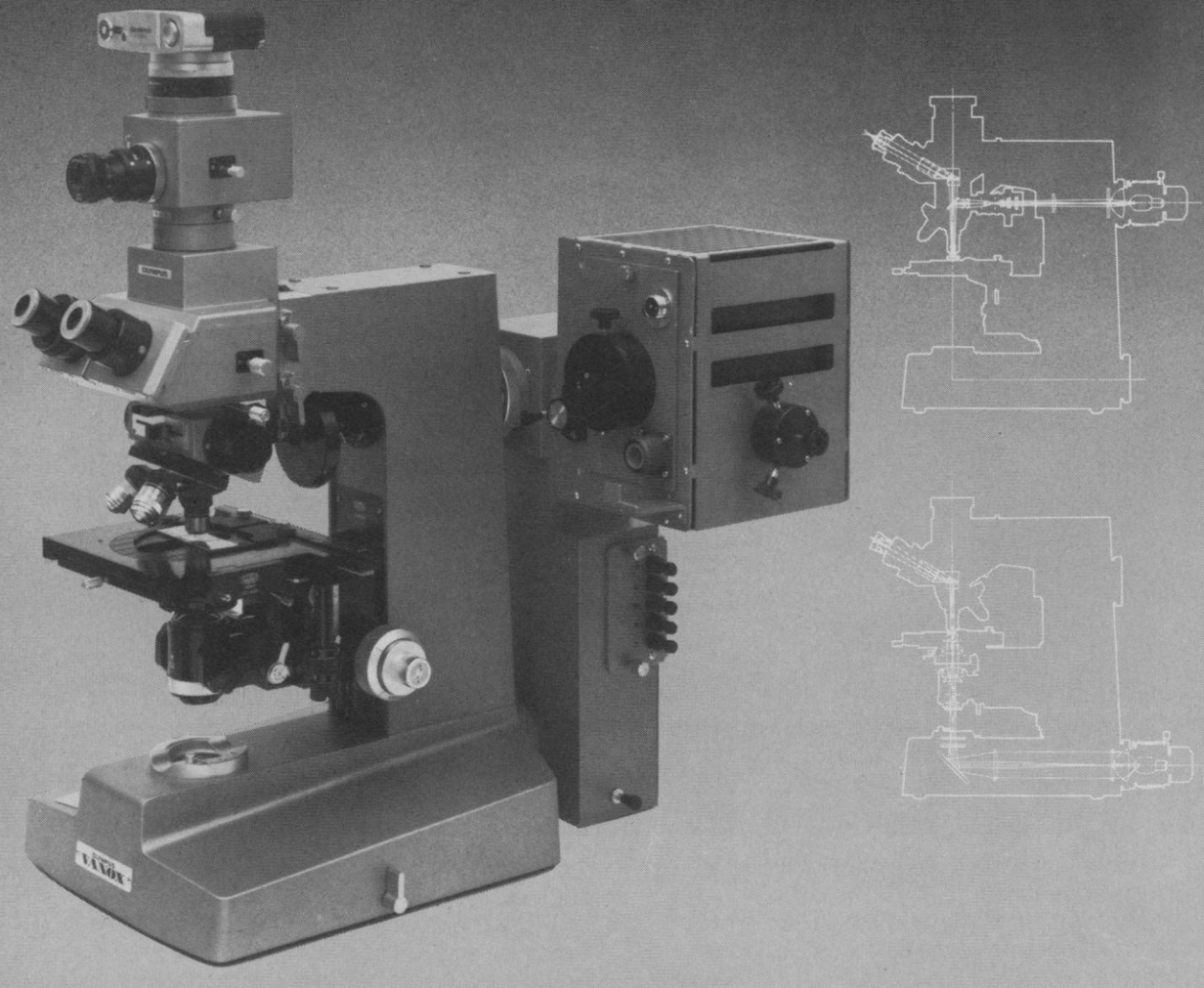

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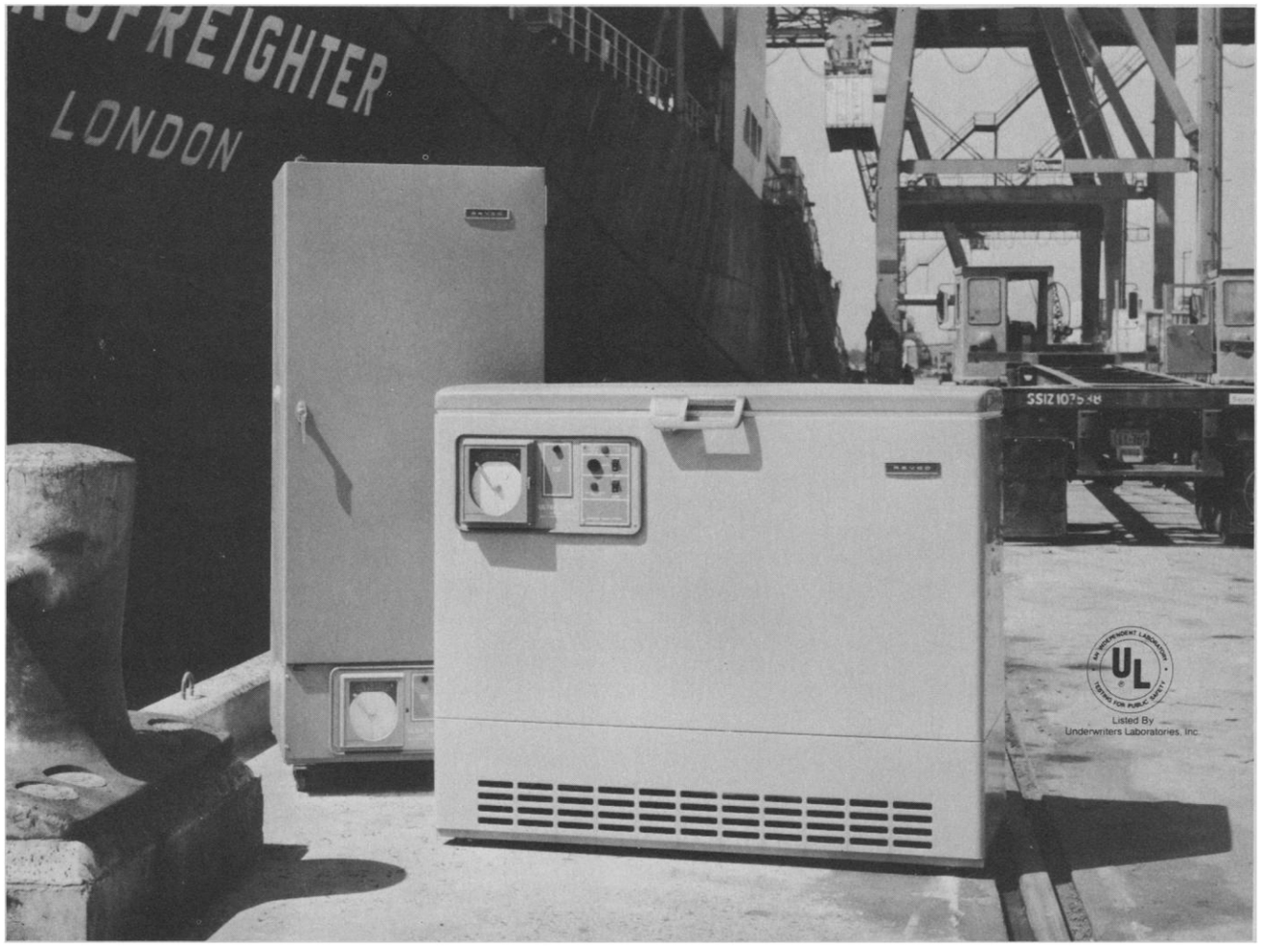

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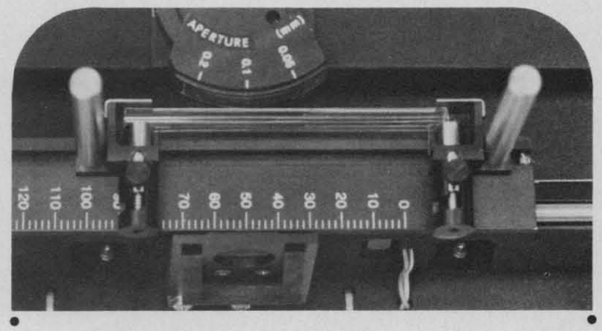

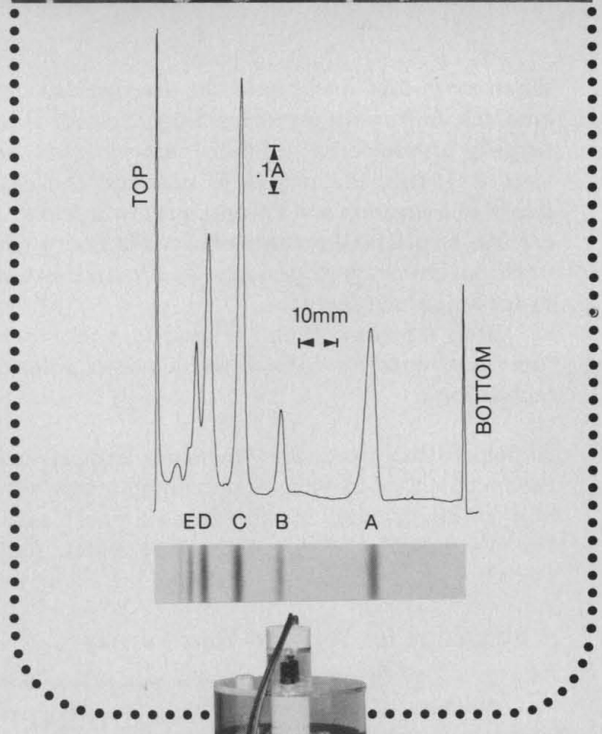

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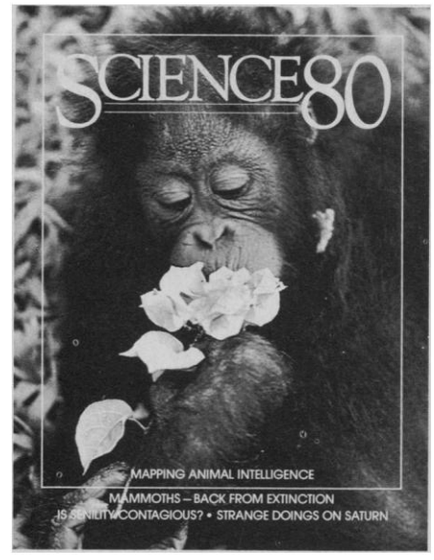

OF SCIENCE FROM THE AAAS

When profound and beautiful discoveries in mathematics, in human genetics, in radio astronomy go largely unnoticed . . . When new insights into the nature of life, the origin of planets, the chemical basis of behavior are known only to a few . . . When critical public and private choices in energy, health, national security depend on accurate assessments of technical subjects . . .

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H9S3

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LETTERS

Synfuel Development

I wholeheartedly support Philip H. Abelson's suggestion (Editorial, 17 Aug., p. 649) that we look closely at the South African experience for producing fuels and chemicals from coal. It should be pointed out, however, that this technology was developed by an American company: the research and development, pilot plant studies, commercial design, construction, and initial operation and debugging of the process for Sasol I were performed for the Sasol Corporation by the M. W. Kellogg Company—now Pullman Kellogg of Houston, Texas.

As Abelson points out, there were difficulties in putting the plant on stream and getting it up to design capacity, but this often happens when new technology is brought to commercial scale.

The people of the United States need to know that we have vast technical resources in this country that can be tapped. We can develop our own synthetic fuels industry—if we can make up our minds that this is what we must do to ensure our future.

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Dorfman's Data Analysis

We return to the subject of our earlier exchange of letters (20 Apr., p. 242; p. 245) with D. D. Dorfman (20 Apr., p. 246) pertaining to his article "The Cyril Burt question: new findings" (29 Sept. 1978, p. 1177). We are neither condoning Burt's deficient reporting nor defending Burt's integrity. Burt's description of his work is very vague in many respects, and precisely because of this sloppiness it is impossible to determine, with the type of statistical investigation attempted by Dorfman, whether or not Burt fabricated data. We here focus on one particularly important example of an inappropriate use of statistics to detect fraudulent data (*1*).

When trying to determine whether data fit an assumed model "too well," one cannot reach valid inferences by Dorfman's technique of collapsing tables and rounding data in a manner exaggerating any regularity that may be present in the original tables and data. Such a technique followed by χ^2 statistics testing the collapsed and rounded tables for the constructed regularity can lead to the

conclusion that most data are fabricated. Dorfman's treatment of Burt's tables follows this illogical paradigm. In his original article he relied on χ^2 tests; in his reply he relied primarily on informal visual impressions.

To illustrate the dramatic visual effects that can be achieved by Dorfman's technique of collapsing and rounding, let us look at a different data set that is of unquestioned integrity; like Dorfman (29 Sept. 1978, p. 1181), we have chosen one that caught the eye of the Belgian statistician Adolphe Quetelet. Table 1 presents a cross-classification of 5732 Scottish militiamen by height and chest circumference. These data are taken from an 1817 Edinburgh medical journal, and they enjoy some fame in the history of statistics due to Quetelet's use of them for investigating distributions in 1846 and subsequent years (*2*). Presumably these data have not been rescaled along the margins in any manner, and since we now know that the distributions of physical measurements are not exactly normal (see Dorfman's article, pp. 1180–1181 and notes 54 and 57 for evidence of this), we might a priori expect a worse fit here than was found by Dorfman in Burt's tables, assuming the data were not fabricated.

Following Dorfman's techniques for detecting fabricated data, Table 2 shows the data of Table 1 collapsed to six columns and expressed as rounded percentages; in parentheses are the corresponding rounded percentages from a bivariate normal distribution with correlation $\rho = .45$ (*3*). The appearance of agreement is striking. For example, 63 percent of the entries agree perfectly; the analogous rates of agreement for Dorfman's rendering of Burt's tables are 61, 72, 56, and 69 percent. (If we only look at nonzero cells, the rates of agreement are 45 percent for the Scottish data and 30, 57, 0 (!), and 44 percent for Dorman's tables.) Of course, inappropriate χ^2 tests, such as used by Dorfman, will suggest too good a fit to normality, and even better apparent fits can be obtained by coarser grouping and more rounding. Yet despite this constructed remarkable fit of the Scottish data to the theoretical normal distribution, even the most skeptical analyst would find it difficult to argue that the Scottish tailor who published these data in 1817 had concocted them from a table of the bivariate normal distribution more than a century before one was printed. Dorfman's dramatic tables and graphs do not provide any more evidence that Burt fabricated his data than our Table 2 provides evidence that this 19th-century tailor was an

Table 1. Heights and chest circumferences (inches) of 5732 Scottish militiamen, data compiled by an army contractor and printed in 1817 (*2*).

Height	Chest circumference																Total
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
64–65	1	7	31	69	108	154	142	118	66	17	6	3	0	0	0	0	722
66–67	1	9	30	78	170	343	442	337	231	124	34	12	3	1	0	0	1815
68–69	1	2	16	34	91	187	341	436	367	292	126	70	13	3	2	0	1981
70–71	0	1	4	7	31	62	117	153	209	148	102	40	16	7	0	0	897
72–73	0	0	0	1	9	7	20	38	62	65	45	43	18	7	1	1	317
Total	3	19	81	189	409	753	1062	1082	935	646	313	168	50	18	3	1	5732

Table 2. Data from Table 1 reclassified and expressed in rounded percents, together with rounded percents (in parentheses) from a bivariate normal distribution with correlation .45. The means and standard deviations of the bivariate normal distribution were fixed to be $39^{7}/_{8}$ inches and $2^{1}/_{16}$ inches (chests) and $67^{1}/_{2}$ and $2^{1}/_{8}$ inches (heights) (*3*).

Height	Chest circumference						Total
	33–35	36–38	39–40	41–42	43–45	46–48	
64–65	1 (1)	6 (6)	5 (6)	1 (2)	0 (0)	0 (0)	13 (15)
66–67	1 (1)	10 (9)	14 (14)	6 (8)	1 (2)	0 (0)	32 (34)
68–69	0 (0)	5 (5)	14 (13)	11 (11)	4 (3)	0 (0)	34 (32)
70–71	0 (0)	2 (1)	5 (5)	6 (7)	3 (3)	0 (0)	16 (16)
72–73	0 (0)	0 (0)	1 (1)	2 (1)	2 (1)	0 (0)	5 (3)
Total	2 (2)	23 (21)	39 (39)	26 (29)	10 (9)	0 (0)	100 (100)

unheralded Gauss who constructed his data using techniques now considered not to have been invented until at least half a century later.

As statisticians we decry both inadequate statistical reporting and inappropriate statistical analyses. But both shortcomings are too common in the literature of the past and present to permit them alone to serve as evidence of fraud or intentional deceit. Dorfman's article has served the worthy purpose of stimulating discussion highlighting the inadequacies of Burt's descriptions. But using Dorfman's inappropriate statistical techniques to detect fraudulent data would be to condemn a major portion, if not all, of empirical science as fabrication.

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References and Notes

1. Among the other problems with Dorfman's statistical analyses are that (i) Dorfman's assumption in his reply (p. 251) that "column totals are not changed by the weighting along rows" does not follow from our proposed method of constructing the tables. It is in fact a tacit assumption of the conclusion he wishes to prove; the algebra here is irrelevant, and the conclusion that "the column totals are determined by the row totals" (p. 254) is incorrect. (ii) It is not unusual to obtain high correlations among class means of approximately multivariate normal data. For example, the correlation of the row means and the height midpoints of the Scottish data (our Table 1) is .99604, not far short of the value .99867 Dorfman (p. 252) found for Burt's means. Analogously, regression of one group of class means on another may, with data like these, produce a remarkably close fit to a straight line, like that exhibited in Dorfman's figure 1 (p. 254), where his "fabrication equation" and the means are displayed.
2. *Edinburgh Med. Surg. J.* **13**, 260 (1817). Table 1 was constructed by aggregating separate tables for 11 different regiments. The compiler of the tables is only identified as "an army contractor, a gentleman of great observation and singular accuracy." Quetelet used the chest measurements in his *Lettres . . . sur la theorie des probabilités* (1846) and other books.
3. The figures in parentheses were found from a bivariate normal distribution with chest mean $39^{7}/_{8}$, chest standard deviation $2^{1}/_{16}$, height mean 68, height standard deviation $2^{1}/_{8}$, and correlation coefficient .45. The columns were considered as corresponding to classes (0, 35.5), (35.5, 38.5), (38.5, 40.5), (40.5, 42.5), (42.5, 45.5), (45.5, ∞). The row classes were taken to be (64, 66), (66, 68), (68, 70), (70, 72), (72, 74). Apparently no Scotsmen below 64 inches or above 74 inches were admitted to the militia, so the distribution was truncated at these values and renormalized so that the sum of the probabilities for the given cells was 1.0. The bivariate normal probabilities were found from the *Tables of the Bivariate Normal Distribution Function and Related Functions* (Applied Mathematics Series No. 50, National Bureau of Standards, Washington, D.C., 1959). All standardized cell boundaries were rounded off before entering in the table, to eliminate the need to interpolate. Means, standard deviations, and the correlation coefficient were chosen as being standard fractions near sample estimates, and they may not produce the best possible fit. Incidentally, published tables are ill-suited to this purpose, and the required computations seemed laborious to us.

Chemical Carcinogens: Estimating the Risk

We would like to respond to the letter by Hooper, Harris, and Ames (16 Feb., p. 602), in which the authors comment on what they feel are ". . . several errors of fact and interpretation" in an earlier series of articles on chemical carcin-

ogens by Thomas H. Maugh II (Research News, 29 Sept. 1978, p. 1200; 6 Oct. 1978, p. 37). In particular, they express concern that one of us (P.J.G.) incorrectly inferred that a threshold exposure to vinyl chloride existed at 50 to 150 parts per million (ppm) and consequently might have underestimated the risk from exposure to low levels of vinyl chloride by ". . . more than a millionfold. . . ."

In fact, the risk estimate alluded to (*1*) (which predicts a cancer risk of 10^{-8} in workers occupationally exposed to 1 ppm vinyl chloride for 35 years) is performed without *any* assumption of a threshold. Instead this analysis incorporates pharmacokinetic principles to predict the rate of production of a reactive intermediate in vivo after exposure to vinyl chloride.

Although we believe it is possible that thresholds for chemical carcinogens exist, our research on vinyl chloride has not provided evidence showing such thresholds. Indeed, attempting to provide irrefutable evidence of absolute thresholds for chemical carcinogens is simply an exercise in futility. Because it is impossible to prove that any chemical is totally without risk, it is essential to move toward rational risk assessment based on the best available technology.

Furthermore, it is important to check *any* type of risk estimate against real data whenever possible. In the case of vinyl chloride this is possible because a survey of almost 10,000 workers occupationally exposed to vinyl chloride was recently conducted by Equitable Environmental Health, Inc. (EEH) (*2*). Exposure of these workers (which occurred before current standards were established) was great—very likely more than 200 ppm and certainly far more than 1 ppm. If Hooper *et al.* are correct in projecting a risk of 10^{-2} to 10^{-1} from exposure to 1 ppm vinyl chloride, then this group of workers, exposed to much higher doses, should have experienced several hundred to several thousand cases of hemangiosarcoma. However, the survey failed to show this—only five of the almost 10,000 exposed workers had developed this type of cancer.

A key factor in the extrapolation of the results of animal studies to humans is the role played by metabolic activation. Vinyl chloride is one of a class of chemicals in which the proximate carcinogen is generated from the parent molecule by microsomal oxidation (*3*). In general, this type of metabolic reaction occurs more rapidly in small laboratory animals than in humans. Investigators in another laboratory have studied the metabolism of vinyl chloride in several species, in-

cluding humans, and have determined that it is about 4.3 times slower in humans than in rats (*4*). Consequently, one would expect that humans should be much less sensitive than rats to the carcinogenic activity of vinyl chloride. The risk assessment of Gehring *et al.* (*1*), based on this principle, is reasonably consistent with the results of the EEH survey. Ten hemangiosarcomas are predicted from exposure to 200 ppm vinyl chloride and five were actually observed. However, the risk estimate of Hooper *et al.*, which apparently does not consider this principle, clearly cannot be reconciled with the data in the EEH report.

Hooper *et al.* also comment on the role of pathological tissue damage in the cancer bioassays of chloroform. Many investigators have reported that short- and intermediate-term exposure to chloroform is toxic to kidney and liver tissue in mice (*5*) and rats (*6*). However, in the long-term studies conducted by the National Cancer Institute (*7*) and Roe (*8*) the absence of *reported* pathological damage is very likely misleading. These studies were designed to detect irreversible toxicity, such as the induction of tumors. In each case, the chloroform was administered daily for a period of 78 to 80 weeks followed by several months of observation before the animals were killed. Consequently, any *reversible* tissue damage would probably not have been apparent in these studies. However, prolonged cell regeneration after chemical insult may be very significant in the induction of tumors. In fact, in the first published study (*9*) to link chloroform exposure with tumor induction in mice, the authors noted that liver necrosis was consistently produced by doses of chloroform that were tumorigenic. These investigators were careful to administer a dose of chloroform 24 hours before necropsy so that both short- and long-term effects could be observed.

Recent studies in our own laboratory have been concerned with the induction of tissue damage and subsequent cellular regeneration after single oral doses of chloroform to male B6C3F1 mice. We found that tissue damage could be detected microscopically in both the liver and kidney after chloroform treatment. In the liver, cellular degeneration and necrosis were present after a dose of 240 milligrams (mg) of chloroform per kilogram (kg) body weight, hepatocellular swelling was noted after 60 mg/kg, and 15 mg/kg apparently had no effect. In the kidney, necrosis was observed after both 240 and 60 mg/kg, but not after 15 mg/kg (*10*). This correlated well with the relative rates of DNA replication in these tissues, estimated by injection of ^{3}H-labeled thymidine 48 hours after a dose of chloroform (*10*). The demonstration of chloroform-induced tissue damage at tumorigenic doses is particularly noteworthy because chloroform has been tested by several investigators in the bacterial mutagenicity test developed by Ames with apparently negative results (*11*).

Thus we do not feel tissue damage can be legitimately dismissed as a factor in the carcinogenicity of chloroform. Furthermore, indications that chloroform probably lacks genotoxic activity raise serious questions about the validity of carcinogenic risk estimates based on the "one-hit" model, since the one-hit model was developed to deal with genetic events.

There is certainly no question that the test developed by Ames can give useful information about the potential of various agents to interact with DNA. However, so many complex interactions are involved in the generation of a tumor in a whole animal that it is essential to carry out a complete evaluation of the effects of chemicals in whole animals before drawing any conclusions about their carcinogenicity.

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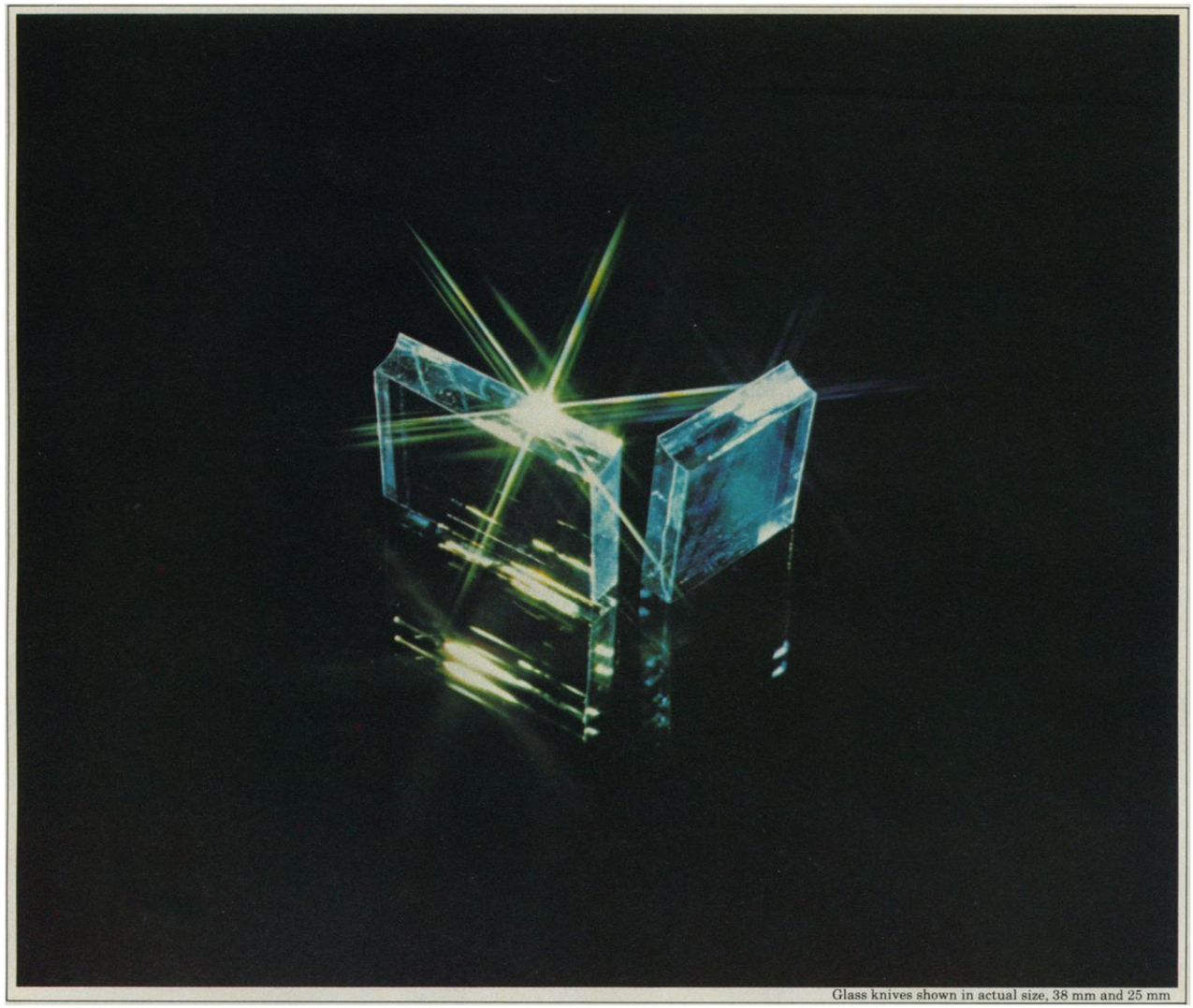

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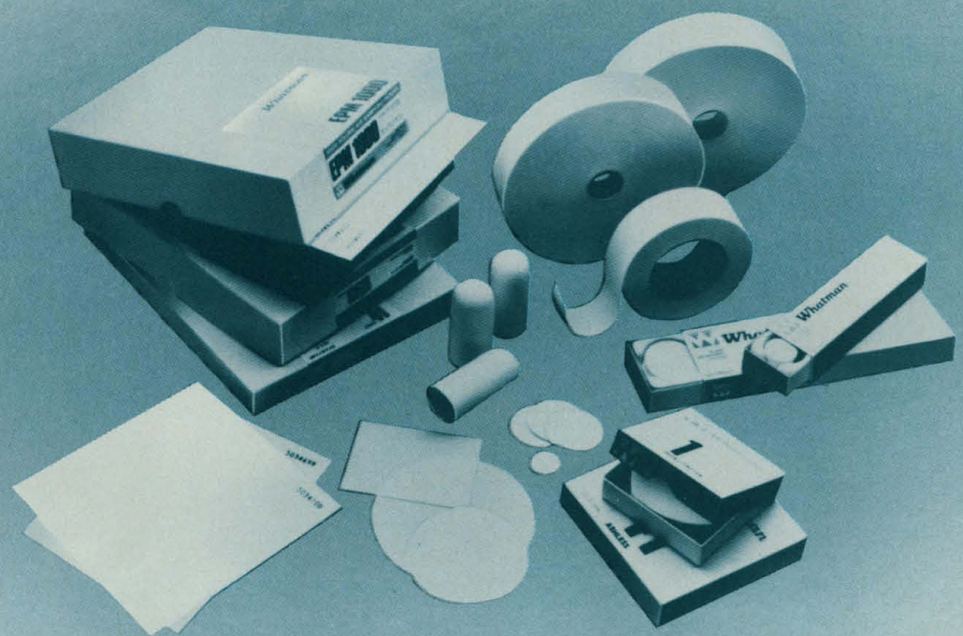

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21 September 1979, Volume 205, Number 4412 **SCIENCE**

Progress on Many Energy Fronts

Those who are concerned about the energy future of the United States would have found encouragement during a symposium at Georgia Institute of Technology on 29 August. The meeting was attended by President Carter and some key members of his Administration. It was organized by Frank Press, the President's science adviser. Ten leading experts from industry, government, and academia made presentations and answered questions on virtually every important aspect of energy conservation and production. Although no major breakthroughs were announced, the atmosphere at the symposium was upbeat, with progress reported on many fronts.

Higher prices of imported oil have painful effects, but they have improved the economic outlook for investments in conservation, solar energy, unconventional natural gas, and recovery of heavy and tertiary oils. Price increases have also served to convince many voters that this nation really does have energy problems. President Carter mentioned telephone conversations that he had recently with congressmen visiting their home districts. They report a greatly increased public awareness and a much improved climate for congressional action.

A notable example of successful conservation stimulated by economics has been in the performance of the chemical industry, which has achieved an improvement of 18 percent since 1972 in its energy use per unit product. Further progress is being achieved by better designs of new plants, by process changes such as replacement of distillation by liquid-liquid extraction, and by exploiting new catalysts that permit better yields and lower operating temperatures. Another example of conservation comes from the automobile industry. New cars already have 42 percent better mileage than 1974 models, and they will better 1974 by 100 percent or more by 1985.

A report on home heating and cooling was particularly gratifying. A combination of good insulation and solar heating has cut fuel bills to miniscule proportions in many examples. A key ingredient is window design with emphasis on catching energy from the sun in the winter and avoiding it in the summer.

The increased costs of oil have stimulated interest in and use of biomass for energy in the Southeast. Annual growth of trees in Georgia amounts to the equivalent of 6 quads, which is four times the total energy consumed in the state. A switch away from oil, which is beginning, would be beneficial to the economy of the region.

Higher prices for natural gas are resulting in much enhanced drilling of deep formations; they have also made unconventional sources of gas much more attractive. Thus the Devonian shales of the Appalachian Basin are being increasingly exploited. The gas-bearing tight formations of the Rocky Mountains are being more vigorously explored. The tantalizing potentials of the Gulf Coast geopressured zone are being assessed.

Higher prices have also stimulated greater efforts in the tertiary recovery of huge amounts of oil that are known to be in place but are left behind with the usual technology. An especially helpful development is the use of CO_2 injected into old wells. This gas dissolves in oil, swelling it and reducing its viscosity. Now under construction is a $600 million pipeline to carry gas from CO_2-producing wells in New Mexico to oil fields in west Texas.

Higher prices have also provided an incentive to evaluate the petroleum potential of an extensive reef structure that lies beneath the continental slope east of Atlantic City. The reef is part of a long structure that includes the highly prolific Mexican oil fields. Other topics in which progress was described included nuclear safety, photovoltaics, and synthetic fuels.

This nation faces a decade of uncertainty and danger with respect to imports of oil. But the oil producing and exporting countries have finally succeeded in awakening the public. They have stimulated the private sector to action. There is now reason to expect that the Congress and the Administration will act together to provide further incentives for energy progress.

—PHILIP H. ABELSON

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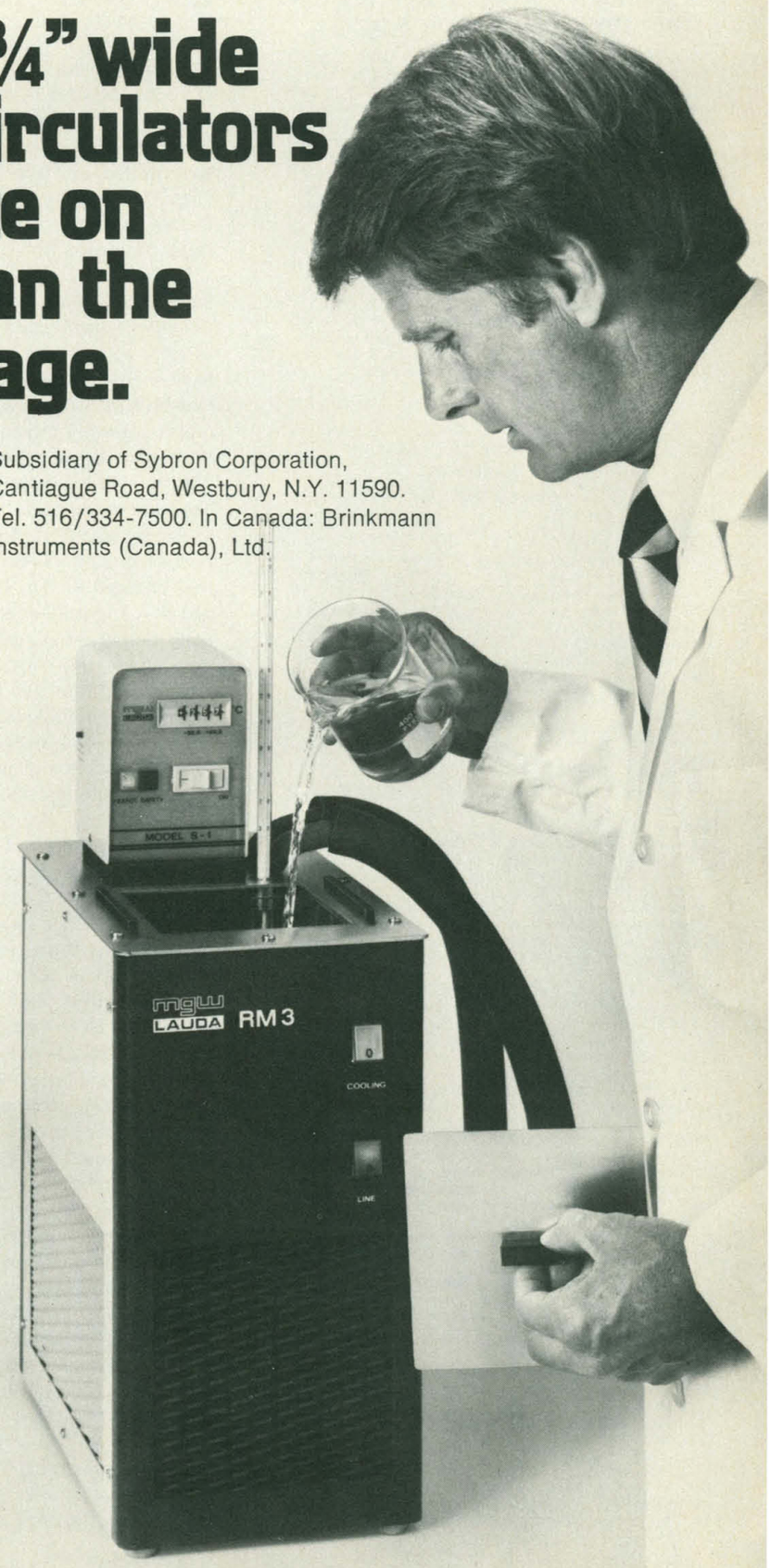

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Literature

Automated Auger Microprobe describes the A²M nondestructive apparatus for analysis of elemental composition of surfaces. Varian Surface Technology Operations. Circle 803.

Lead in Blood describes an automated determination by means of atomic absorption spectroscopy. Instrumentation Laboratory. Circle 815.

Heating Mantles and Apparatus lists a complete line for research and teaching laboratory applications. Glas-Col Apparatus. Circle 816.

Cleaning Agents is the subject of a brochure devoted to laboratory detergents presented in a problem-solving format. Alconox. Circle 817.

Continuous Flow Analyzers includes reagents, supplies, and parts. Bio-Dynamics/bmc. Circle 818.

Liquid Chromatography is a catalog for practitioners of this separatory technique. It includes HPLC, amino acid analyzers, columns, packings, pumps, detectors, and accessories. Glenco Scientific. Circle 819.

T_3 and T_4 Reagents are featured in a price list of chemicals with high specific activity for use in concentrated or diluted forms. NuClin Diagnostics. Circle 820.

Guide to Electrodes and Instrumentation offers a line of instruments to measure *p*H and specific ion concentrations. Orion Research. Circle 821.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Reader Service Card (on pages 1206A and 1302A) and placing it in the mailbox. Postage is free.
—RICHARD G. SOMMER

BOOKS RECEIVED

(Continued from page 1256)

1978 (U.S. distributor, Kluwer Boston, Hingham, Mass.). x, 320 pp., illus. $51. Documenta Ophthalmologica Proceedings Series, vol. 16.

Genetic Mosaics and Chimeras in Mammals. Proceedings of a symposium, Gatlinburg, Tenn., Apr. 1978. Liane B. Russell, Ed. Plenum, New York, 1978. xiv, 486 pp., illus. $39.50. Basic Life Sciences, vol. 12.

The Genetics and Biology of Drosophila. Vol. 2b. M. Ashburner and T. R. F. Wright, Eds. Academic Press, New York, 1978. xvi, 602 pp., illus. + index. $61.25.

Handbook of Thermoplastic Elastomers. Benjamin M. Walker, Ed. Van Nostrand Reinhold, New York, 1979. xviii, 346 pp., illus. $24.95.

Life Cycles. An Evolutionary Approach to the Physiology of Reproduction, Development and Ageing. Peter Calow. Chapman and Hall, London, and Halsted (Wiley), New York, 1979. x, 164 pp., illus. $14.95.

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Navaho Symbols of Healing. Donald Sandner. Harcourt Brace Jovanovich, New York, 1979. xii, 290 pp., illus. Paper, $8.95.

Neurogenetics and Neuro-ophthalmology. Papers from a congress, Nijmegen, The Netherlands, Sept. 1977. A. F. Deutman and J. R. M. Gruysberg, Eds. Junk, The Hague, 1978 (U.S. distributor, Kluwer Boston, Hingham, Mass.). viii, 486 pp., illus. $84. Documenta Ophthalmologica Proceedings Series, vol. 17.

Origins of Inbred Mice. Proceedings of a workshop, Bethesda, Md., Feb. 1978. Herbert C. Morse III, Ed. Academic Press, New York, 1978. xvi, 720 pp., illus. $36.

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Textbook of Immunology. Baruj Benacerraf and Emil R. Unanue. Williams and Wilkins, Baltimore, 1979. viii, 298 pp., illus. Paper, $10.95.