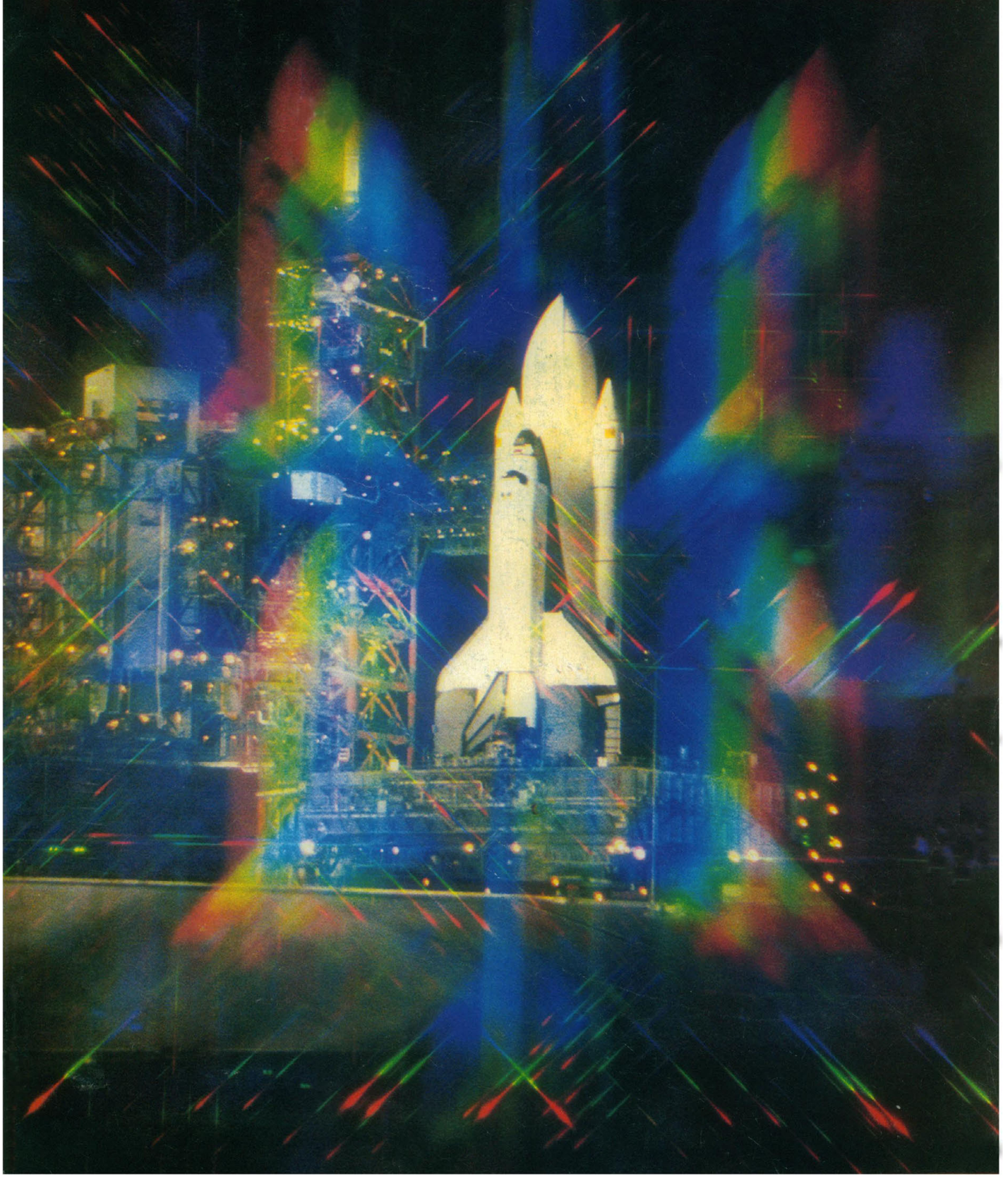
9 October 1981 • Vol. 214 • No. 4517 $2.00

# SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



# How do you make the best large-capacity centrifuge better? Add microprocessor control and a new drive.

There never has been a 6000-rpm large-capacity centrifuge like the new J-6M. It's microprocessor-controlled and has an induction drive based on technology developed for Beckman ultracentrifuges.

The microprocessor makes centrifugation virtually automatic. Just program into the memory the operating conditions of the runs you do most often. You can repeat a program at will by pressing just two controls. Or you can use the touch/tone keyboard to manually select run conditions.

With the J-6M Ultra-Smooth drive, you can take advantage of maximum acceleration/deceleration rates to save time or select other rates for special separations. And you'll never have to change brushes because there are none.

The J-6M also provides a new degree of temperature control with automatic temperature compensation for each rotor and automatic over-temperature protection. The rotor speed control systems are miles ahead too with automatic overspeed protection and microprocessor control to within 20 rpm of set speed.

The J-6M continues in the quiet-running tradition of its J-6 and J-6B predecessors and can spin a total of 17 Beckman rotors, including the new JS-2.9 which holds up to 12 blood bags. Elutriator Rotor capabilities too!

To find out more about how the J-6M is better, contract Beckman Instruments, Inc., Spinco Division, 1117 California Ave., Palo Alto, CA 94304.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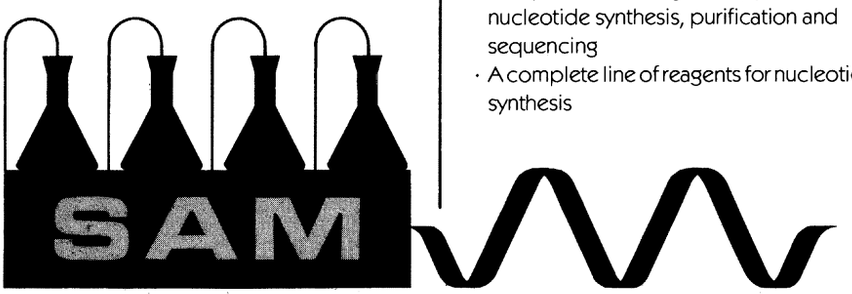


The SAM has the following features:

### Microprocessor Control

The custom built microprocessor has a 500 step memory incorporating 16 outputs, 4 inputs and a 12 digit alphanumeric LED display.

### Versatility

All current and emerging nucleotide synthesis methodologies may be employed, including the popular phosphite and phosphotriester chemistries. The SAM may also be quickly adapted to peptide synthesis as well as any number of new chemistries.

### Custom Programming

Nine user-defined programs may be stored in the machine. The SAM is shipped pre-programmed to perform oligonucleotide synthesis by the phosphite method. Peptide synthesis programs will also be supplied.

### Complete Automation

All steps of the synthesis of the oligonucleotides are performed automatically by the module. The phosphite method cycle time is 30 minutes.

### Simplicity

The SAM is easily connected to an HPLC and supplied with reagents in top-mounted reservoirs. Removal of the finished product and reconversion of the HPLC to an analytical instrument is accomplished in minutes.

### Service

BIOSEARCH offers:

- A course in nucleotide synthesis
- 6 months warranty on all parts and labor
- Complete technological support for nucleotide synthesis, purification and sequencing
- A complete line of reagents for nucleotide synthesis

## CUSTOM SYNTHESIS OF OLIGONUCLEOTIDES

Because of recent technological advances in the automated synthesis of nucleotides, BIOSEARCH is able to offer the rapid and accurate synthesis of custom oligonucleotides.

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| 8 | 1000 |
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| **Blocked triester monomer kit**<br>500 mg of each of 4 blocked monomers as TEA salts | $200 |
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The SAM will be available in late fall, 1981, for $10,800. Blocked nucleosides for a 15mer cost approximately $300. A stand-alone synthesizer will also be available.

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**COVER**

Space shuttle Columbia on pad at night showing spectra of pad lights. See page 160. [Robert Hillenbrand, Port Orange, Florida 32019]

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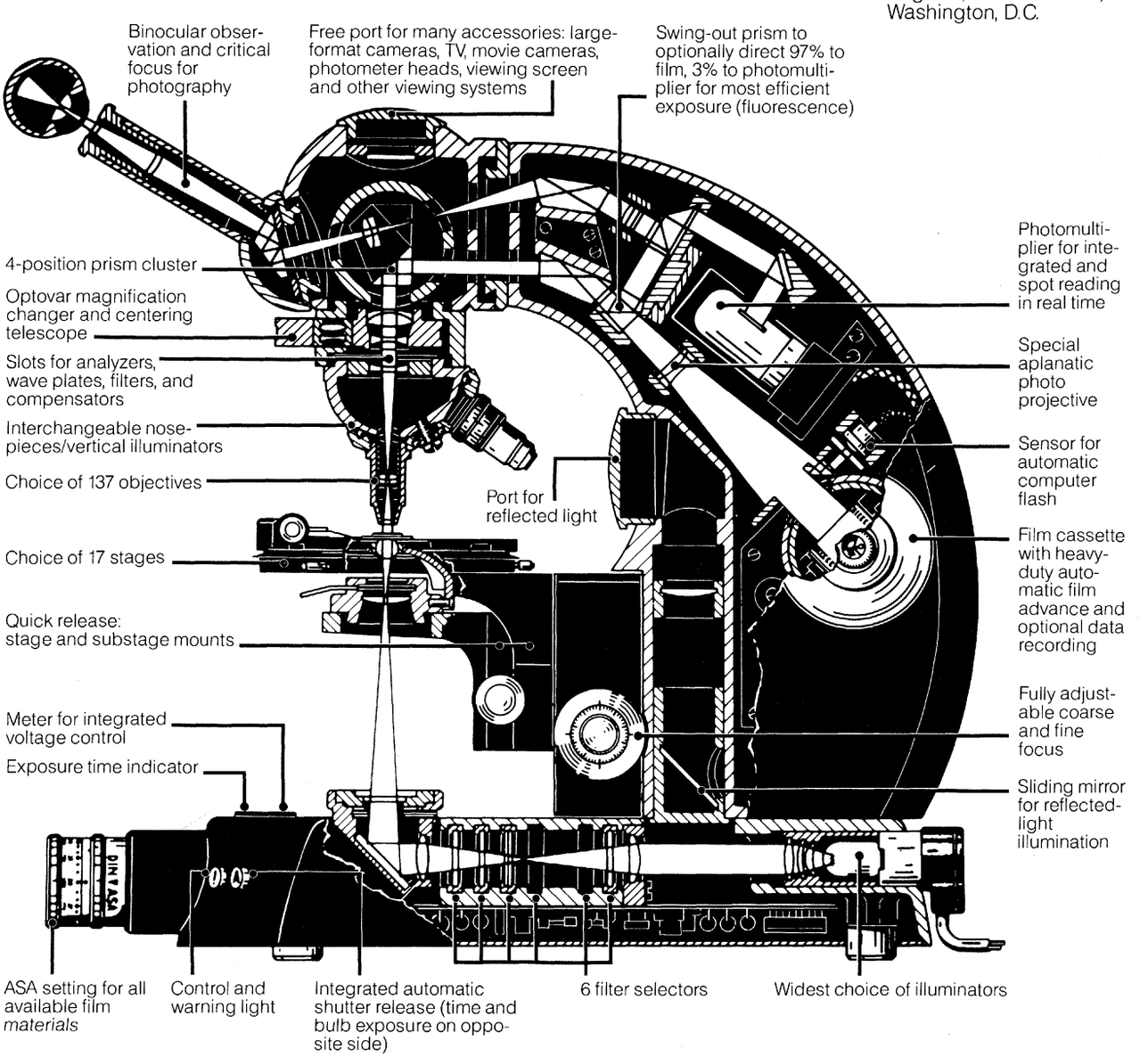

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To begin with, the No Problem typewriter speeds up the typing of your proposals, manuals, and reports like no ordinary typewriter can.

It eliminates typing rough drafts on paper. Pages are prepared on a TV-like screen instead.

Changes and corrections are made right on the screen. So no whiteouts. No retyping. No false starts. Whole paragraphs can be moved with the touch of a few keys.

Letter quality printing is done at up to 540 words per minute.

With the No Problem typewriter, one typist can now do work as fast as 3 or 4 people using ordinary electric typewriters.

Plus, the basic intelligence for the No Problem typewriter is contained on No Problem Smart Discs.™ So future functions and improvements can be added with new Smart Discs as they are developed.

**One typewriter or a shared system**

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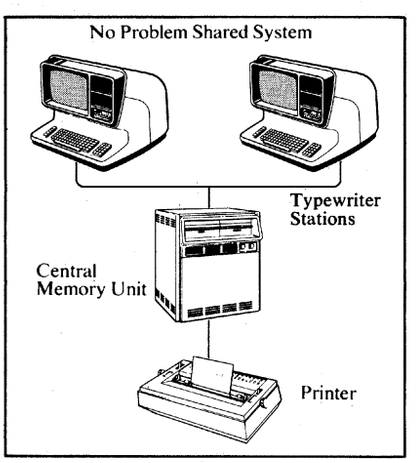


The No Problem Shared System™ adds new capabilities to the already versatile No Problem concept.

The heart of the system is the Central Memory Unit. It can store up to 30,000 pages, giving you lower storage costs per page, and eliminating the need for typists to handle numerous discs.

You can start with one or two typewriter stations connected to the Central Memory Unit, and add typewriter stations or printers as your needs increase.

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Consider the old method of incorporating complex mathematical equations into your copy: leave the space blank, then hand letter them in after the page was typed. Or, you could run to the photocopier, then "cut and paste."

With the No Problem Shared System, you can incorporate *and edit* virtually any equation you may encounter—*right on the screen.* It will display *256 different characters,* including Greek and math symbols.

Line drawings can be constructed on the No Problem screen, too.

The No Problem Shared System automatically selects left, right or center page position for numbers, and chapter names on even and odd pages. Repagination automatically updates section numbers to accommodate your additions and deletions.

Advanced editing automatically positions footnotes on the proper page.

And the printing of the No Problem Shared System approaches typeset quality and flexibility. Proportional and bold printing, to fit any format or width, is easily done. Even in two typestyles and two colors on the same page at the same time.

Most of all, the No Problem Shared System can improve your cost/performance ratio dramatically with its increased workpower.

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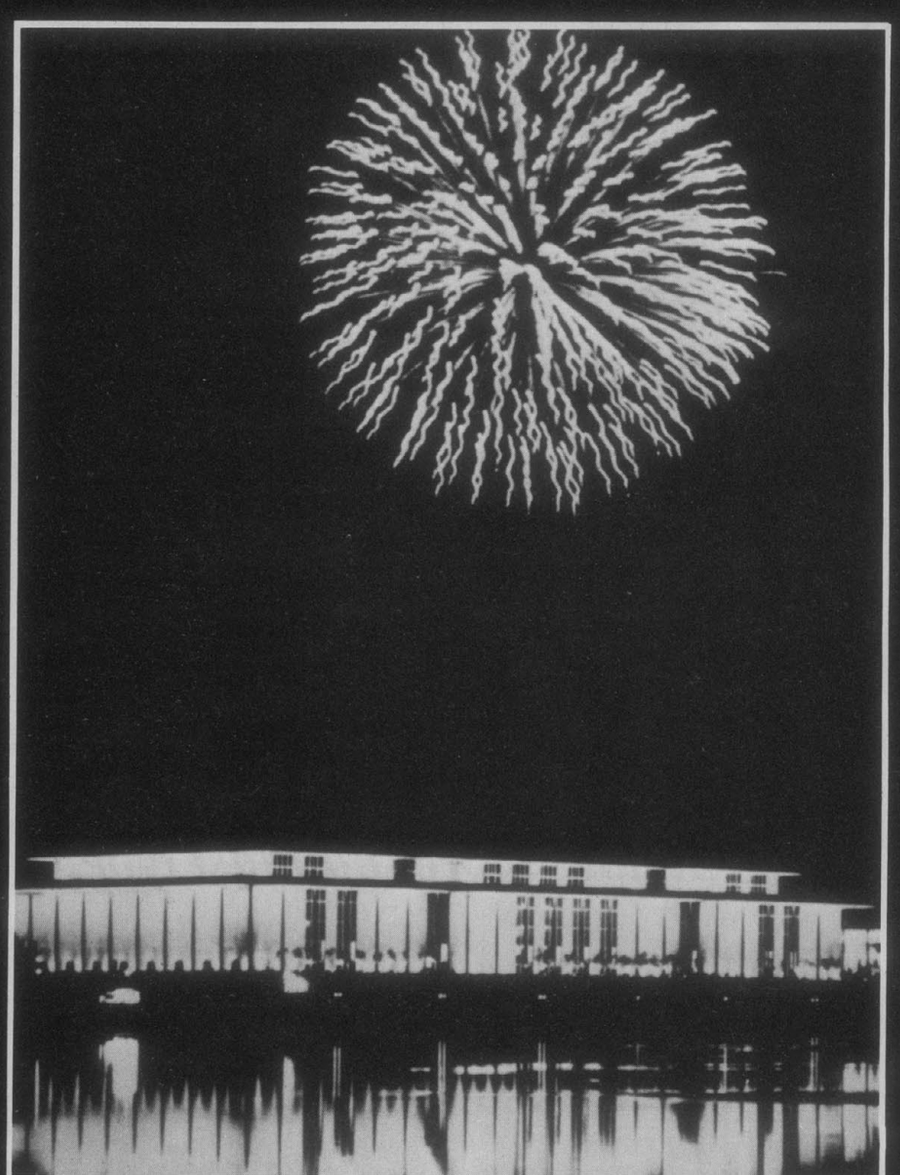

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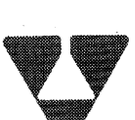

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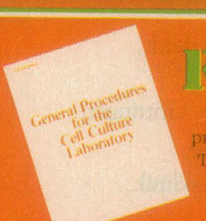


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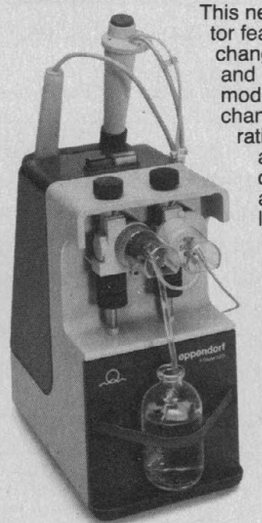


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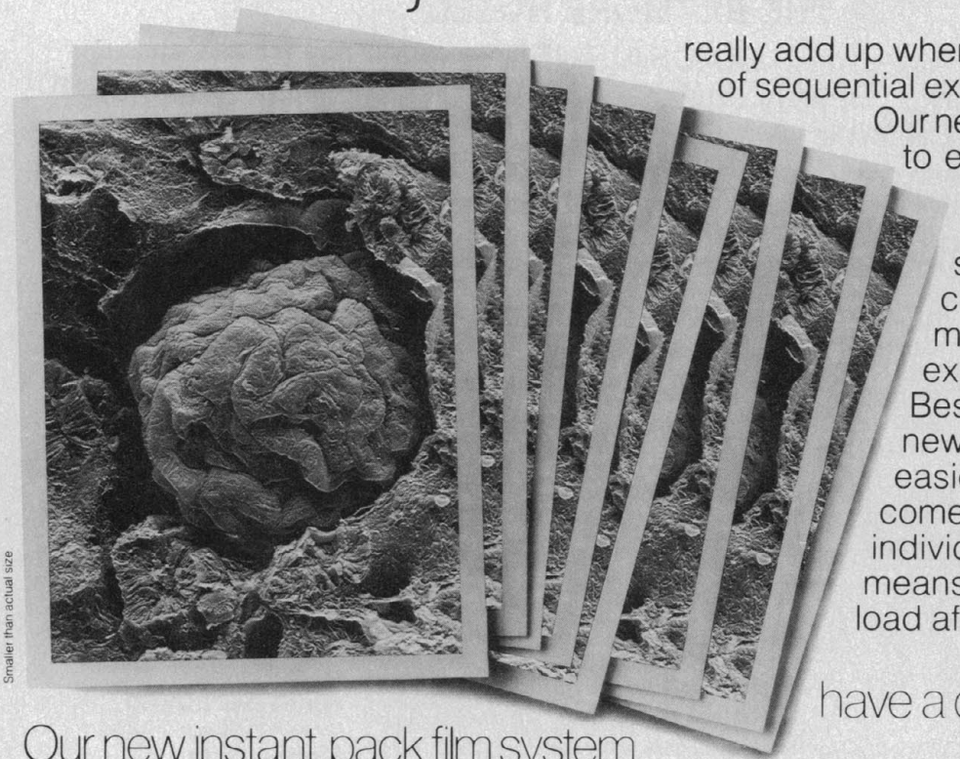

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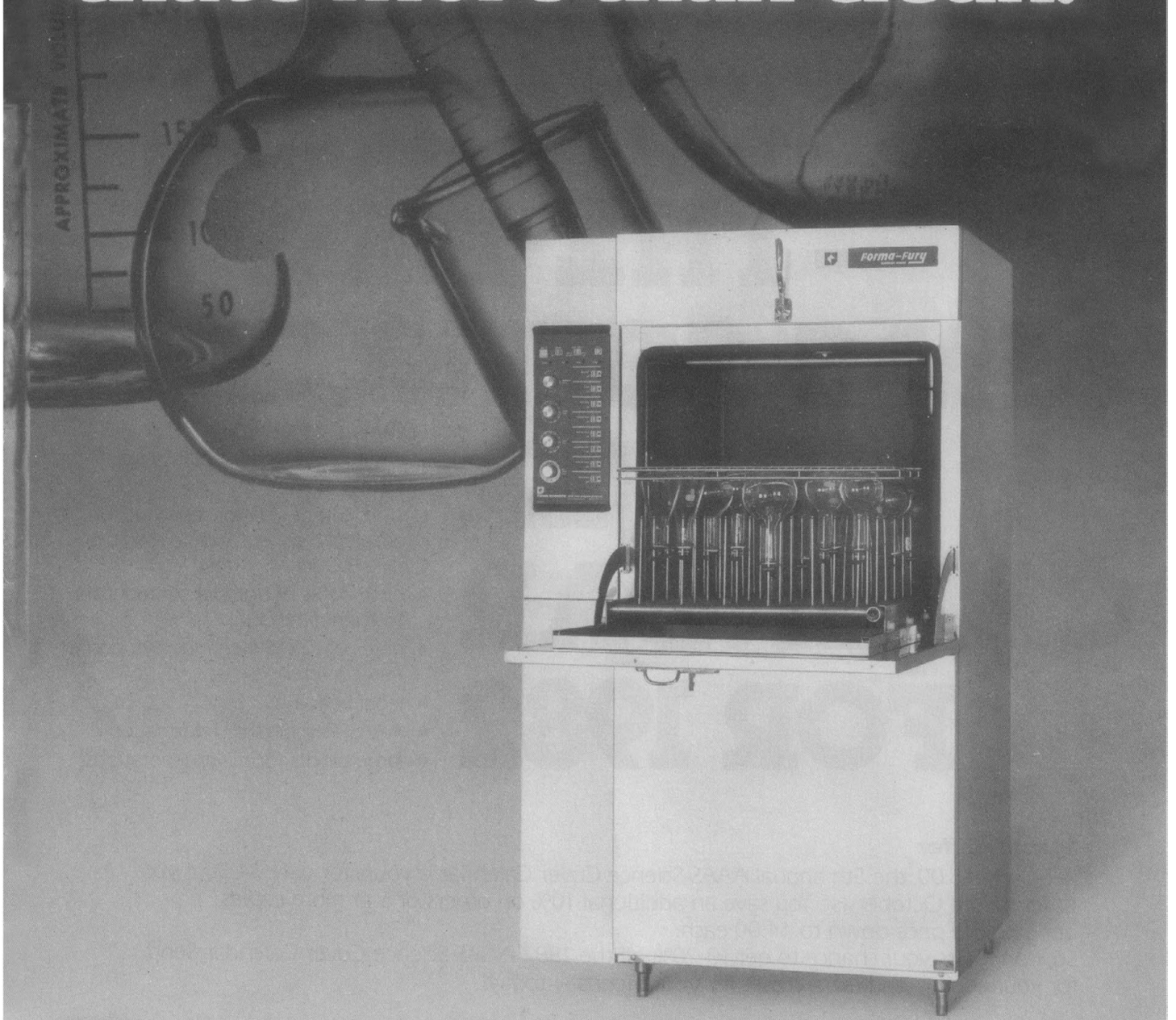


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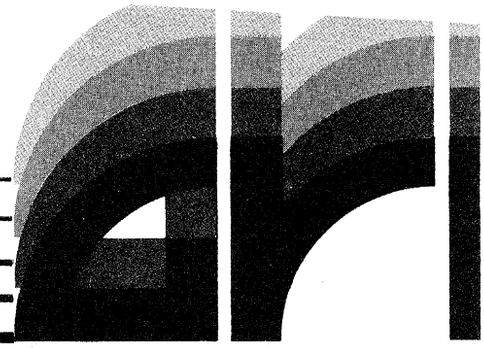

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proceeding on schedule with the assistance and approval of the Department of Agriculture.

In a more general vein, nutrition research has indeed been moved as part of the overall reorganization of the Department of Agriculture. It will now be more closely integrated with agricultural research, thus assuring nutrition a central place in the Department's programs.

JEAN MAYER

*Tufts University, Medford, Massachusetts 02155*

## Malathion Safety Record

Jean L. Marx's article "Malathion threat debunked" (Research News, 31 July, p. 526) does not mention the massive and successful aerial spraying of south Florida in 1956 to eradicate the Mediterranean fruit fly—a highly sophisticated operation with protective measures for beehives, fish farms, auto painters, and so forth that should be a model for the California program.

There has been no indication of any health hazard whatsoever as a result of this heavy application of malathion, the spraying in 1962–1963 over three counties, and the continued use of malathion for mosquito control. Because of this safety record, Florida experts advised aerial spraying in California 8 or 9 months ago. If heeded, there would be no crisis nor health-hazard furor today.

JULIA F. MORTON

*Morton Collectanea, University of Miami, Coral Gables, Florida 33124*

## Saccharin and Bladder Tumors

Several reports (*1*) suggest an increased incidence of bladder tumors in male rats fed high doses of saccharin for prolonged time intervals. These reports review the information on saccharin which indicates that very little, if any, is metabolically altered and that the compound is essentially completely eliminated in the urine. The compound does not appear to react with DNA, and its mutagenicity is debatable. The mechanism by which an otherwise innocuous compound can induce bladder tumors appears to be an enigma. We should like to suggest a factor which appears to have been overlooked.

The bladder tumors are seen only with maximum tolerated doses of sodium saccharin which are in the range of 4 grams per kilogram per day. Since all of this would appear in the urine, which may be estimated at a volume of 200 milliliters per kilogram per day, the concentration of saccharin in the urine of these rats would be approximately 0.1 molar. Saccharin, however, is an acid with a $pK_a$ of about 1.4 (*2*) and therefore should be distributed across cellular membranes according to the *p*H gradients across those membranes. The *p*H of the rats' urine was about 6.0; indeed, in the studies cited ammonium chloride ($NH_4Cl$) was administered to some of the rats to maintain the urine at an acid *p*H value. Although the intracellular *p*H of rat bladder epithelium is not known, most mammalian cells have an intracellular *p*H of about 7.0 (*3*), and it is reasonable to assume that bladder epithelial intracellular *p*H should be near this value. Furthermore, $NH_4Cl$ treatment can raise intracellular *p*H due to the transmembrane diffusion of nonionized $NH_3$. Therefore, at a urine *p*H of 6 and an intracellular *p*H of at least 7, the intracellular concentration of saccharin in the bladder epithelium should be greater than 1 molar. This concentration approaches the solubility limit for some salts of saccharin. Even if intracellular precipitation of saccharin salts does not occur, the effect of such a massive solute concentration on cellular functions must be profound. The chronic physical presence of these high concentrations of saccharin ions precipitates, or both, might induce tumors through an indirect effect on the cells' internal environment. Therefore, the tumors may be an artifact of the combination of massive doses, renal elimination, and cellular transmembrane *p*H gradients in the bladder.

W. J. WADDELL
M. P. LACHANCE

*Department of Pharmacology and Toxicology, University of Louisville, Louisville, Kentucky 40292*

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3. W. J. Waddell and R. G. Bates, *Physiol. Rev.* **49**, 285 (1969).

*Erratum*: In the report "Staining of blue-sensitive cones of the macaque retina by a fluorescent dye" by F. M. de Monasterio *et al.* (11 Sept., p. 1279), the calibration bar, referred to in the legend of Fig. 2, was omitted; the bar corresponds to 5 mm of the printed page. In the same report, the labeling of Fig. 3C (bottom right panel of Fig. 3, p. 1280) is missing. Its ordinate axis should read "Percentage," and the ordinate axis marks should read (from top to bottom) "13, 11, 9, 7, 5."

*Erratum*: The mezzotint of Isaac Newton on page 1341 of the issue of 18 September should have been credited to the Prints Collection, New York Public Library, by permission of New Republic Books.

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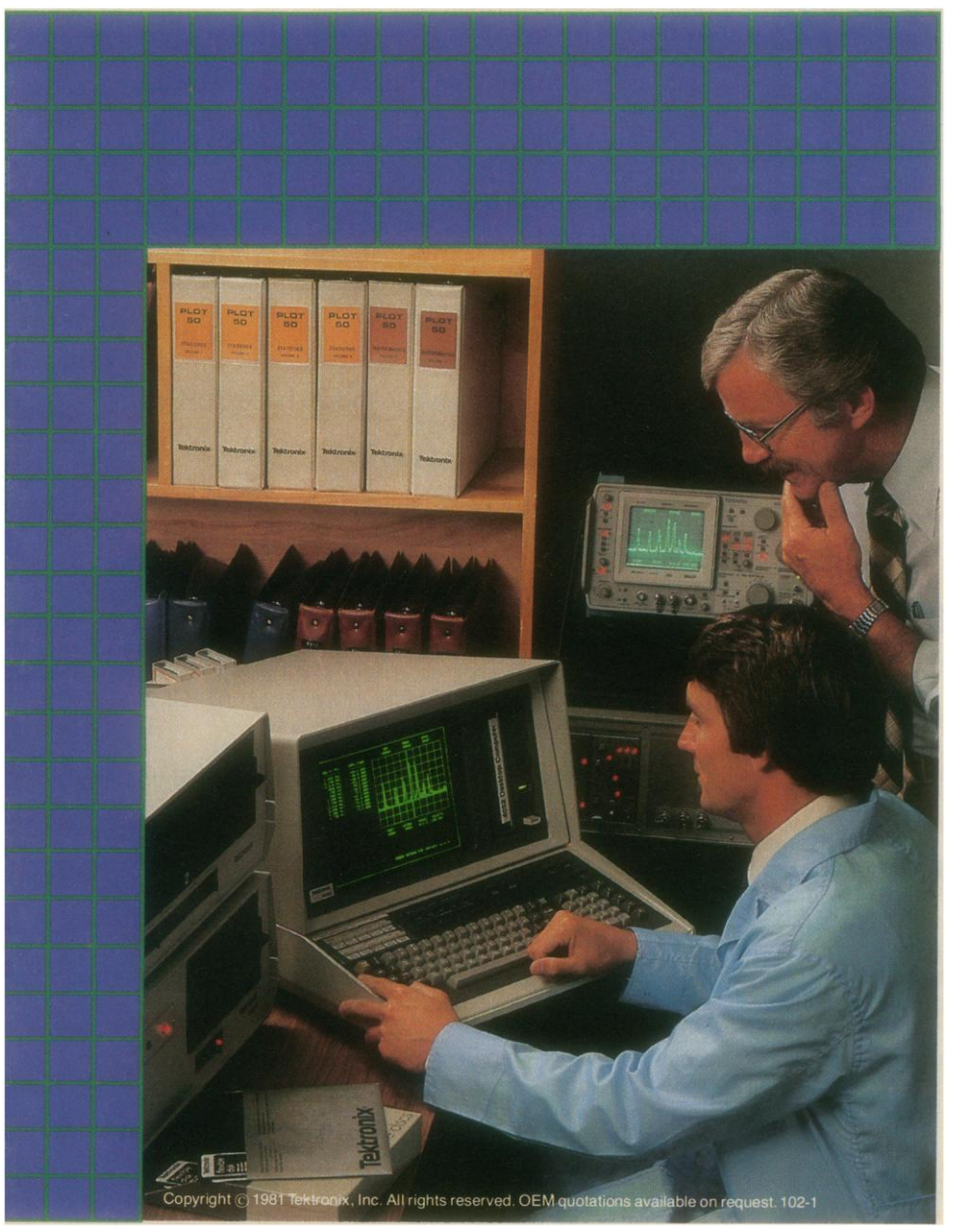




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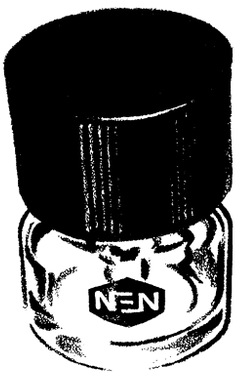


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9 October 1981, Volume 214, Number 4517 **SCIENCE**



# Women/Minorities in Science and Technology

In response to recent budget cuts at the National Science Foundation, scientists and engineers deplored in turn the effects of budget decisions on international science programs, social and behavioral sciences, and science and engineering education. The rationale for the excisions and the manner in which they were accomplished baffled and disturbed many, who believed that legislative processes for arriving at such decisions were ignored. Less prominent have been protests against cuts in programs designed to increase the participation of women and minorities in science and technology.

Past arguments for inclusion were phrased in such a way that only demands for rights were heard. This seems unfortunate at a time when such rights are unpopular, or at least considered unaffordable. Some scientists and engineers—male and female, minority and nonminority—have voiced the other reasons for supporting increased participation of women and minorities in science and technology. They have called attention to the waste of the brainpower of 60 percent of the population while we need to build capacity in all of the population to meet the challenges to our nation's scientific and technological preeminence. They have spoken of the role of women and minorities in addressing issues of health, national defense, and productivity. They have pointed out that personnel shortages in critical areas of science and technology can be met, while maintaining quality, by better utilizing the talents of these groups, and they have talked about the diversity of perspectives and experiences which are brought to science and technology by a heterogeneous mix of participants. Science has not been served well by our past prejudice and discrimination; we have lost time, talent, and ideas.

Although the battles for access, advancement, status within the professions, equal treatment, and equal pay are not finished, women made tremendous gains during the 1970's. This is not true of minorities. Quirks of statistics obscure the fact, but minorities saw little real progress over the last decade. Problems of access for minorities begin at the precollege level, in the science and mathematics education which students receive from the early grades on. The historical barriers, lower expectations of teachers, and poor overall quality of training offered by the schools affect these students most. Minority scientists, calling for access for the youth who would follow them and recognizing that quality is a part of equality, demand improvements in training, increased course requirements in mathematics and science, and a return to rigor.

Buck passing, however, is rampant. The federal government says that precollege education belongs to the states and local governments—to the states that originally led minorities to seek federal redress and to the local governments of many inner cities which are suffering under declining tax bases, increased need to provide basic human services, and little sympathy or money from state legislatures whose suburban and rural factions have traditionally remained unimpressed by these facts.

The Administration's suggestion that the private sector be involved is a reasonable one, but can be expected to work only for efforts which industry sees as being in its own interest. Where national and private sector interests intersect, there is no problem. History tells us, however, that public and private sector needs not only match imperfectly, but often conflict. For this country to attend to the health of science as well as provide for the common defense, see to the physical and mental health of the people, and increase national productivity necessitates greater participation of women and minorities in science and technology. Seeing to the health of science and technology is a legislated federal responsibility—where the interests and activities of other sectors intersect as well as where they do not. We must protest cuts in programs for developing the capabilities of women and minorities, not only for the sake of these groups, but also for the sake of science and for the sake of our nation.—SHIRLEY M. MALCOLM, *Office of Opportunities in Science, AAAS, Washington, D.C. 20036*

possible match appeared linking that enzyme to sheep myoglobin. There were 23 identities among the 127 aligned residues, and the NAS score positioned it relatively high on the listings (Table 3). The statistical significance was uncertain ($n$ = 2.4 S.D.). What puts the lie to common ancestry, quite apart from the distant relationship of yeast and sheep, is that none of the other myoglobin sequences, of which there were more than two dozen explored, had a resemblance anywhere near approaching the sheep comparison. A statistical anomaly occurred in which there were several identities in one small segment, and that had carried the bulk of the "homology."
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