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SCIENCE

New Microfuge 11 & 12 The Little Centrifuges with Big Centrifuge Features.

Everyone's familiar with Beckman Microfuge™ centrifuges. They're indispensable in research, clinical, and industrial labs for spinning down small samples fast.

Now Beckman offers two advanced Microfuge models with features you'd expect only in larger centrifuges, plus higher speeds, forces, and increased capacity.

The Microfuge 11 holds tubes in slides, like the Microfuge B. But it generates much higher centrifugal forces—up to 11,600 *g* with a full load of 18 1.5/1.8 mL tubes.

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If you're in the market for a microcentrifuge, get one with big centrifuge features. Write for brochure SB-570 to Beckman Instruments, Inc., Spinco Division, 1117 California Avenue, Palo Alto, CA 94304.

Special Offer: As an introductory offer, we'll give you $200 off the price of a new Microfuge 11 or 12 with trade-in of any Beckman, Eppendorf, or Fisher microcentrifuge, regardless of its condition. Offer limited to one trade-in per new Microfuge 11/12, valid in the U.S. and Canada only; expires June 30, 1981.

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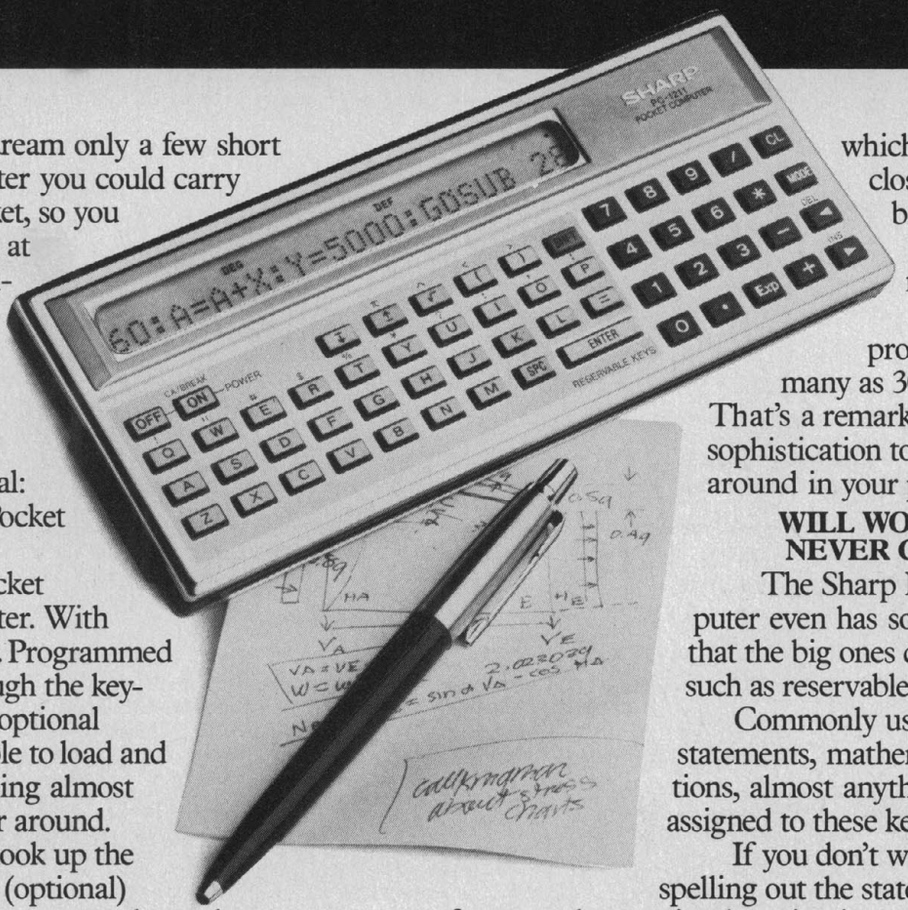

It was a pipe dream only a few short years ago. A computer you could carry around in your pocket, so you could run programs at home or while traveling; a computer small enough both for your pocket *and* your pocketbook.

Herewith, the pipe dream made real: the Sharp PC-1211 Pocket Computer.

Not a fancy pocket calculator. A computer. With 1.9K RAM memory. Programmed conventionally through the keyboard. Or, using an optional cassette interface, able to load and unload programs using almost any cassette recorder around.

You can even hook up the PC-1211 to a printer (optional) and print out the program results or the program listing itself.

BASIC SPOKEN HERE.

The PC-1211 Pocket Computer has a dot matrix display that scrolls right or left, handling up to 24 alphanumeric characters.

This allows the program to display instructions asking for data, as well as any other prompting the program requires. It also allows you to look at the program listing, line by line.

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It will run programs of as many as 30 or 40 lines. That's a remarkable degree of sophistication to be carrying around in your pocket.

WILL WONDERS NEVER CEASE?

The Sharp Pocket Computer even has some features that the big ones don't have, such as reservable keys.

Commonly used commands, statements, mathematical functions, almost anything can be assigned to these keys.

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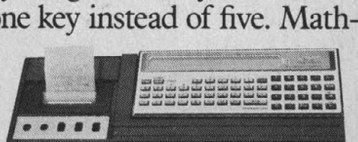

The PC-1211 with optional printer.

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ISSN 0036-8075

12 June 1981

Volume 212, No. 4500

SCIENCE

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COVER

Adult male chacma baboon (*Papio ursinus*) inspects an infant as the mother watches. These baboons live in multimale, multifemale groups. Dominant males mate with females and subsequently protect their probable offspring in the presence of potentially infanticidal immigrant males. See page 1281. [William J. Hamilton III, Institute of Ecology, University of California, Davis 95616]

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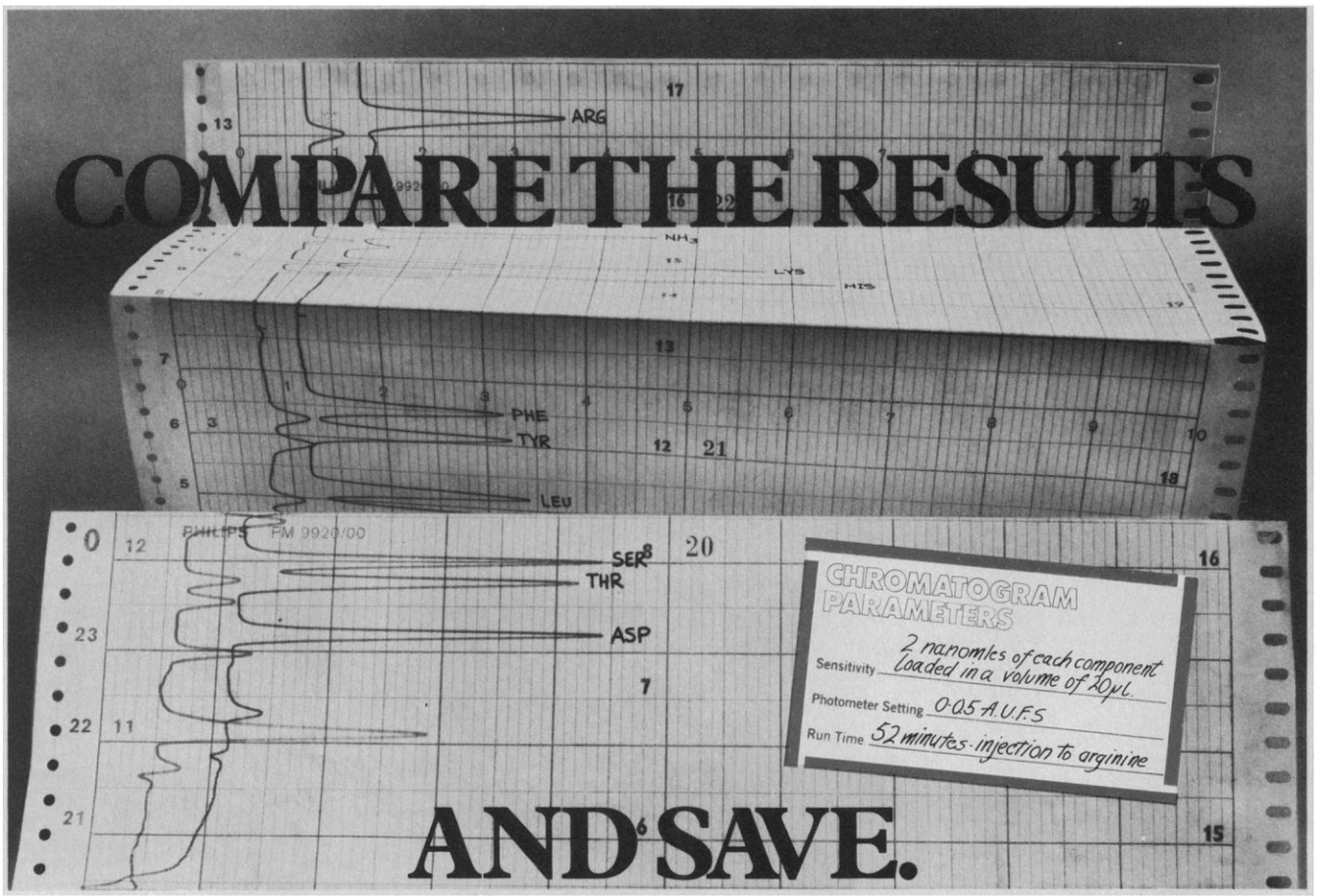

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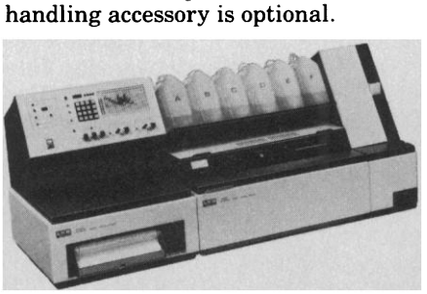

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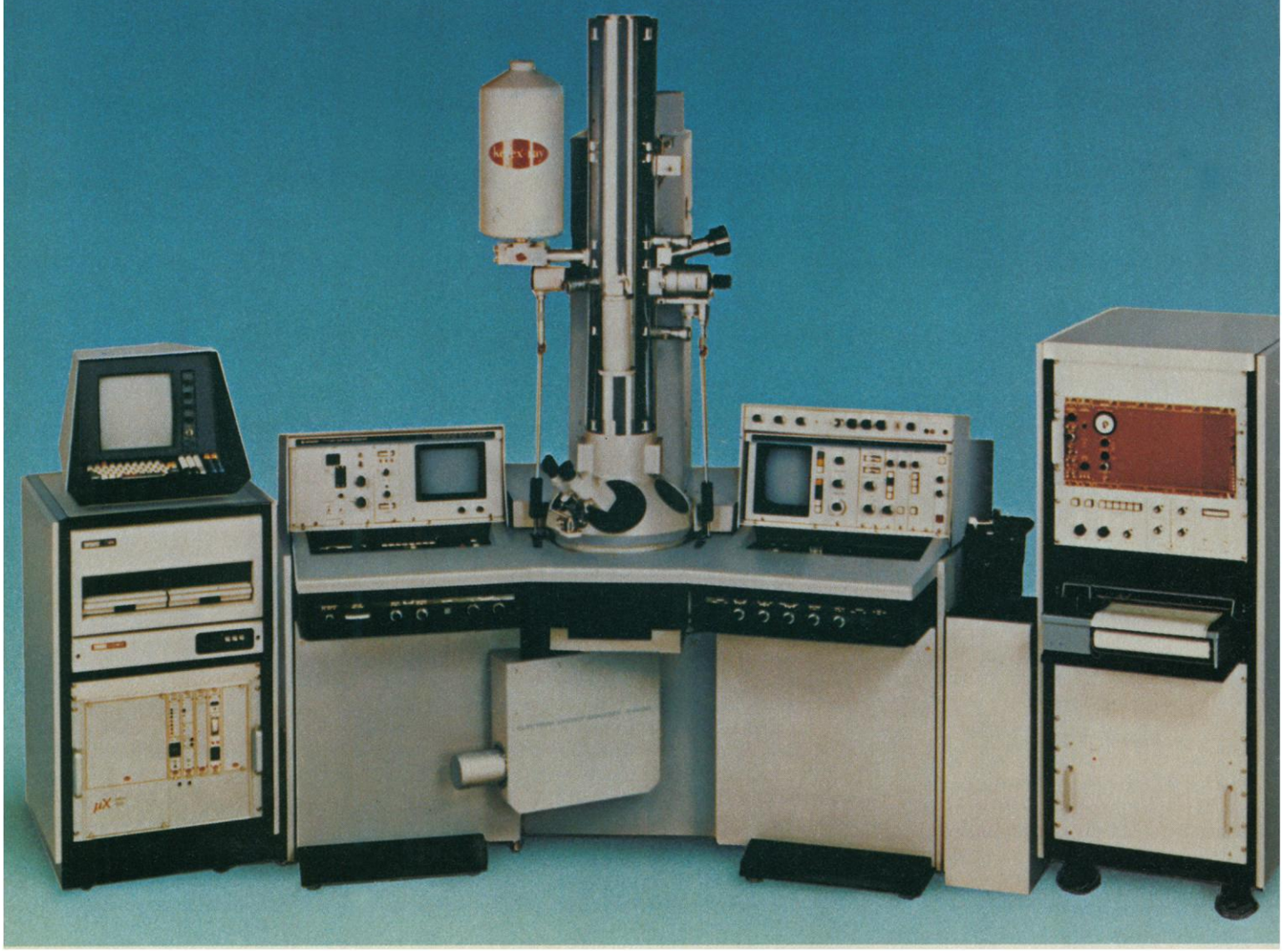

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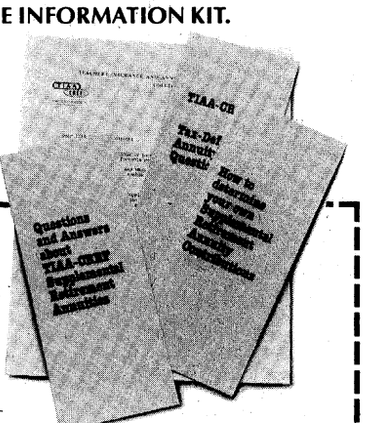

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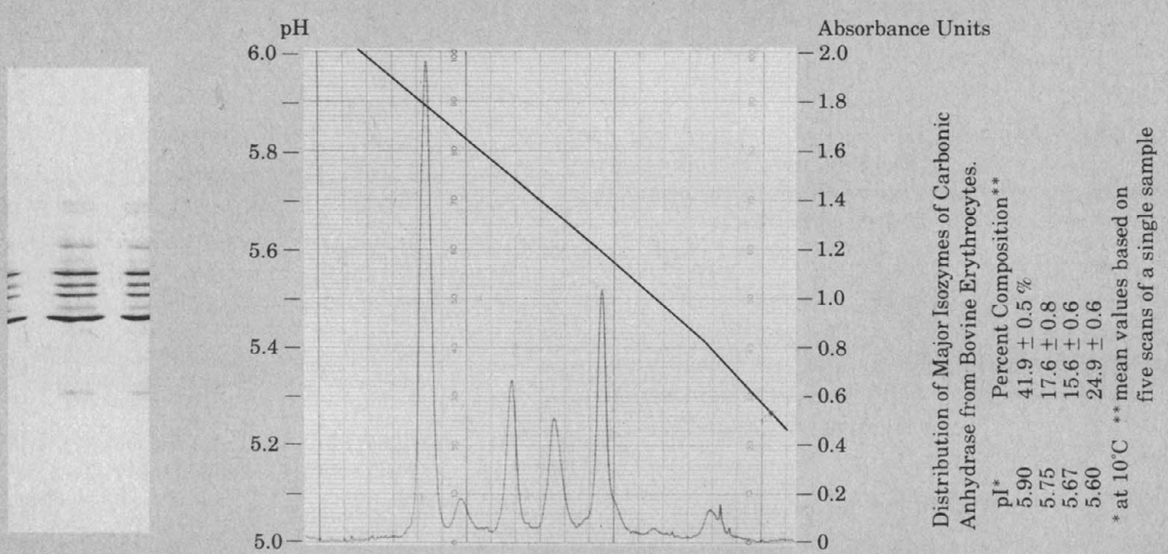


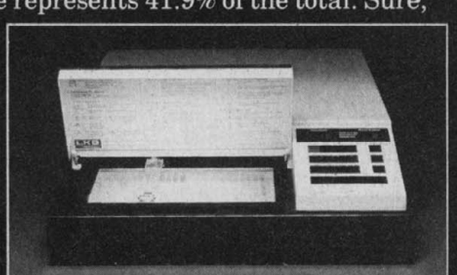
Distribution of Major Isozymes of Carbonic Anhydrase from Bovine Erythrocytes.

pI*	Percent Composition**
5.90	41.9 ± 0.5 %
5.75	17.6 ± 0.8
5.67	15.6 ± 0.6
5.60	24.9 ± 0.6

* at 10°C ** mean values based on five scans of a single sample

Laser densitometric analysis of the four major isozymes of carbonic anhydrase

There's more information to be gained than meets the eye. Looking at carbonic anhydrase on a stained electrofocusing gel will show you the four major isozymes. But it takes laser densitometry to tell you that the predominant isozyme represents 41.9% of the total. Sure, there can be problems with stains. But this analysis was valid over a concentration range covering two orders of magnitude, from 0.1 to 10.0 mg/ml. And isozymes bind with very similar staining affinities. For precision, the gel was scanned in different positions five times, automatically. It took less than six minutes, including the integration. How was it done? With the new UltroScan Laser Densitometer, from LKB – the experts in electrofocusing. Contact them today, to see what a laser can do for your gels.



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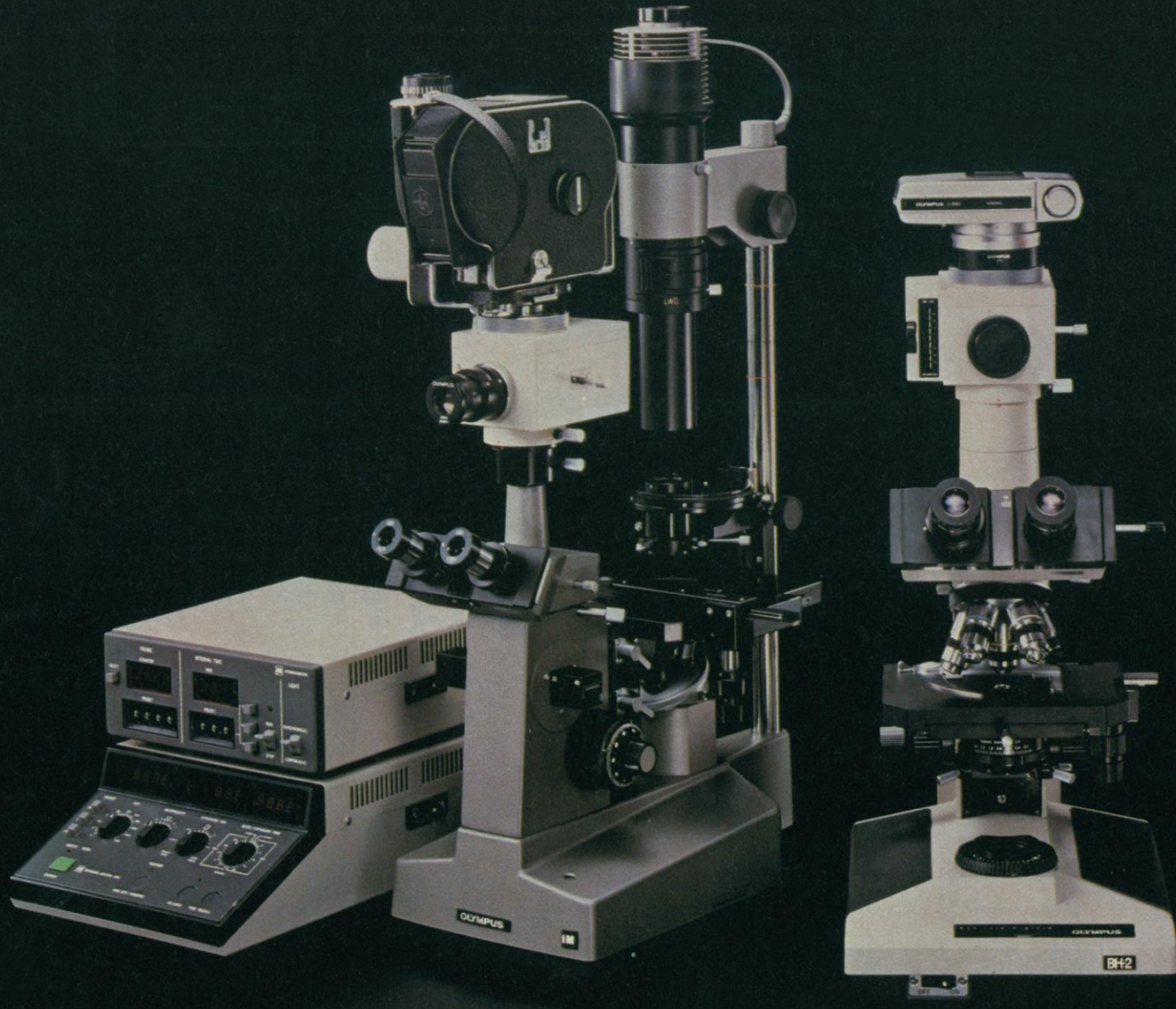
Olympus introduces the universal system for automatic exposure photomicrography: Olympus PM-10AD.



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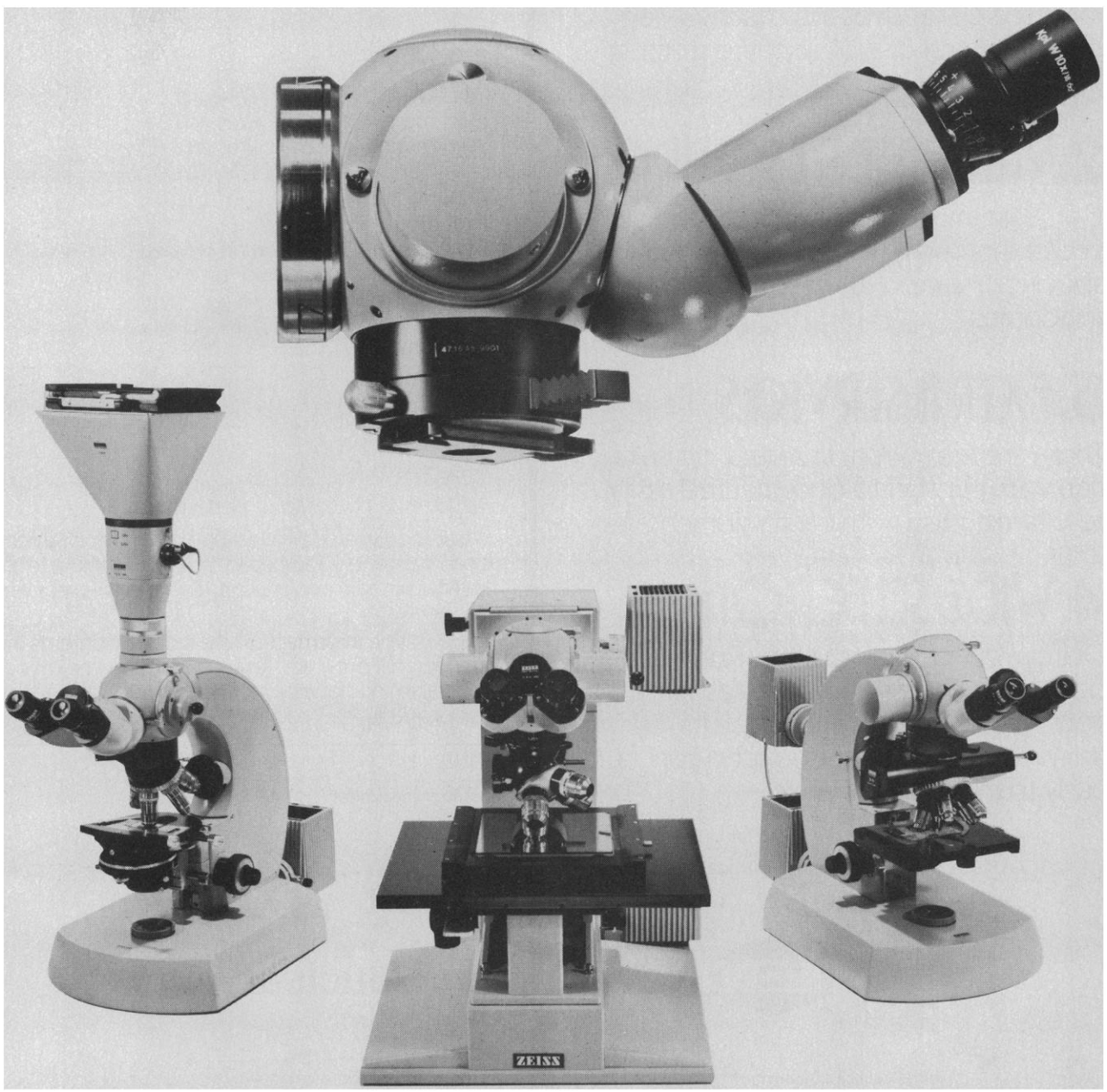

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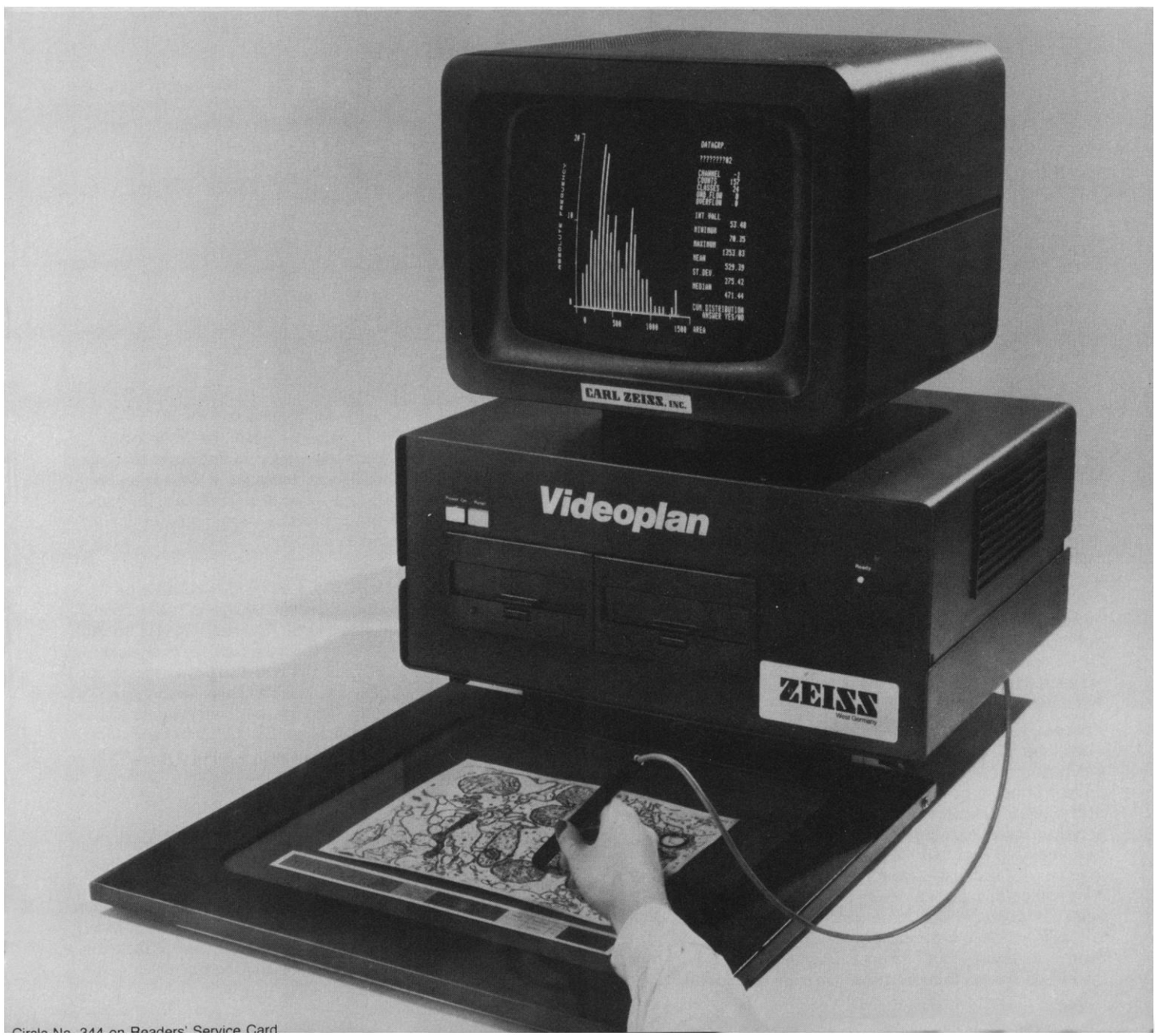

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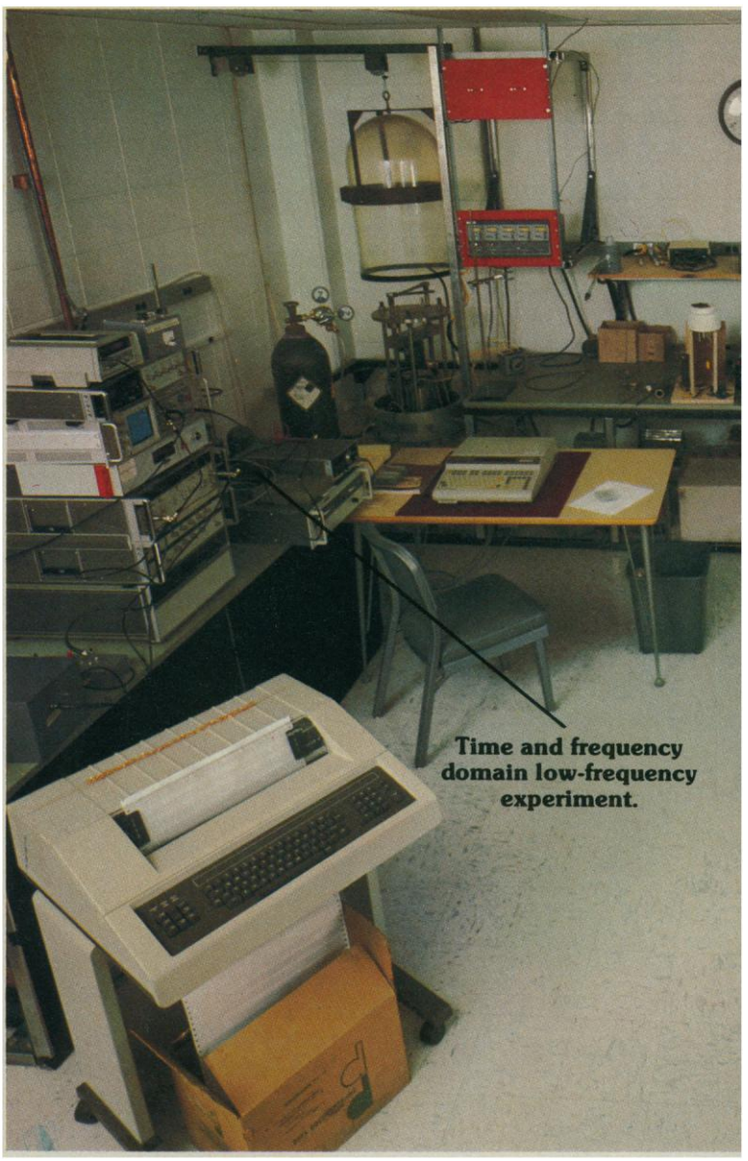

Time and frequency domain low-frequency experiment.

For Colorado State University's Department of Electrical Engineering, contracts and grants are a hectic game. The competition is stiff, funds must be utilized to the maximum, and contracts unfailingly completed on time.

Professor Joel DuBow, head of the Department's Energy and Materials Group, recommended the use of an HP-IB system for experimental programs involving fossil fuels, because "we have enough problems understanding the measurements without having to worry about interfacing. By using HP-IB compatible instruments and computers, we were able to get right to the data analysis, without first having to do research on research."

Processing the unseen.

The in situ oil shale processing, now considered the most promising oil extraction technique, utilizes underground processing. Since the material cannot be seen, it is critical that the process be monitored and diagnosed accurately. CSU's HP-IB system has permitted Professor DuBow and his colleagues to devise — and test — conceptual schemes for accomplishing this. For example, when oil shale is heated, it goes through three structural changes: from an "as is" state to a transition zone, to a retorting zone, and, finally, to a combustion zone. By using the HP-IB system to monitor temperature coefficients of the shale properties, Prof. DuBow has been able to delineate the location of these zone boundaries. Process engineers can then use this data to detect the position and velocity of these reaction zones, and to determine the shape of each zone. In turn, this tells them whether or not the desired process is being followed. If not, corrective action can be immediately taken.

A hierarchy of machines.

Another reason why Prof. DuBow chose HP-IB is because of the flexibility provided. "We use three HP 9825s, in conjunction with an HP 1000," Prof. DuBow says. "That way, we end up with a hierarchy of machines. The 9825s have the capacity to analyze most of our data, while the HP 1000, with floppy disc drive, is faster for graphics and hard copy output. The HP 1000 also gives us the ability to store data permanently, and to compare new data against data that was generated six months ago. On the other hand, if the 1000 is busy, the 9825s can provide us with a lot of our essential data. And, since software is compatible, if one 9825 is unavailable the other two can keep the lab running."

Flexibility for data quantity and quality.

In short, this HP-IB system made it possible for CSU engineers to assemble a system configuration quickly, so they could begin looking at data months faster than might have been possible had conventional components been used. It also permits them to analyze oil shale samples faster and obtain more data from the tests. In fact, in one three-month period, CSU has generated more oil shale test data than had ever before existed in published form.

more oil shale test data than had ever before been published.

"Not a new adventure every time."
Professor DuBow's HP-IB system now represents an investment in excess of $250,000, and includes the computers, a low frequency network analyzer, a differential thermal analyzer, printer, four-pen plotter, five disc drives, tape drive, measurement process controller, terminals, and ten other HP instruments. "With HP," Prof. DuBow reports, "I can modify, upgrade or expand the system as our needs change; I have a system where I can hook up specialized and expensive analytical instruments (such as an HP GCMS) rapidly and not have a new adventure every time. Aid from HP people was crucial at certain times. In fact, if it hadn't been for them, the whole program might have failed. One of their applications engineers was especially helpful not only in the interfacing, but his intimate knowledge of the instrument system helped us design our experiment to get the data we wanted accurately."

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LETTERS

Days of Wine and Lasers

The proliferation rate of small, independent wineries in California and throughout the world is exceeded only by activity in the publication of books and periodical articles on wine and wine tasting. A mystique has thereby evolved which renders the consumer frustrated in the selection and judgment of wines that he might buy. Is a knowledge of the myriad qualitative wine parameters really needed and, furthermore, is there any means by which the consumer may determine that a particular analysis by an expert is more hype than fact? Since the qualities of a wine (taste, aroma, color, and clarity) exist only by virtue of particle types present, be they molecules, bacteria, or even grapes, it is reasonable to expect that an answer to these questions might be achieved by looking at wine particles by means of laser light scattering (*1*). Described here are the results of a very limited experiment in which the light-scattering properties of carefully decanted and diluted wines were compared with the opinions of a nonprofessional consumer panel. The results clearly show that, had the wines been judged initially by the quality of their differential light-scattering (DLS) patterns, the entire panel would have concurred.

All measurements were performed with seven different West Coast varietal Pinot Noir wines using a Differential III light-scattering photometer (2) equipped with a nominal 3-milliwatt, vertically polarized, helium-neon laser. The wine samples, diluted 10 to 1, are placed individually in special cuvettes at the center of the beam. The logarithm of the scattered intensity is recorded as a function of scattering angle, and the data are presented as shown in Figs. 1 and 2. The wines, labeled A through G, cover a

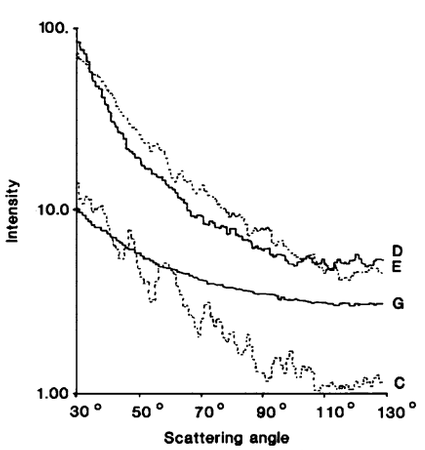

Fig. 1. DLS patterns of wines C, D, E, and G.

Table 1. Wine qualities (Pinot Noir).

Identification	Cost* ($)	Panel† rank	Comments‡
A	3.75	4	NR
B	3.75	5	NR
C	5.00	3	Y, T
D	3.15	7	SP, T, H
E	6.50	6	T, V, H
F	7.00	2	P, N
G	12.00	1	G, N, Y

*Cost varies from store to store. These were prices at one store on date of purchase. †Physicist, mathematician, electrical engineer, office manager, x-ray technician, coin dealer, electromechanical assembler, and attorney. ‡G, good; SP, soda pop aftertaste; T, thin; P, pleasant; N, nice flavor; NR, no resemblance to a Pinot; V, vegetable taste; H, horrible; and Y, young.

retail price range from $3.15 to $12 per standard three-quarter liter bottle (Table 1). Because the natural "pigmentation" of all these wines is red, the use of a red laser wavelength (λ = 632.8 nanometers) ensures that virtually no light is absorbed and all recorded patterns characterize the scattering properties of the ensemble of molecules and particles present.

As may be seen from Figs. 1 and 2, the degree of unpleasant taste as determined by the panel of nonprofessionals (Table 1) correlates well with the degree of noise and relative amplitude in the recorded signals. The smoother and flatter curves correspond to better-tasting wines, a predominance of large particles tending to affect simultaneously both taste and light-scattering properties.

The total material present within each sample is manifest from the vertical position of the DLS pattern. Thus if two samples contained identical types and distributions of molecules and other particulates, the sample containing the greatest concentration would yield the pattern of greatest intensity. The relative height of the pattern, however, is *not* necessarily proportional to the *number* of particles present. Indeed, in the molecular regime (*3*), the scattered intensity

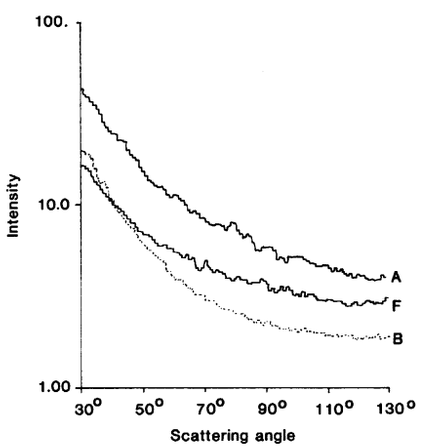

Fig. 2. DLS patterns of wines A, B, and F.

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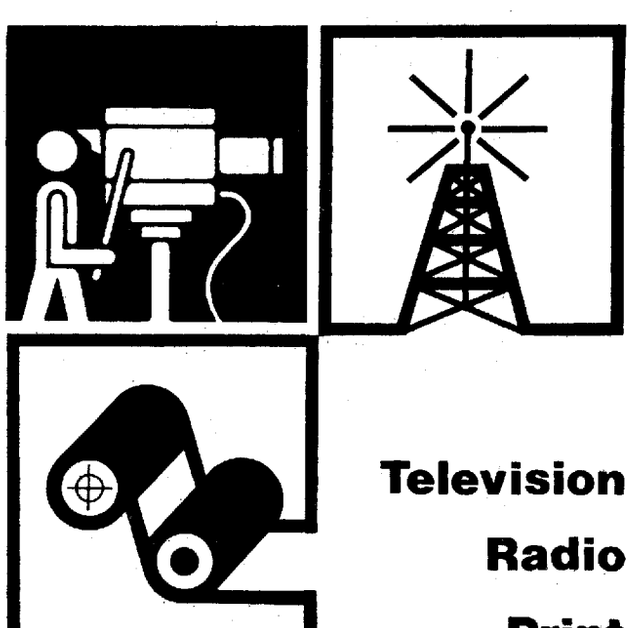
For literature circle R.S. #329

1981 AAAS Westinghouse Science Journalism Awards



Rules

The aim of this competition is to encourage and recognize outstanding reporting on the sciences and their engineering and technological applications in newspapers, general circulation magazines, radio, and television. The following categories are not eligible: items on the field of medicine, items published originally in AAAS publications or produced by AAAS; reports by employees of the AAAS or Westinghouse Electric Corporation.

- Each entrant may submit three entries for any one category.

Print

- An entry for a newspaper competition may be any of the following: a single story; a series of articles; or a group of three unrelated stories, articles, editorials, or columns published during the contest year. A magazine entry may be a single story or series published during the contest year.
- A completed entry blank must be submitted together with seven copies of each entry in the form of tear sheets, clippings, reprints, or syndicate copy (**not over 8½" x 11"**), showing name and date of the publication. **ENTRIES MUST NOT BE ELABORATE!**

Broadcast

- An entry for the radio or television competition may be an individual news story, feature, or a series, regardless of length, broadcast during the contest year on either public or commercial stations. Entries must be comprised of scripted material. Interviews are not eligible.
- A completed entry blank must be submitted together with a cassette in the case of radio and copy of the script or a ¾" videocassette in the case of television and copy of the script.
- Each entry must have been published or broadcast within the United States during the contest year—1 October 1980 through 30 September 1981. (In case of a series, more than half of the items comprising it must have been published or broadcast during the contest year.) The date on the issue in which an article appeared will be considered as the date of publication. All entries must be postmarked on or before midnight, 15 October 1981.
- Persons other than the author may submit entries in accordance with these rules. Entries will not be returned.
- Winners of the 1980 Awards are not eligible for the 1981 awards. Persons winning three times are no longer eligible.
- The Judging Committee, whose decisions are final, will choose the winners. There are five awards of $1,000: for the winning entry in the over 100,000 daily circulation newspapers competition; for the winning entry in the under 100,000 circulation newspapers competition; for the winning entry in the general circulation magazine competition; for the winning entry in the radio competition; and for the winning entry in the television competition. For award purposes, newspaper circulation will be sworn ABC daily circulation as of 30 September 1981. The Judging Committee may cite other entries for honorable mention.
- The awards will be presented at the dinner meeting of the National Association of Science Writers during the Annual Meeting of the American Association for the Advancement of Science in January 1982. Travel and hotel expenses of the awards winners will be paid. Entrants agree that, if they win, they will be present to receive their awards, unless prevented by circumstances beyond their control.

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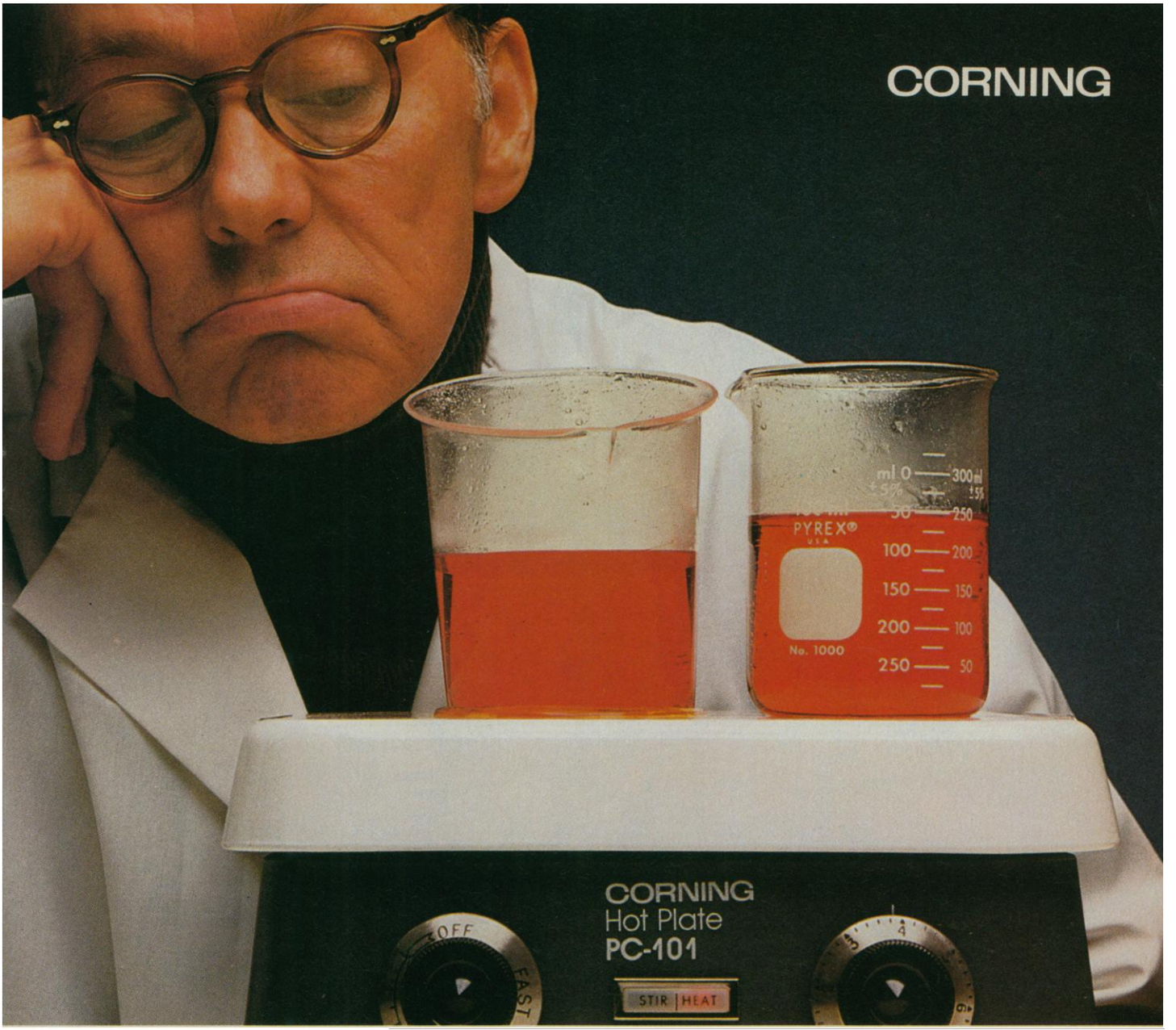

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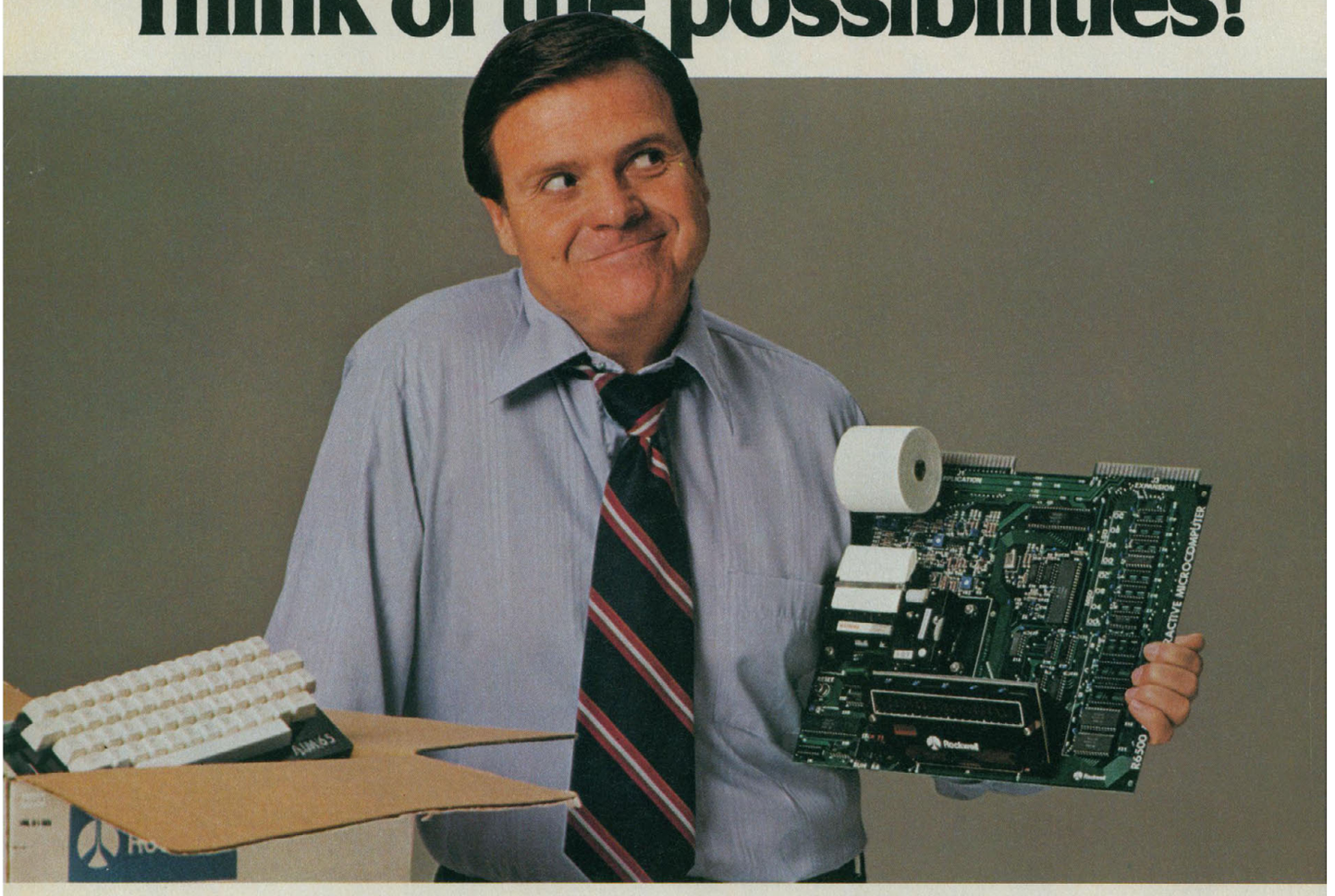

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12 June 1981, Volume 212, Number 4500 **SCIENCE**

Resources for Research Medicine

Research medicine has come far, and it has farther yet to go. The pace of biomedical discovery, of developments in technology and technique, has been explosive, and has been correlated with the explosion in NIH research funding since 1950—the latter distorted by inflation but impressive even in constant dollars.

Since 1979, however, annual NIH appropriations have not increased when measured in constant dollars. But the constant-dollar cost of biomedical research keeps on increasing. Will the resources be available to allow us to advance, and without breaking stride? If federal support declines, will industry and private investment pick up the slack? And if so, on what terms? These are our current problems, and we do not yet have solutions. Our hope must be that we can go forward. That hope, however, rests on a simple recognition: neither a miracle nor a happy accident produced our recent progress—billions of dollars of public investment made it possible. Our future has an obvious price tag attached to it.

A second hope I have is that we will be flexible enough to keep adjusting responsibly and effectively to changes of bewildering proportions. Medicine is rooted in the present but must well serve the future. No prophecy is needed to anticipate the shock of impact of trends already fully visible. Our increased ability to prevent disease will produce shifts in kinds of patients in hospitals. The aging of our population will produce a demand for greater and different resources for medical care. Changes in treatment may have consequences ranging from noninvasive diagnosis to the possibility that whole clinics may close as the tuberculosis hospitals closed in the 1950's. Our hope under these circumstances must be that we will neither resist the flow of change nor drown in it, but that we can and will succeed in managing and channeling change within our medical institutions.

Yet another hope is that we will make the best possible use of the larger number of physicians that are coming onto the scene. It is anticipated that their number will increase by a full one-third within this decade. Will we therefore be able to reduce the scale of some medical schools to more intimate and more personal dimensions, and to achieve more effective staffing in hospitals? Can we avoid the possible negative outcomes of so great an enlargement in the supply of physician talent?

Let me now shift from hope to purpose and touch upon two points. There is harmony rather than dissonance in the marriage of private enterprise with the public interest. When committed to public service, private enterprise surrenders profit. But it retains the virtues of autonomous and responsive private governance, the efficiency and flexibility of independence in management and operation, and the discipline of competing for resources. When committed to the public benefit of private enterprise, government as the representative of public authority surrenders control. But with respect to private not-for-profit institutions, it retains the incentive of providing support for public purposes with public funds, the responsibility for the public order in which the private corporation functions much as the private citizen does, and accountability for the legitimate use of public funds. In the American tradition, it is our genius that private enterprise and public policy are linked in partnership and therefore strengthen one another.

I am also convinced that the resources needed in the private sector will depend on our own resolve to secure them. If the quality of our work and strength of our purpose merit support, we shall not fail for lack of it. But as we achieve a richer and more diverse mixture of support, let us not trap ourselves into the false notion that support from government and industry is an either-or proposition. Only the trinity of university, industry, and government can effectively support the trinity of service, training, and research.—STEVEN MULLER, *President, Johns Hopkins University and Johns Hopkins Hospital, Baltimore, Maryland 21218*

Excerpted from an address by Dr. Muller at the dedication of the North Division, Duke University Hospital, 25 April 1981.

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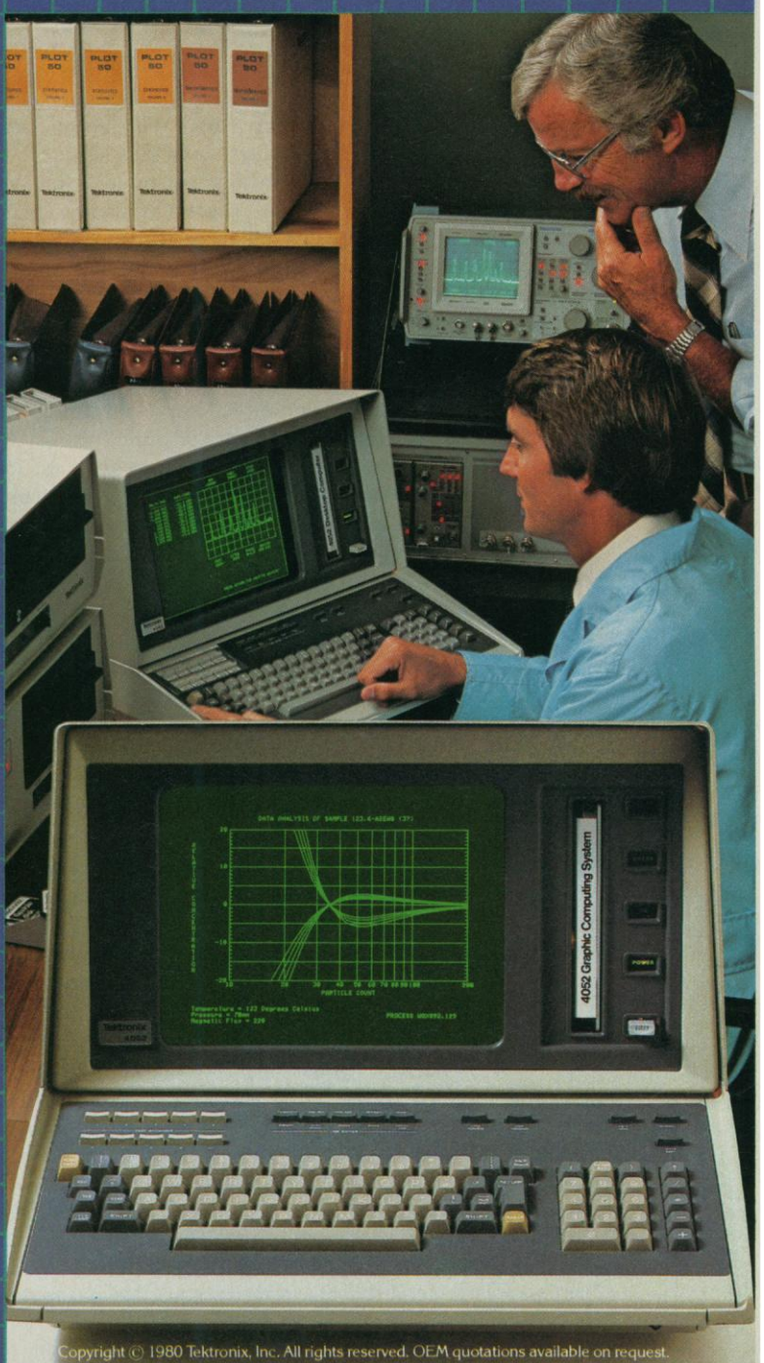

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