9 March 1979 • Vol. 203 • No. 4384 $1.50

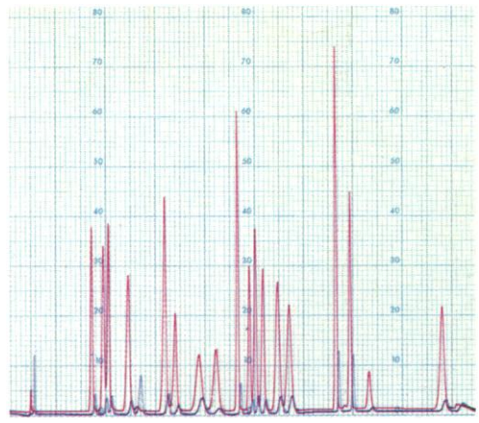
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The sensible analyzer

The 119CL is the sensible amino acid analyzer that gives you fast, accurate results with simple programming and automatic operation—all at moderate cost. Beckman representatives install your analyzer, then thoroughly train you on your own instrument. Illustrated guides show you how to set up various runs. And the proven components of the Model 119CL assure you of reliable operation.

From a performance standpoint, the 119CL comes close to analyzers costing twice as much. For instance, its sensitivity of 0.5 nanomole means accurate analysis of very small samples. Solid-trace recordings are linear with concentration for easy quantitation. Fast run times



give complete single-column hydrolyzate analyses in only 1½ hours (see chromatogram) and single-column physiological separations in only 4½ hours—times which include regeneration and equilibration. And, if you want to eliminate tedious manual calculations entirely, just add the companion Model 126 Data System.

Send for literature on the sensible 119CI : the best-selling analyzer in the world. Ask for SB-428 from Spinco Division, Beckman Instruments, Inc., 1117 California Ave., Palo Alto, CA 94304.

BECKMAN®

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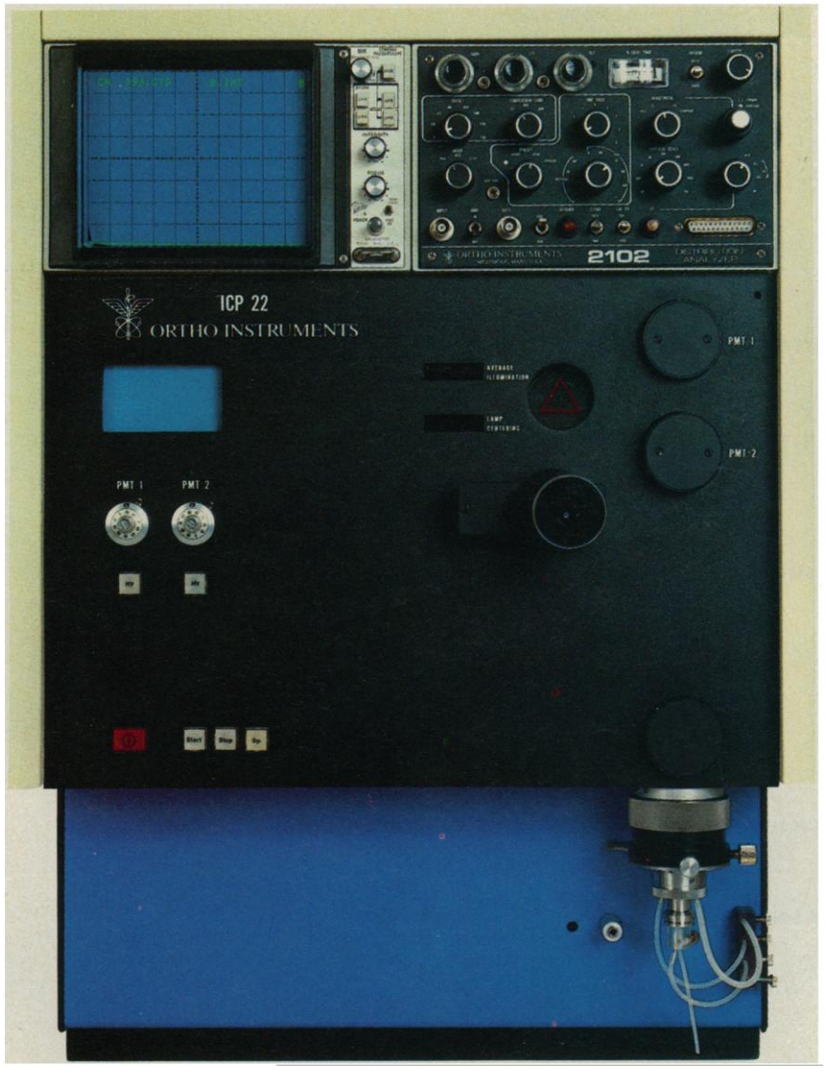
The ICP Flow Cytometer



Precision and simplicity of operation

Ortho Instruments announces the ICP Flow Cytometer — a new unique, flow cytometry instrument with high numerical aperture arc lamp illumination. Use of a high-power, HBO 100 mercury lamp has the advantage of providing fluorescence excitation at wavelengths — and with optical filter combinations — which are familiar to the fluorescence microscope user.

The Kohler illumination optics and the large numerical aperture over which the fluorescence emissions are collected — achieve great precision even with cells in which the DNA is irregularly distributed. Measurement of DNA content of cells and even individual chromosomes is made possible by the ready availability of highly specific and stoichiometric dyes for DNA. Two fluorescence detectors permit correlated measurements of two dyes. For example, simultaneous measurement of per-cell DNA and protein content. A large choice of dyes and staining techniques for various cellular constituents is available.

The Ortho ICP Flow Cytometer can be obtained as a stand-alone flow cytometric analyzer, or can be combined in modular fashion with the Ortho laser illumination systems.

For further information contact the Research Instruments Division.

ORTHO INSTRUMENTS
410 University Ave., Westwood, Mass. 02090 • (617) 329-6100

Visit us at FASEB Booth No. R26-R28.

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ISSN 0036-8075

9 March 1979

Volume 203, No. 4384

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

High water banding on a standard boat in a Delaware salt marsh resulting from interception of the estuarine surface microlayer and resulting fouling. See page 1010. [Dan Murphy, College of Marine Studies, University of Delaware, Newark]

VAX Program Capacity. Ask any user.

"VAX offered us almost three times the address space of our 370/168."

Bill Miller, Senior Systems Analyst
Chevron Geophysical Co., Houston, Texas

Chevron Geophysical is heavily engaged in seismic data processing involving matrix operations on large arrays.

As Senior Analyst Bill Miller states the problem: "Our IBM systems, running on TSS, give 24 bits of true address space—for a maximum program size of 16 megabytes. But only 10 to 12 megabytes of this can be used by the programmer—and our application had grown to the point that TSS was simply cramping us.

"With the VAX-11/780, we know we can have application programs that use a full 32 megabytes as we're configured now—and it could be more if we wanted."

But Chevron didn't buy their VAX without first benchmarking it against the far more expensive 168.

Miller comments: "We developed a number of benchmarks to test specific areas of performance. On the average, the VAX CPU appears to be about a third as fast as the 168, which is really quite impressive. And it's very possible that for certain applications, we may see a negligible loss of throughput over the 168, thanks to VAX's unique page clustering scheme."

And as far as system performance to date, Miller reports: "The VAX/VMS operating system has been remarkably reliable. The people at Digital have done a phenomenal job."

"VAX's true 32-bit addressing puts its potential capacity so far out, we don't have to worry about it."

Dr. Edwin Catmull, Director,
Computer Graphics Lab
New York Institute of Technology,
Old Westbury, New York

The Computer Graphics Lab at New York Institute of Technology is a leading research and production facility for computer animated commercial and educational films.

In Dr. Catmull's words, here's what brought NYIT to the VAX-11/780: "While spending years developing our capabilities with minicomputers, we

"With a 22,000-point data base, we really needed VAX's huge memory capacity."

Peter Ackermans, Manager of Computer Systems Engineering
CAE, St. Laurent, Quebec, Canada

CAE Electronics Ltd., currently has thirteen VAX-11/780 systems under development for both flight simulation and supervisory power control.

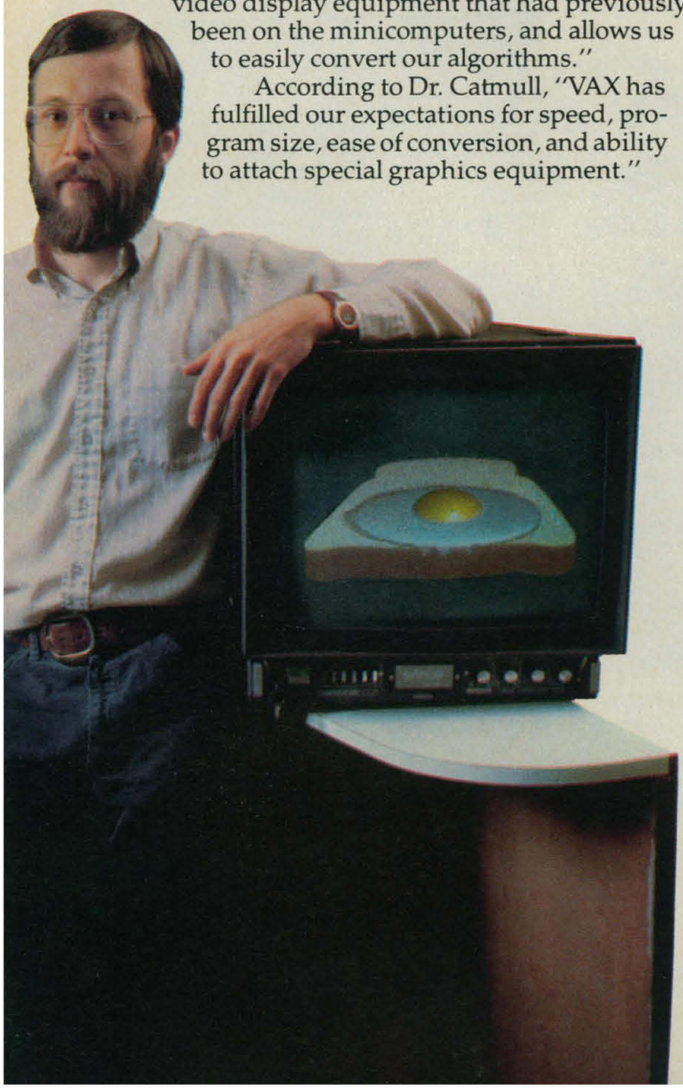
Here again, VAX capacity was key. Systems Manager Peter Ackermans told us: "Our SCADA systems for the power market need to handle a 22,000-point data base. VAX's large memory capacity and the VAX/VMS virtual memory operating system made it a very attractive machine."

But speed was also important. "In flight simulators," Ackermans continues, "top FORTRAN performance is essential, and on that score, VAX measures up well. Our FORTRAN programmers have also been impressed with the machine's debug facility and file handling capabilities."

continually ran into the problem of small address space. Our work demands the large address space we can get with a 32-bit machine. We were dealing with extremely large, randomly accessed data bases, and memory mapping is not the answer."

Dr. Catmull continues, "The VAX UNIBUS lets us easily hook up a wide range of special video display equipment that had previously been on the minicomputers, and allows us to easily convert our algorithms."

According to Dr. Catmull, "VAX has fulfilled our expectations for speed, program size, ease of conversion, and ability to attach special graphics equipment."



Digital's VAX-11/780, with its true 32-bit address space, has set a new standard for program capacity. This means that you can run large programs easily on VAX, with a potential for growth that's unmatched in the industry.

But rather than have us tell you about it, send for our new brochure.

And listen to our customers.

☐ Please send me the new "VAX—Ask Any User" brochure and detailed Technical Summary.
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digital

Now there systems laboratory airborne

System A

This is the standard Stay-Clean system now in use in hundreds of facilities all over the country. The cage rack, permanently attached to the unit, can accommodate as many as twelve small cages (11½″ by 5¾″ by 6″) or as many as three large cages (14⅞″ by 12⅞″ by 6⅝″) per shelf. Shelves are easily adjusted without tools and extra shelves are available to accommodate all cage sizes. This system effectively minimizes cage-to-cage contamination.

Note: An identical system is also available with *reverse flow.*

System B

This new system is virtually identical to system A but the cage rack has independent casters and is completely detachable. The shelves are longer than those of system A and will accept as many as fifteen cages (11½″ by 5¾″ by 6″) per shelf. This system is also effective in minimizing cage-to-cage contamination.

Note: An identical system is also available with *reverse flow.*

are five Stay-Clean™ to protect your animals from contamination.

System C

A new Stay-Clean system designed to accommodate any conventional cage rack up to 70" length by 34" width by 80" height. Lexan™ plastic doors enclose the rack and the system is ideal for minimizing *rack-to-rack contamination.*

Why use a Stay-Clean system?

There is ample evidence that microbial airborne contamination plays an important role in the incidence of animal colony infection and that turbulent dirty air is a major mediator of such contamination. Pathogen-free unidirectional air flow over animal cages greatly reduces the concentration of airborne contaminants, be they microbial (bacteria, fungi, molds, spores, etc.) or nonviable particulate matter. Additionally, because the animals are "downstream" of the air source, the airflow effectively prevents re-entry of ambient contaminants.

The air in the Stay-Clean systems is purified by continuous processing through high efficiency particulate air (HEPA) filters which effectively remove virtually all particulate matter of any origin of 0.3 microns or larger and hence provide pathogen-free air.

Accordingly, whenever airborne contamination can jeopardize a colony or a research effort, these systems can aid materially in reducing such contamination and its untold effects. The Stay-Clean systems are particularly useful in reducing colony-threatening cross-contamination.

Important: a particle counter for continuously monitoring air purity is also available.

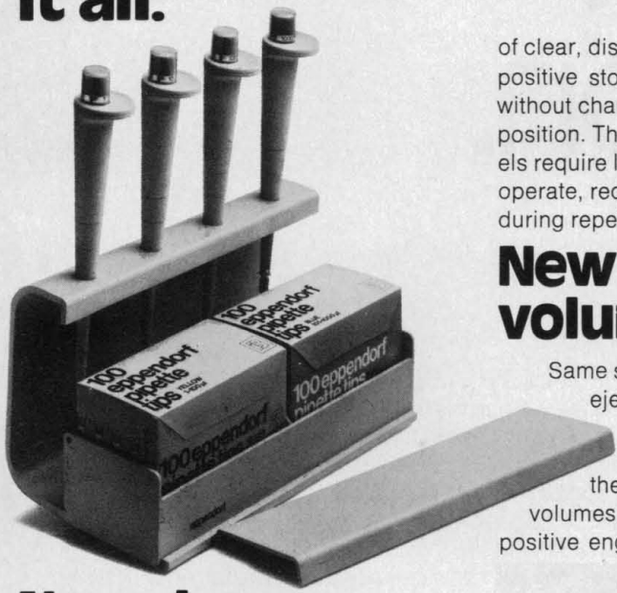
For more Information

For additional information—or to see a Stay-Clean system in operation near you—write or call Lab Products, Inc., 365 W. Passaic Street, Rochelle Park, New Jersey 07662. (Phone: 201/843-4600)

lab products inc a BioMedic company

Circle No. 90 on Readers' Service Card

Sample pick-up, pipetting, tip ejection... On the new Eppendorf® Pipettes, a single button does it all.



New shape.

The new Eppendorf System 4700 Pipettes fit your hand perfectly. A finger rest at the top provides positive support during use, prevents rolling off the workbench when laid down. Slimmer nose cone allows entry into narrow test tubes. Available in 30 fixed-volume sizes from 1 to 1,000 µl.

New built-in tip ejector.

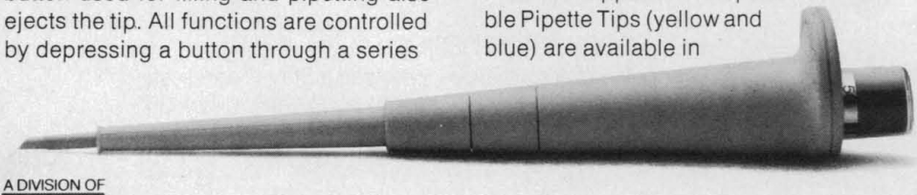
On System 4700 Pipettes, the same button used for filling and pipetting also ejects the tip. All functions are controlled by depressing a button through a series of clear, distinct positive stops, without changing grip position. The new models require less force to operate, reducing fatigue during repetitive sampling.

New multi-volume models.

Same size, similar accuracy and tip ejector feature as fixed-volume models, but a partial twist of the operating button adjusts the pipettes for any of 3 different volumes. Ratchet-type stops assure positive engagement of desired setting and prevents accidental change of volume. Choice of 6 models: 10/20/25 µl, 20/25/50µl, 50/75/100µl, 100/200/250µl, 200/300/500 µl, and 500/750/1,000 µl.

New tray-mounted tips.

New Eppendorf Disposable Pipette Tips (yellow and blue) are available in bags of 50 loose tips, or in boxes of 100 tray-mounted tips for convenient "hands off" tip mounting. Two boxes fit into the new modular Eppendorf Pipette Stand.



New modular pipette stand.

Basic rack module holds up to 4 pipettes and tips (loose or tray-mounted) in a plastic storage box with removable, hinged cover. Interlocking "add on" rack modules expand pipette holding capacity to 8, 12, 16, etc.

For an informative brochure on the Eppendorf Pipetting System, write: Eppendorf Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590. In Canada: 50 Galaxy Boulevard, Rexdale (Toronto), Ont.

A DIVISION OF BRINKMANN

Eppendorf Pipetting System

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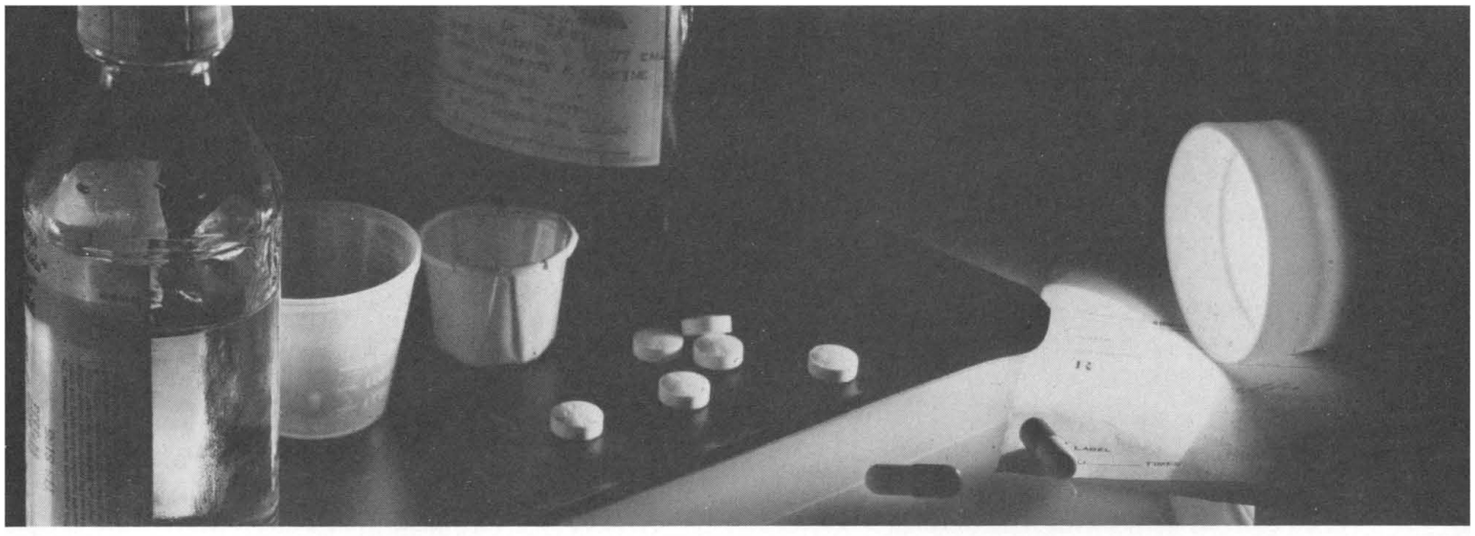
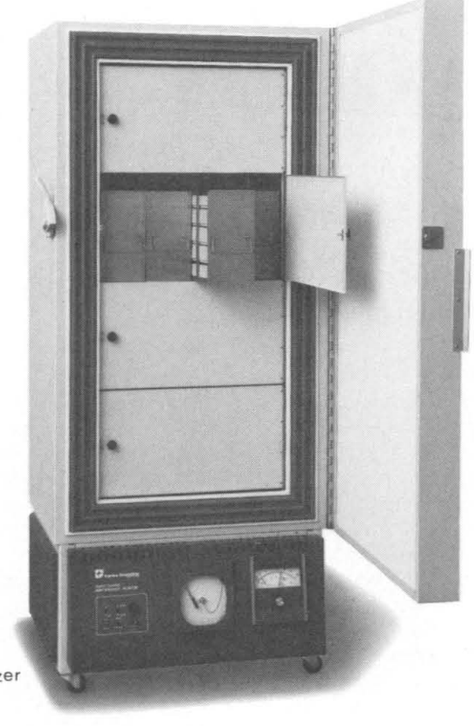


If the lights go off, worry about the patients. Don't worry about the blood.

Tissue samples, cell lines, pure cultures, stored blood—they're all safer in ultra-low temperature freezers from Forma Scientific. If power fails, a product stored in one of our freezers at —75°C will only "warm up" about 5.5°C in the first six hours.

Forma insulates its freezer cabinets with a minimum 5 inches of high-density foamed-in-place urethane to assure stable temperature. That's one of the reasons we can guarantee a low temperature of —85°C in a +90°F ambient—a promise no other manufacturer matches.

Write for more information on Forma chest and upright storage freezers. One less thing to worry about.



Model 8200
Upright Biological Storage Freezer

Where technology begins with imagination.

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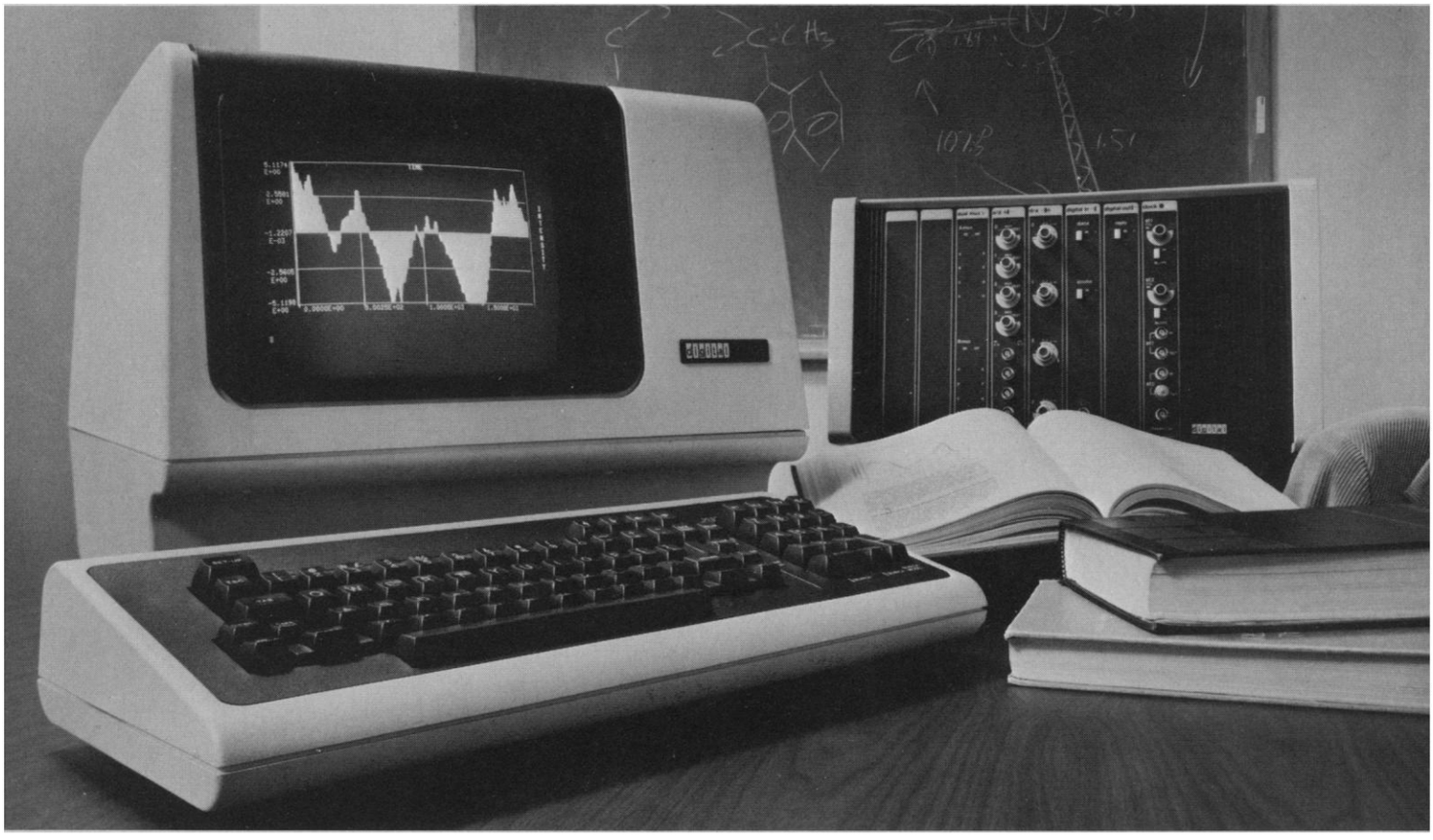
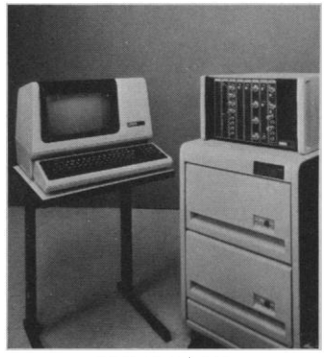
Visit Forma Booths F16, 17, 18 and G16, 17, 18 at the FASEB Show.

THINK MINC.

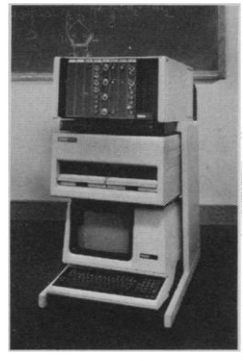


Digital made the computer easy-to-use and easy-to-interface. And you can buy it on a desk-top calculator budget.

Plug MINC in, turn it on, and you can plot charts, solve complex engineering and statistical problems, control instruments and acquire data. You have complete, ready-to-run BASIC software—true computer functionality. It's as easy as that. MINC's built around Digital's proven PDP-11 microcomputer. MINC has its own graphics terminal, one million character dual floppies and three serial line interfaces.



DECLAB-11/MNC



MINC

And MINC makes interfacing easy. Hooking up a lab instrument is as simple as plugging in a single connector to the IEEE Bus interface or one of the seven optional input/output modules. When you finish your experiment, you unplug the connector and wheel the MINC cart to the next job.

And, if you need more on-line data storage, there's the new DECLAB-11/MNC that combines the functionality and ease-of-use of MINC with 10 million character, random access disk drives, powerful FORTRAN software and Digital's versatile RT-11 operating system.

If you'd like the whole story on these easy-to-use systems, write Laboratory Data Products Group, Digital Equipment Corporation, Marlborough, Massachusetts 01752. Telephone (617) 481-9511, Ext. 6969. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

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The friendly desktop computer system...

They're solving big problems.

They've learned what computer power is all about. HP's System 45 desktop computer provides the simplest, most direct way to a solution—from the problem in your mind to a final report or plot, quickly and easily. That's why more and more problems thought to need a big computer are now being solved by System 45.

This powerful graphic, computational tool operates with a wide range of input, mass storage and output peripherals. As for software, we don't think you should have to write all the programs you need to solve your problems. That's why we have a wide array of practical, user-tested software to help you handle statistical analysis, engineering design, management science, business administration and much, much more.

In the graphics system shown, the input device is the HP digitizer (9874A), the mass storage is the internal dual tape drives, and the output is the HP 4-color plotter (9872A). You can interface System 45 with virtually any instrument found in the scientific

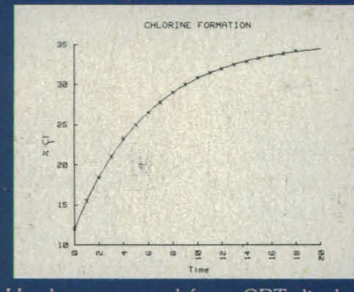
But not on a big computer.

or engineering environment. All interface cards, cables and I/0 slots are designed for quick "plug in and run" operation.

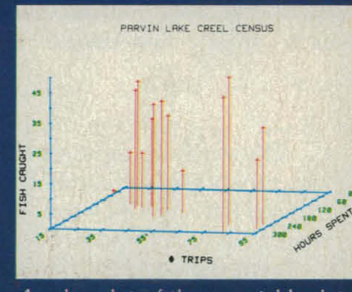
In addition, the System 45 Enhanced BASIC language allows you to upgrade any peripheral—internal printer to line printer, CRT graphics to 4-color plotter, tape drive to floppy disk—by simply changing one statement with no other software modification.

If you'd like to solve big problems on your own terms, at your own pace, and in your own work environment, you need the power and flexibility of the friendly HP System 45. Power in terms of fast, simple solutions, and the flexibility to solve more big problems than you probably thought possible.

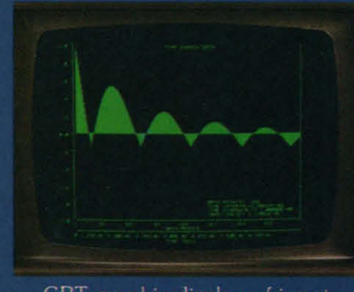
For brochures describing System 45 and the HP programs of interest to you, call the HP Literature Center toll-free day or night. The number is 1-800-821-7700, Extension 400. (In Missouri, call 1-800-892-7655, Extension 400.) Or, call your nearest HP sales office for a demonstration.



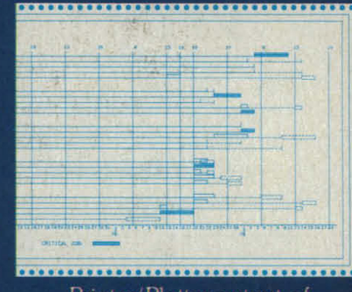
Hard copy record from CRT display of non-linear regression curve.



4-color plot of three-variable data in a scattergram.



CRT graphic display of input to Fast Fourier Transform.



Printer/Plotter output of project schedule (GANTT chart).

409/3A

HEWLETT hp PACKARD

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For assistance call: Washington (301) 948-6370, Chicago (312) 255-9800, Atlanta (404) 955-1500, Los Angeles (213) 877-1282. Ask for an HP Desktop Computer representative.

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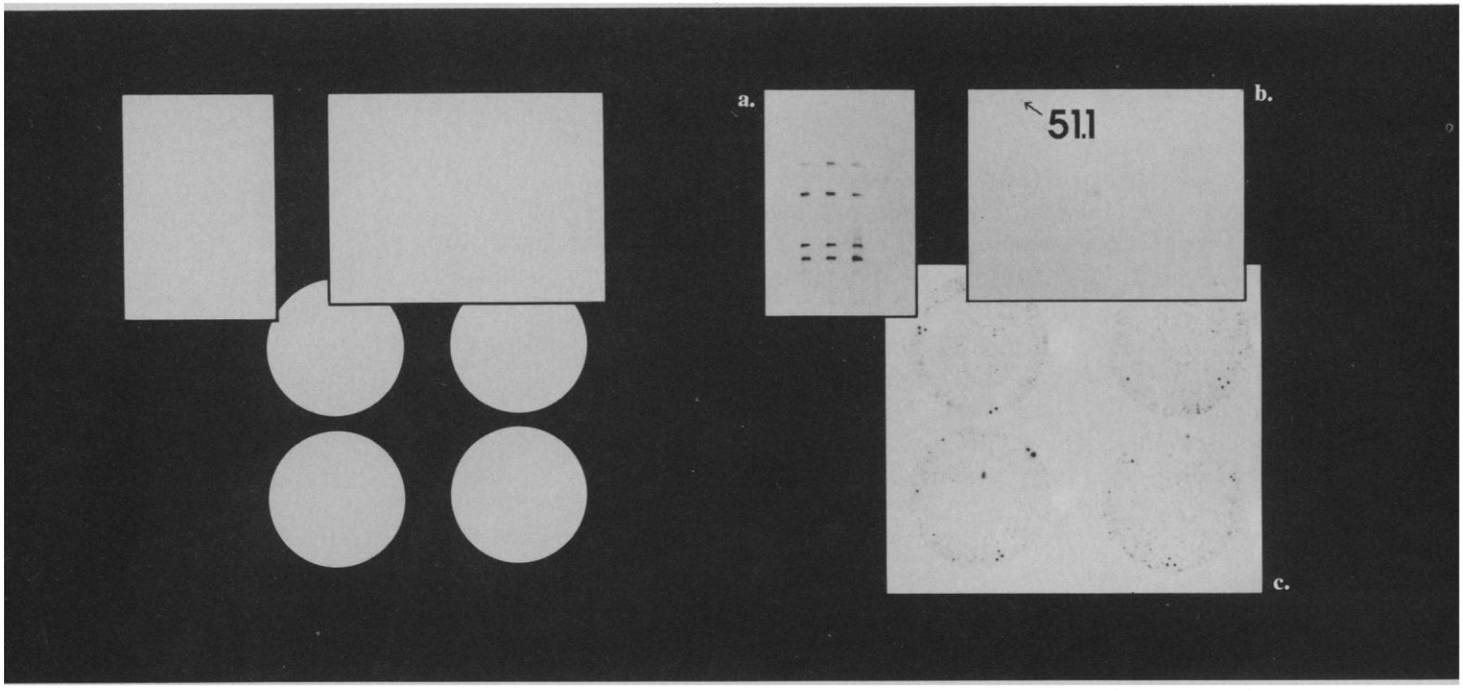
You need BA 85 nitrocellulose to get the picture.



S&S BA 85 pure nitrocellulose.

Autoradiograms (unretouched, approx. ⅙ actual size).

Shown at the top right are unretouched photographs of background-free autoradiograms of labeled RNA or DNA hybridized to single-stranded DNA. They were developed from "Southern" blots and "plaque lifts" using Schleicher & Schuell BA 85 nitrocellulose.

They really make the case for S&S BA 85.

BA 85 succeeds so well because it's *pure* nitrocellulose. This means you get maximum transfer of DNA from gels or plaque lawns. The smaller fragments are not lost. And you're assured of a more complete hybridization with RNA or DNA probes.

For these reasons, S&S BA 85 has become the standard for hybridization studies. When nucleic acid investigators specify "nitrocellulose" they really *mean* pure nitrocellulose — S&S BA 85.

BA 85 is available plain or gridded. And in circles, rolls, squares, strips and full sheets. What more could you ask for? Ask us.

If you're not already using BA 85, you owe it to yourself to try some. Write to S&S on your letterhead and we'll send you a sample in the size you request (up to 15 cm square or 82 mm diameter). Also, S&S has a newsletter on DNA/RNA applications, procedures and products. It's called "Sequences". Ask to be put on the mailing list.

---

a. DNA fragments which hybridize with a probe that is homologous to nitrogen fixation (*nif*) genes of *Klebsiella pneumoniae*. Prepared by Gerard Riedel, The Biological Laboratories, Harvard University.

b. Screens of mouse and human shotgun collections (approx. 25% of original autoradiogram). Prepared by the Blattner and Smithies groups, Laboratory of Genetics, University of Wisconsin. Technique described in the following papers: 1) Blattner, F. R. *et al.* 1978. Science. 202:1279-1284; 2) Smithies, O. *et al.* 1978. Science. 202: 1284-1289.

c. Genome screening of a sea urchin library cloned in Charon 4λ bacteriophage. Prepared by D. M Anderson, R. H. Scheller and J. W. Posakony, Division of Biology, California Institute of Technology.

Detailed descriptions of autoradiograms available on request from S&S.

Photos by S. Miller, The Biological Laboratories, Harvard University.

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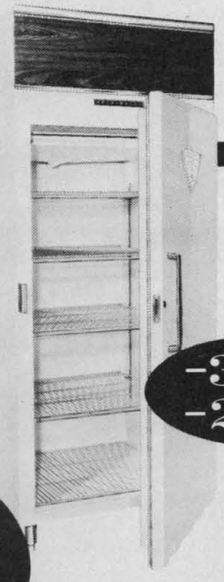
4°C
39°F

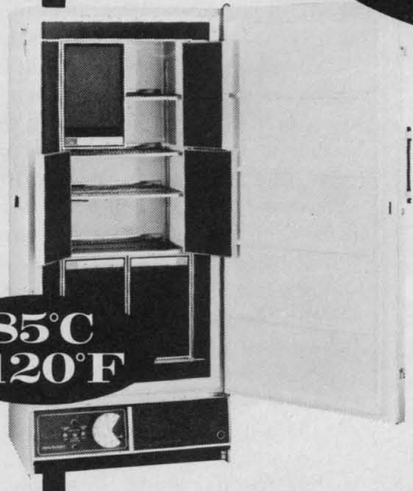
Model UC-50-RG-CH
CHROMATOGRAPHY
REFRIGERATOR

Model UC-26-F-FMS
FLAMMABLE
MATERIAL STORAGE
FREEZER



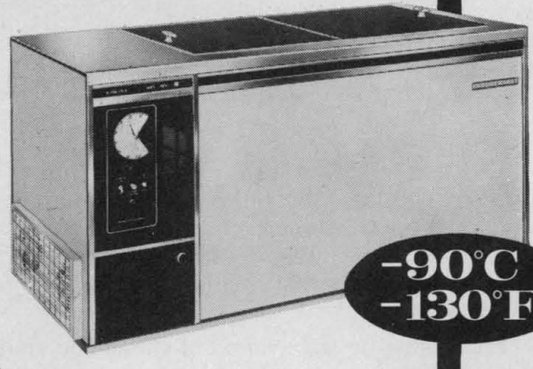
-32°C
-25°F

Dependable
Kelvinator
Economical



-85°C
-120°F

Model UC-122
UPRIGHT
FREEZER



-90°C
-130°F

Model UC-522
CHEST TYPE
FREEZER

Storage Ideas From Kelvinator Ultra Cold

We know what you need in the way of cold so we've designed our units to make you happy. Single and double door models for chromatography, Flammable Material Storage, quick freezing. And upright and chest models from -76°C. to -90°C. for Ultra Cold testing and research.

We sell Ultra Cold. Hair-cracking cold. Send for detailed information on our complete line of cabinets.

Kelvinator will give you the best "Cold" you ever had.

For complete information on the full Kelvinator line, contact T.M. LeClair, Sales Coordinator, Scientific and Industrial Sales. Phone; (414) 682-0156 or TWX: (910) 260-3507 TODAY!

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LETTERS

Wind Generators and the Oil Reserve

The U.S. national program to store 10^9 barrels (bbl) of imported oil underground by 1985 is progressing. A different "reserve," which would be, in a certain sense, equivalent can be obtained at the same cost by using large wind generators. In 10 years wind generators could save a total of more than 10^9 bbl of oil that otherwise would be burned to make electricity. If oil were imported at the same rate as it would be in the absence of a wind generator program, domestic oil fields would, after 10 years, contain 10^9 bbl more petroleum than they otherwise would have. Moreover, the wind generators, which have an expected life much greater than 10 years, would be delivering energy at a rate equivalent to 175×10^6 bbl of oil per year.

This calculation is based on the availability of large wind generators at an installed cost of $500 per kilowatt (*1*). They would operate at an average plant capacity factor of 0.30 (*2*). It is assumed that construction of the underground storage facility to be used to store the oil will cost, when completed, $\$3.5 \times 10^9$ (*3*). This would be filled with crude imported petroleum costing $15 per barrel or $\$15 \times 10^9$ for the entire inventory (*4*). To simplify the calculation it is assumed that the construction would be completed before any oil were purchased for storage, and that all 10^9 bbl would then be purchased and stored at one time, at the beginning of year 1.

The alternative to constructing the oil storage facility would be to buy wind generators. At the beginning of year 1 the sum of $\$3.5 \times 10^9$ (the construction cost of the storage facility) would be available to buy 700 megawatts of wind generator capacity. These would operate for 1 year, producing 18.4×10^6 megawatt-hours. At the end of year 1 the stock of wind machines would be augmented by an amount corresponding to the interest (at 10 percent) on the full petroleum inventory for 1 year. Thus $\$15 \times 10^8$ would become available. At the end of the second year another $\$15 \times 10^8$ would become available, and so on. The wind generators, grid-connected, would save oil in power stations at an assumed average heat rate of 10,000 Btu's per kilowatt-hour or 554 kilowatt-hours of wind electricity would save 1 bbl of oil. At the end of 10 years the wind capacity in place would total 37,000 megawatts, the annual oil savings would be 175×10^6 bbl/year, and the cumulative oil savings would be 1.15×10^9 bbl.

The wind generators in place at the end of 10 years could be expected to go on producing for several more decades, at least, although they would already have been "paid for." More wind capacity could be added every year, using the money that would have been spent to finance the oil reserve.

The above is, of course, drastically simplified. However, the assumed and calculated numbers are reasonable. Wind has substantial environmental advantages as compared to oil. Perhaps we should be studying the replacement of at least a part of the oil reserve with wind generation capacity.

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References and Notes

1. Prices of large wind generators are not well defined at the present time; much depends on the scale of production and existing machines are all prototypes. Several studies sponsored by the Department of Energy have developed costs, based on present designs, in the $500 per kilowatt range for rated wind speeds consistent with a plant capacity factor of 0.30.
2. Plant capacity factor is the factor by which the number of hours per year and the kilowatt rating of the generator must be multiplied to yield the number of kilowatt-hours generated in a year.
3. According to press reports (*Wall Street Journal*, 11 January 1979, p. 22) the cost of constructing facilities to store the oil seems likely to exceed $3.50 per barrel.
4. If one considers that most of the crude petroleum is likely to be purchased at some future, higher price, the number $15 per barrel is conservative.

Biological "Strategies"

The term "strategy" has become common currency among biologists of various persuasions from the molecular to the population level. We read of biochemical strategies exhibited by marine invertebrates and reproductive strategies of birds, not to speak of osmotic strategies in desert plants!

The term "strategy" implies that a rational choice has been made and has its origin in ancient military parlance. While I will concede that some higher mammals, such as a pride of hunting lions, may employ a decision-making process which borders on strategy, can you imagine a group of barnacles convening a meeting to decide on which set of isoenzymes to use so that their metabolism could become temperature-independent? The term is therefore semantically quite incorrect but, far more important, it is philosophically grossly misleading, as it implies that a process has occurred which is the very antithesis of the evolutionary concept of chance and necessity.

Let us therefore agree on the strategy to expunge this nasty little word from our biological vocabulary and, while we are about it, let us also exclude its kid brother or congener the "trade-off principle," which is philosophically equally misleading.

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Carcinogen Report to the Public?

Luther J. Carter's article (News and Comment, 9 Feb., p. 525) on the amendment to the National Cancer Act requiring the Department of Health, Education, and Welfare (HEW) to issue a report each year on carcinogens suggests to me that, in addition to preparing this type of report, HEW should make a presentation to the general public concerning the dangers of various substances. This presentation could be sent to newspapers throughout this country, informing readers about what substances might increase their chances of contracting cancer. The report could also inform the public as to where these substances occur, that is, in gasoline, solvents, adhesives, paint, and so forth. With this knowledge the public would not only be aware of the dangerous substances but could carry out a surveillance action of its own, informing the proper regulatory agency of any possible overexposure to toxic substances. The reports should be in simple, nontechnical language; the use of brand names of particular products would be best, as it would put pressure on various companies to "clean up their act," so to speak.

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The Piltdown Hoax: Piltdown 2

The theory that Piltdown man was a joke, at least partially designed by W. J. Sollas (News and Comment, 8 Dec. 1978, p. 1062), does not fit the facts. Piltdown 1 and "associated fossils" were found over a number of years either by Charles Dawson or someone who was with Dawson at the time of the discoveries. The motivation appears to have been to prove that the eoliths were human-made by providing the maker, stone tools, and associated fossils for determining the age. The evidence pointing to Dawson has been carefully presented by

Weiner (*1*) and recently evaluated by Krogman (*2*). The history surrounding the "discovery" of Piltdown 1 is vague, complex, and will probably never be completely understood.

The discovery of an anatomically modern braincase with an ape-like lower jaw set off a controversy that lasted until 1953, when all the supposed fossils and stone tools were shown to be fakes (*1*). If the forgery were just a joke that went too far, the matter, presumably, would have stopped after the discovery of Piltdown 1, but apparently the forger wanted to prove that the lower jaw and the skull belonged together. With this end in mind, Piltdown 2 was created. It consisted of a piece of frontal bone, a bit of occipital, and a lower molar tooth—just enough to suggest similarity with Piltdown 1 and to prove that the ape-like molar tooth belonged to a human with a high forehead and small browridge. The only person associated with Piltdown 2 was Dawson, who died shortly after the discovery; after his death no further stone tools or fossils were found. Clearly, Piltdown 2 was no joke but an attempt to end the controversy which gravely affected the importance of Pitldown 1.

Piltdown 2 had the desired effect and converted many scientists (*3*), or reinforced the opinions of others (*4*). The motivation behind 2 seems to have been the same as behind 1—to prove that a primitive form of human being had made the stone tools. The evidence suggests a serious attempt at fraud, not a joke or minor hoax. It must be remembered that at that time the eolith problem was one of the major issues in prehistory. Dawson had been involved in it, had faked tools (*1*), and, as Piltdown 1 failed to settle the issues, Piltdown 2 may well be regarded as a bold stroke to settle the matter beyond any reasonable doubt.

The argument that someone else with more anatomical knowledge must have been involved is very weak. Although it cannot be proved that someone else might have helped on Piltdown 1, the case is clear on 2. Further, if the forger had anatomical experience, the parts for Piltdown 1 would surely have been selected differently. To provide an ape-like jaw it was not necessary to find the simian shelf or the canine. Most of the body with the two molar teeth would have been quite enough. Further, if the jaw were to be associated with the skull, it was essential to remove the very distinctive human temporomandibular joint from the skull, not the condyle from the jaw. The joint is uniquely human, the condyle is much less distinctive, particularly if abraded a little (as was done to the teeth). Dawson had been collecting stone tools, eoliths, and fossils for more than 20 years (*1*), so there seems to have been no necessity that anyone else be involved. That cannot, of course, be proved so many years later.

The great interest in Piltdown, both popular and scientific, was due, in part, to the belief that it was the first human fossil to be found in England. Smith Woodward's book is titled *The Earliest Englishman* (*5*)! But for the scientists, the discovery fitted the theory that, in human evolution, the brain had evolved earlier than the face, and that all previous discoveries were on side branches of the human evolutionary tree (*6*, *7*). Weidenreich could not accept the "chimera" because it would not fit in with his view of human evolution (*8*). For Hooton, *Eoanthropus* was central to his theories (*9*). I think it was these implications of Piltdown that kept the controversies alive. For many years it was not possible to draw a scheme of human evolution without considering the Piltdown problem.

Sollas took a strong position favoring Piltdown, the association of the lower jaw and skull, and Smith Woodward's reconstruction (*10*). On the possibility that the jaw did not belong with the skull, he wrote, "The chances against this are, however, so overwhelming that the conjecture may be dismissed as unworthy of serious consideration" (*10*, p. 54). The canine was found after Sollas's book had been written, but it is described in a footnote (*10*, p. 55). Sollas commented that, "Thus, Dr. Smith Woodward's method receives an unexpected and triumphant vindication." In the second edition of *Ancient Hunters*, pages 51 to 57 are devoted to Piltdown, with no suggestion that there was anything suspicious about the finds.

A new theory suggests that Sollas was involved in a joke to discredit Smith Woodward, but the hoax became too successful to be revealed (*11*). Whatever Sollas's personal feelings about Smith Woodward may have been, what he published was strong support. The Piltdown finds were made over a period of several years, and each of the later ones was designed to answer the problems which had emerged in earlier reconstructions. The nasal bones helped in understanding the face. The canine tooth ended the problem of reconstructing the jaw. Piltdown 2 proved that skull and jaw went together. Is there any evidence that Sollas was involved in these "discoveries," which occurred over a period of more than four years?

If Sollas knew that Piltdown was not a

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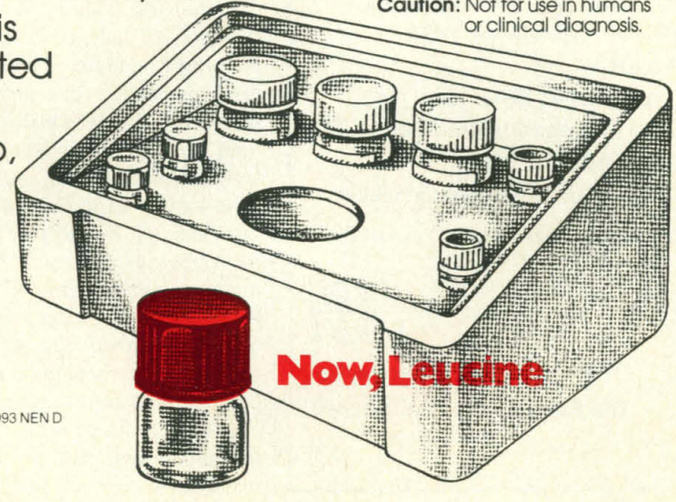

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genuine fossil, he knowingly published a most misleading account, allied himself with the forger, and silently watched the futile controversy for 25 years. These are serious charges to bring against a person who has been dead for more than 40 years. Surely Sollas should not be blamed unless there is more evidence than that he did not like Smith Woodward, had access to fossils, and was not pictured in a group of scientists studying Piltdown. I believe that what Sollas wrote is a far better guide to what he thought than the recently disclosed suspicions of a person who did not voice them until the critical actors in the drama had been dead for many, many years.

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The Humanities and Science

I question Charles A. Lave's notion (Letters, 19 Jan., p. 224) of the humanists who "were the first to define 'education' long ago." As I understand the humanists of Western history, they did not limit themselves to arts and letters but sought to understand and codify all possible human experience and knowledge. Da Vinci and Newton are only two of the most obvious examples. These early humanists even understood how the drive to acquire knowledge of all things can lead to the illusion that we can control all things, as the enduring power of the legend of Faust shows us.

I strongly agree with Lave that we in the humanities need to know the issues debated in the sciences and have our educated say on those issues—that is why I read *Science*. But the strong insistence that the scientists understand the issues in the humanities is based on a simple matter of scale. If I write a poem, it is unlikely to change the world for better or worse, regardless of the number of people who read it. But those in the physical and mechanical sciences have a great potential for changing the lives of a very great number of us, whether we choose to cooperate with them or not. Many lives have been saved by the invention and use of the Salk vaccine; many lives have been lost by the invention and use of nuclear weapons. Moral choices must always be made.

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Lave complains of anti-science discrimination by educational institutions, and by humanities departments in particular. I do not pretend to speak for institutions, but Lave and other readers might be interested to know that in the humanities few new topics have seemed more attractive in the last decade than science. Science's epistemology, ethics, social structure, psychology, rhetoric, and relations to current policy issues have been taken up by a broad spectrum of teacher-researchers in humanities (and social science) departments, including English departments like my own. Half a dozen new publications (for example, *Science, Technology & Human Values*) have appeared to display the fruits of this activity.

Also—and this is not untypical—members of my department are teaching advanced writing courses that take for their content the current debates over nuclear power and recombinant DNA research, two topics Lave implies are hopelessly beyond the range of humanities departments.

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Reflections

There seems to be come confusion in the picture caption on page 15 of the 12 January issue (News and Comment) about the 13-inch *reflecting* telescope at Vassar. The ladies may be reflecting, but I am quite sure the telescope is refracting.

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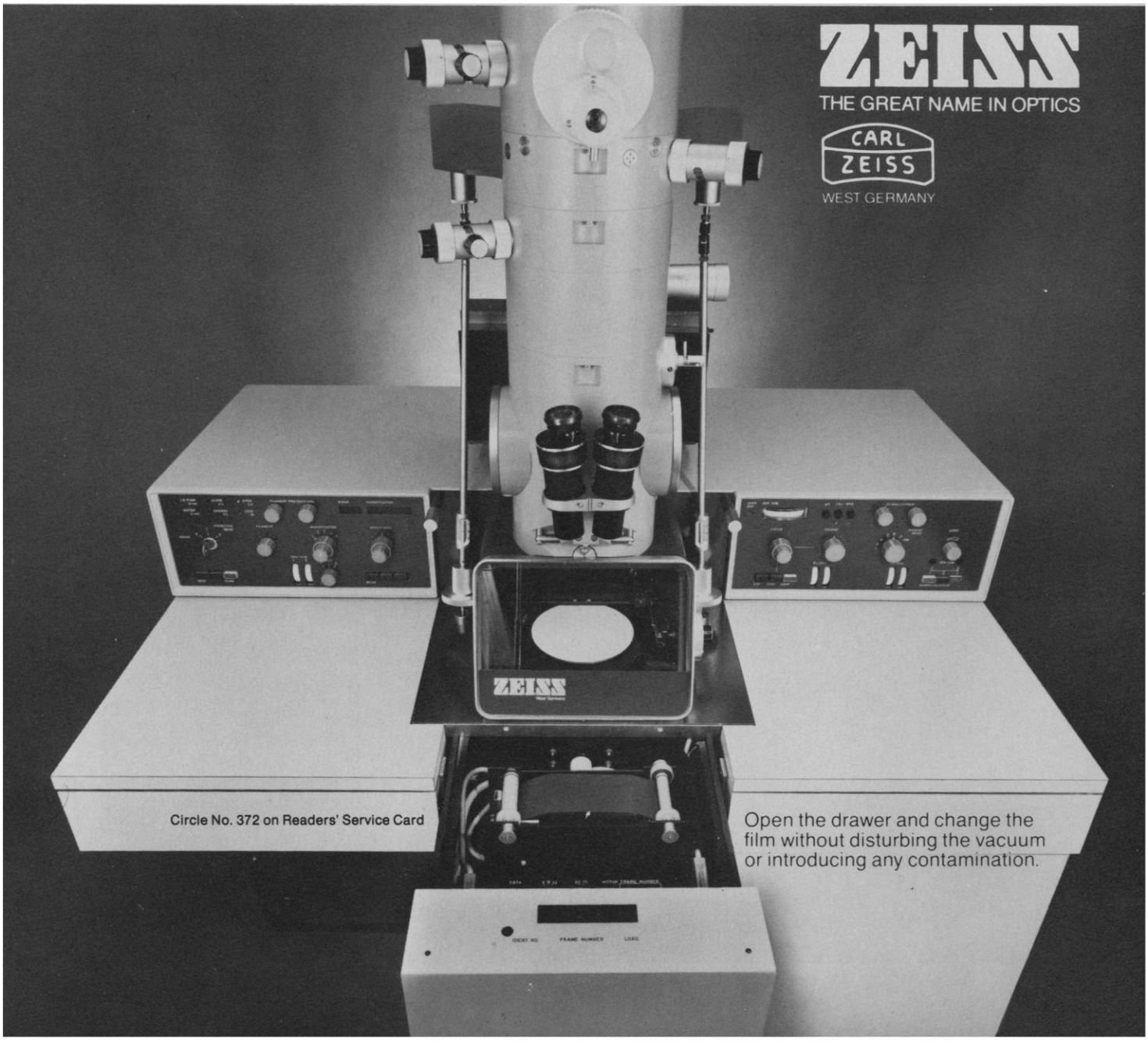

9 March 1979, Volume 203, Number 4384 SCIENCE

FITC: Something New or More of the Same?

On 29 March 1978 President Carter announced his Administration's plan to create a Foundation for International Technological Cooperation (FITC). The proposed foundation will be considered in this session of Congress and is expected to be part of the 1980 budget. The purpose of the FITC is to expand knowledge and increase the availability of technology to meet the needs of developing countries. The FITC will engage in or contract for programs aimed at building an indigenous capacity for science and technology in developing countries as well as a capacity to plan for expansion of the technical sector and for amelioration of side effects of such expansion. It will support and foster direct nongovernmental linkages among scientists, planners, and analysts engaged in development activities in the United States and developing countries.

The FITC offers an opportunity to foster a collegial, expert-to-expert, nonbureaucratic, nonpatronizing, no-strings-attached approach. It could also be a signal of real change in the U.S. response to the entirely new environment for development. The foundation form appears to promise that assistance will be awarded on the basis of the merit of proposals. A major expansion of the arm's-length foundation model for exchange of personnel, experts, and professional groups has long been needed in international programs. The Agency for International Development (AID) has provided some support to the development of collegial, productive exchanges by funding programs such as those of the Board on Science and Technology for International Development of the National Academy of Sciences. But AID support has been too small in relation to the need and has been conducted in the shadow, real or perceived, of an agency dominated by American political objectives abroad and political pressures at home.

Widespread consultation gives encouragement that the FITC will be well planned, adequately funded for this time of necessary budget restraint, and launched with the support and enthusiasm that are needed. But there is a real hazard that it may not keep a sufficient distance from government and make a distinct break with the past, and without these features the enterprise will surely fail. The FITC will probably become one of the group of agencies under the general rubric of a new International Development Cooperation Agency. Such a placement may be administratively necessary, but it would be risky. A major part of the FITC budget and possibly of its personnel will be transferred from the present AID. Its public board will probably be only advisory, without policy or program responsibilities. The aura of the AID, fair or unfair though the image may be, will be very much around. Whatever the true nature of the new agency, it may not be perceived as new and independent.

The proposed foundation offers this country the best available chance to participate in international political and economic development under the present circumstances, which are entirely different from those on which past programs have been based. To succeed, it must be completely insulated from large bilateral national aid programs and their associated political history. It must have, both in fact and in perception, the independence that the word foundation implies.

The United States is at its best in foreign scientific and technological programs when it treats foreigners like colleagues and not like wards. The "ugly American" has too often been a patronizing U.S. expert. A separate foundation, independently operated, can make an immense contribution to development. It may be able to achieve more with limited funds than has been possible with large infusions of capital into development projects. This is a chance to create a long-needed institution; it will be a shame if we fall short of meeting that need.—BREWSTER C. DENNY, *Dean, Graduate School of Public Affairs, University of Washington, Seattle, Washington 98195*

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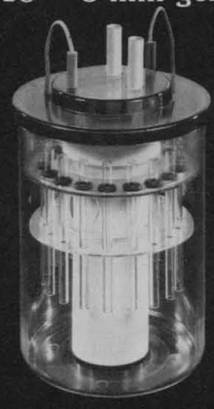

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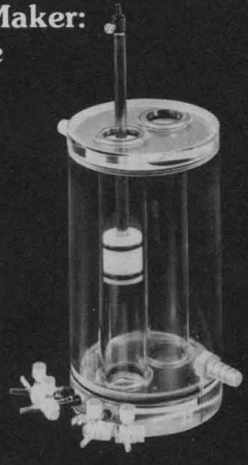

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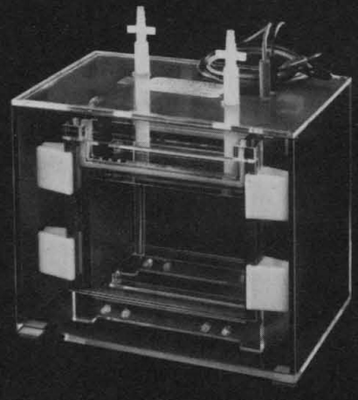

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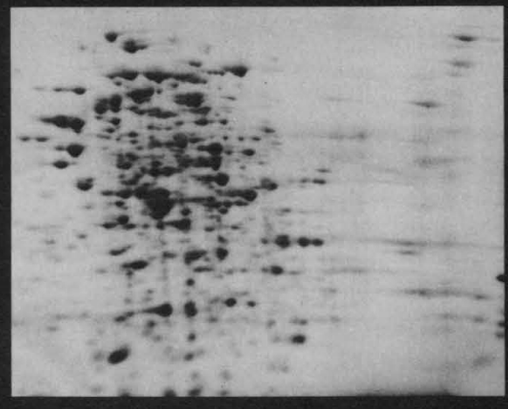

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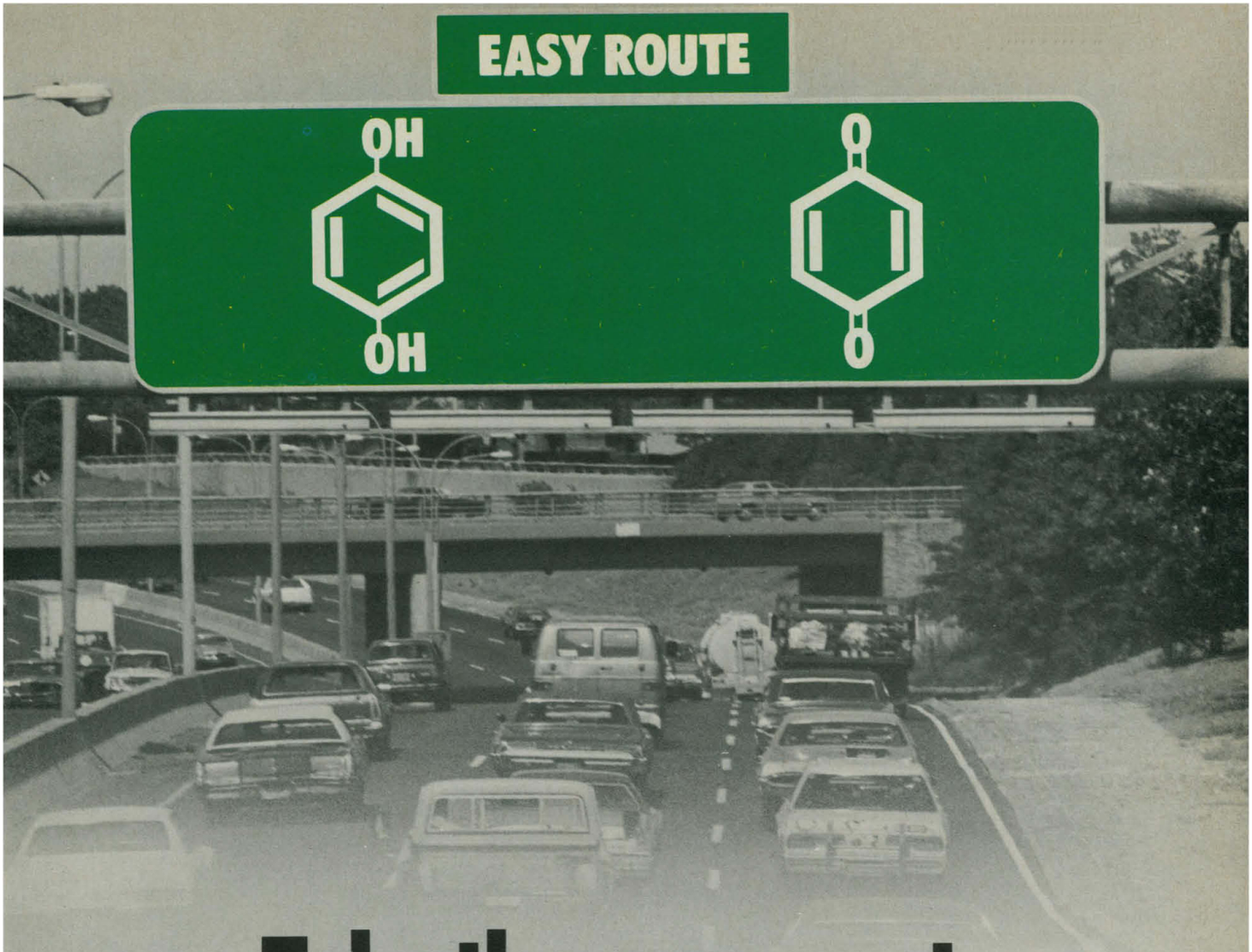

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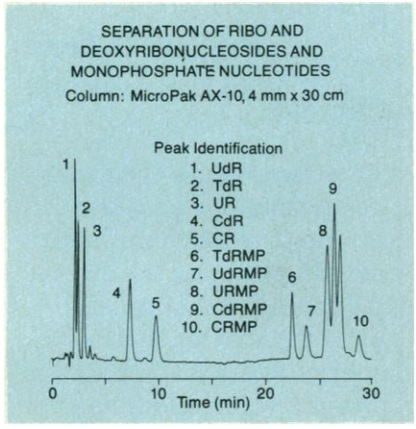

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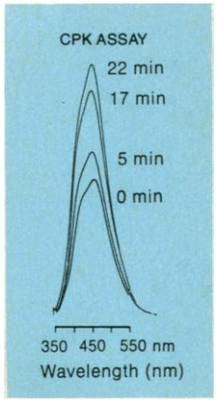

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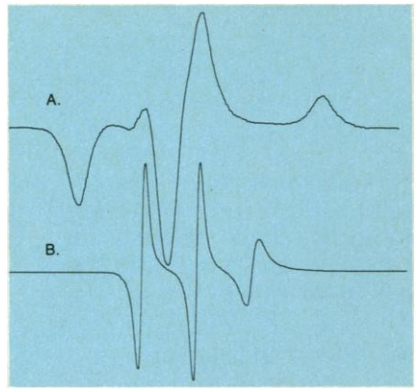
Em = 465 nm, slit = 20 nm
Temperature 27°C

2 **Do enzyme assays** on microsamples with the new **SF-330 Spectrofluorometer.** It gives you broad bioanalytical capability at modest cost.

The SF-330's special microflow cell also lets you measure PNAs, vitamins, drugs and amino acids after separation by liquid chromatography. For information circle **Reader Service No. 64.**

3 **Investigate drug metabolism**, study the topography of binding sites, enzymatic reactions, membrane structure, and the effects of anesthetics with the **E-109E EPR Spectrometer System.**

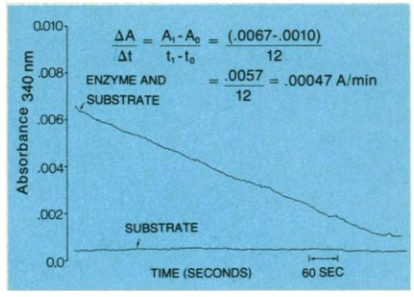
By using spin-labeled analogues or by identifying indigenous free radicals associated with cells, tissues, proteins, etc., the E-109E provides important structural and environmental information—often not obtainable by other methods. This information can be



Before (A) and after (B) administration of anesthetic.

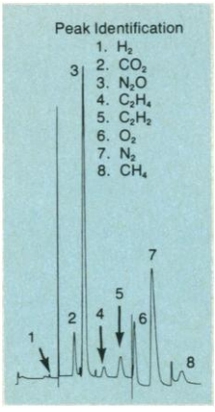
stored by the E-900 EPR data system for future comparison and manipulation. For further information, circle **Reader Service No. 65.**

4 **Measure enzyme activity** at 0.0005 A/min with the new **Model 219 UV/Vis Spectrophotometer.** You don't have to concentrate your column fractions when the activity is low and you don't have to dilute your samples when highly turbid material is present. The Model 219 will handle them all.



And Model 219 has routine sampling kinetics systems that will sip a 500 μl sample and in 15 seconds measure its kinetics at 20°, 25°, 30°, 32° or 37°C. To make interpretation easy, the 219 will print all results on its microprocessor-based Smart Printer. For details circle **Reader Service No. 66.**

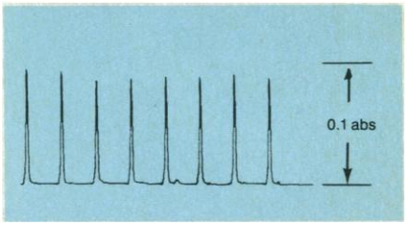
5 **Analyze for soil gases**, for haloforms in drinking water, for steroids, lipids and carbohydrates in body fluids, for drugs and drug metabolites in blood. Do it with **Model 3700 Gas Chromatograph.** The modular, fully automatable 3700 lets you choose exactly what you need for your application.



New element-specific detectors and a new easy-to-use capillary system give you extra capability. For details circle **Reader Service No. 67.**

6 Use atomic absorption to **measure electrolytes in tissues, cells, and fluids**; determine toxicity; nutrient and metabolic activities; therapeutic effects of some 67 elements. Extreme sensitivity of the AA technique enables characterization of microliter samples.

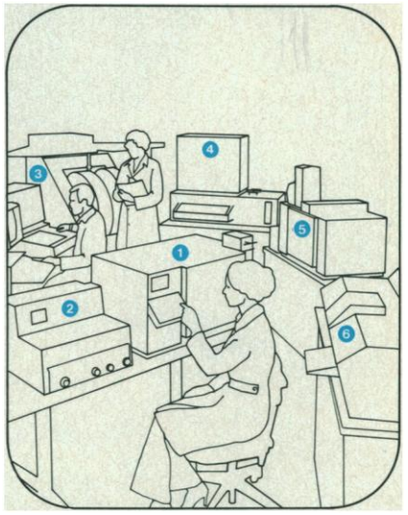
The new AA-775 Atomic Absorption Spectrophotometer's advanced microprocessor collects and computes analytical data, enhancing accuracy and precision. Calibration routines allow automatic weight compensation, calibration by standard additions, and up to 5-point curve correction. For more information circle **Reader Service No. 68.**



Replicate measurements of lead in blood-acid solution, using carbon rod atomizer. Sample volume 2 μl. Lead level 400 pg. Relative standard deviation 3.2%.

Varian also makes NMR Spectrometers **(Reader Service No. 69)** and Mass Spectrometer/Gas Chromatograph Systems **(Reader Service No. 70).**

To have a representative contact you about *any* Varian instrument, circle **Reader Service No. 71.**



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pH Electrode Quiz

QUESTION

The most common cause of pH electrode failure is:

- ☐ Other people break them.
- ☐ Other people let the reference dry out.
- ☐ Cosmic forces de-energize them.

ANSWER

Eventually all pH electrodes age; response becomes slow and span is short. Unfortunately, most electrodes are broken or let dry out before old age takes its toll.

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You need no special programming skill to operate the Data Station. We provide an applications program consisting of more than 32 different routines. Twenty-four special function keys further simplify operation. Just push a key to initiate a dialog in which the screen asks you for any additional information needed to process your spectrum. Such routines as difference, smoothing, accumulation, average, multiply, subtract, add, divide, flat, etc., are made easy with the Data Station.

When you start a scan, the Data Station goes into action. Single or repetitively scanned spectra are taken into memory. In a matter of seconds, the spectra can be smoothed, averaged or flattened. Difference spectra can be obtained rapidly by using the special function key, while automatic scaling speeds the process. You can view the spectra on the CRT screen at any point in the process; when satisfied, plot the final spectrum on your instrument's own recorder for a permanent record. Or, if you prefer, save it in digital form on a microfloppy disk. The unique OBEY command lets you specify a sequence of operations to be performed on a single sample or series of samples. This is especially powerful when coupled with our multisampling accessory.

GRAPHIC DISPLAY OF SPECTRA

The graphics capability lets you follow the scan of the spectrophotometer on the CRT. You can display up to three spectra simultaneously on the screen; for example, component A, component B, and the mixture of A plus B. You can overlay two spectra (as shown) highlighting the differences. The GRID command superimposes grid lines with wavenumber calibrations corresponding to the spectrum of interest. Any portion of a spectrum's X-axis can be expanded to fill the screen.

What won't the Infrared Data Station do? Just about nothing. It was designed by infrared specialists to make your work easier, faster, and more accurate – to relieve you of time-consuming chores. It's directly compatible with the Model 283 Infrared Spectrophotometer in your lab and can also be used with our X99B Series and our Model 580B. Find out more about what the Infrared Data Station can do for you. For a brochure, contact your nearest Perkin-Elmer representative or write to Perkin-Elmer Corporation, MS-12, Main Avenue, Norwalk, CT, 06856. To arrange for a demonstration, just phone (203) 762-6126.

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PRODUCTS and MATERIALS

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The Cary 210 operates in the ultraviolet and visible portions of the spectrum. It has a patented, double-pass monochromator which maximizes resolution and minimizes stray light. The Cary 210's absorbance range extends from −0.6000 to 4.0000 with four decimal places. Ten scan speeds are available. Absorbance may be read in eight ranges from 0.01-Abs full scale to 2 Abs. The sampling period may be set or extended. Operator selects single- or double-beam modes as well. Varian Associates. Circle 796.

Spectrofluorometer

The Ratio II instrument can obtain the percent transmittance of a solution in addition to its fluorescent properties. It compensates for the inherent instability and decreasing output of xenon lamps to electronically divide the sample output by the output of the reference photomultiplier. This real-time compensation is suited to analyses of short-lived phosphorescence and fast kinetic reactions. Six scan rates are available and there is an Autoranging feature to select the proper scale for a given sample. American Instrument. Circle 806.

Electrophoresis Chamber

Model VQS uses silicone rubber sealing gaskets and single-action rapid clamps to mount electrophoresis plates without sealing grease, removable spacers, or pinch clamps. The unit employs Lucite electrolyte chambers and glass electrophoresis plates. The electrophoresis path-length is 13 centimeters. Two-dimensional electrophoresis is easily set up with optional gel plates that have beveled tops. Electrodes are platinum; stainless steel and brass are used for hardware. Atlantis Scientific. Circle 807.

Digital Electrometer

Because of its metal oxide semiconductor field-effect transistors (MOSFET), model 642 can measure currents as small as 10^{-17} ampere. As little as 0.005 percent of an input signal may be resolved. Input gain is fixed over a range of 10^6 to 1. Model 642 is suited for measurements of voltage, current, or charge. Voltage may be measured from 10 microvolts to 10 volts with 10^6 ohms input resistance. Current measurements from 10^{13} to 10^{-7} amperes full scale can be made with $4^1/_2$-digit resolution. Keithley Instruments. Circle 808.

Laboratory Freezer

Model PR120-17 is used for medical research, biological storage, preserving tissue, plasma, blood cells, and microbiology. The cabinet is made of steel with a counterbalanced lid. An indicating temperature control provides an adjustable temperature range from −18°C to −85°C. The cabinet has an air-cooled condenser; no liquid is required. Chamber dimensions are 69 by 20 by 21 inches high. Outside dimensions are 79 by $35^1/_2$ by 50 inches high. Model PR120-17 is also available with a recording thermometer and a buzzer alarm. So-Low Environmental Equipment. Circle 812.

Reversed-Phase Thin-Layer Plates

Microslides, 1 by 3 inches, employ a silica gel in which the surface hydroxyl units are reacted with octadecylsilane (C_{18}) to form layers 200 micrometers thick. Interaction of the sample hydrocarbons with octadecyl groups in this layer is the basis of separations occurring on these plates. This silica gel accommodates high loads and rapid flow. The new plates also include an inorganic fluorescence indicator for visualization under ultraviolet excitation at 254 nanometers. Whatman. Circle 810.

Microbial Plating and Counting

The Spiral System eliminates serial dilution and replicate plating. The heart of the system is the dispenser that distributes the liquid sample on the surface of a rotating agar plate. The dispensing arm moves from center to edge. After inoculation, colonies appear along a spiral track; space between colonies is increased as the arm moves from center to edge. Concentration is determined by counting colonies and dividing by the calibrated volume of the sample in the counted area. A laser-based automatic counter may be used or counting may be done manually. Spiral Systems Marketing. Circle 811.

Computer Interface for Mass Spectrometers

Interlink interfaces many types of 16-bit computers and desk-top calculators with mass spectrometers. With the appropriate hard- and software, these data processors can control mass scanning, signal acquisition, and many other functions of a mass spectrometer. Interlink uses a 16-bit digital-to-analog converter for mass command and 12-bit analog-to-digital converter for analog data acquisition and scalers for pulse counting. Other controls and status checks are routed through three 10-bit digital-to-analog converters and various switches and latches. Extranuclear Laboratories. Circle 809.

Literature

Instrumentation Tape Recording is written for scientists who must evaluate, select, and use tape recording systems with their experimental apparatus. EMI Technology. Circle 815.

Vacuum Filtration Manifold describes a means for simultaneous filtration of up to 12 samples. Amicon. Circle 817.

Neuroscience, Statistics and Psychology is devoted to apparatus and audiovisual materials for these disciplines. Life Science Associates. Circle 818.

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 Readers' Service Card (on pages 946A and 1042A) and placing it in the mailbox. Postage is free.

—RICHARD G. SOMMER

AAAS NEWS

(Continued from page 996)

published in the Proceedings Issue of *Science*.

The new procedures call for publication of a directory of AAAS Fellows, to be sold to AAAS members at cost. The directory cannot be published before the 22 May deadline for submission of nominations, but inquiries about the fellowship status of prospective sponsors may be directed to the Executive Office. As soon as the directory is available, an announcement will appear in the AAAS News section of *Science*.

For the Library

The Double Bind: The Price of Being a Minority Woman in Science, third printing. Shirley Mahaley Malcom, Paula Quick Hall, and Janet Welsh Brown. Report of a 1975 conference of Black, Puerto Rican, Mexican-American, and Native American women scientists. The report discusses problems of minority women in science and contains policy and program suggestions which can serve as guides to public agencies, educational institutions, professional associations, and funding organizations. 70 pp. Cost: $3 per copy.

* * *

Programs in Science for Minority Students, 1960–1975, second printing. Compiled by Shirley Mahaley Malcom, John Cownie, and Janet Welsh Brown. An inventory of projects, undertaken since 1960, aimed at improving the quality of science education for minority students. Single copies available at no cost.

For further information, contact Karen L. Ehrlich, Office of Opportunities in Science, at the AAAS address.

CSFR Committee to Meet

The AAAS Committee on Scientific Freedom and Responsibility will meet on Friday and Saturday, 16 and 17 March, in the AAAS Board Room, 1515 Massachusetts Avenue, NW. The meeting is open. For further information, contact Rosemary Chalk, CSFR staff officer. Telephone: 202-467-5236.

For more information about the activities and publications described in AAAS News, write to the appropriate office, AAAS, 1776 Massachusetts Avenue, NW, Washington, D.C. 20036, unless otherwise indicated.

BOOKS RECEIVED AND BOOK ORDER SERVICE

(Continued from page 1001)

Robert B. Taylor, John L. Buckingham, E. P. Donatelle, William E. Jacott, and Melville G. Rosen, Eds. Springer-Verlag, New York, 1978. xl, 1366 pp., illus. $38.50. *To order circle 587 on Reader Service Card.*

Fibrinolysis. Current Fundamental and Clinical Concepts. Papers from a symposium, Istanbul, Turkey, Sept. 1977. P. J. Gaffney and S. Balkuv-Ulutin, Eds. Academic Press, New York, 1978. x, 240 pp., illus. $19.65.

Field Theory, the Renormalization Group, and Critical Phenomena. Daniel J. Amit. McGraw-Hill, New York, 1978. xiv, 336 pp. $23. International Series in Pure and Applied Physics. *To order circle 615 on Reader Service Card.*

Flow, Mixing and Heat Transfer in Furnaces. Papers from a conference, Cairo, Feb. 1977. K. H. Khalil, F. M. El-Mahallawy, E. E. Khalil, and D. B. Spalding, Eds. Pergamon, New York, 1978. viii, 248 pp., illus. $30. HMT, vol. 2. *To order circle 604 on Reader Service Card.*

FORTRAN 77 Programming. Walter S. Brainerd, Charles H. Goldberg, and Jonathan L. Gross. Harper and Row, New York, 1978. xviii, 360 pp. Paper, $9.95.

The Fourier Transform and Its Applications. Ronald N. Bracewell. McGraw-Hill, New York, ed. 2, 1978. xviii, 444 pp., illus. $23. *To order circle 605 on Reader Service Card.*

Garden Spice and Wild Pot-Herbs. An American Herbal. Walter Conrad Muenscher and Myron Arthur Rice. Illustrations by Elfriede Abbe. Comstock (Cornell University Press), Ithaca, N.Y., 1978. x, 214 pp. Paper, $6.95. Reprint of the 1955 edition.

The Gas Industry and the Environment. Proceedings of a symposium, Minsk, Soviet Union, June 1977. Published for the United Nations by Pergamon, New York, 1978. xvi, 264 pp., illus. $34. *To order circle 623 on Reader Service Card.*

Gaseous Electronics. Vol. 1, Electrical Discharges. Merle N. Hirsh and H. J. Oskam, Eds. Academic Press, New York, 1978. xii, 506 pp., illus. $39.50.

General Relativity from A to B. Robert Geroch. University of Chicago Press, Chicago, 1978. xii, 226 pp., illus. $11.95.

The Genius of Arab Civilization. Source of Renaissance. John R. Hayes, Ed. MIT Press, Cambridge, Mass., 1978. xii, 232 pp., illus. Paper, $15. Reprint of the 1975 edition.

Geomagnetic Diagnosis of the Magnetosphere. A. Nishida. Springer-Verlag, New York, 1978. viii, 256 pp., illus. $38.80. Physics and Chemistry in Space, vol. 9. *To order circle 588 on Reader Service Card.*

German-English Science Dictionary. Louis De Vries. Updated and expanded by Leon Jacolev with the assistance of Phyllis L. Bolton. McGraw-Hill, New York, ed. 4, 1978. xxxviii, 628 pp. $14.50. *To order circle 592 on Reader Service Card.*

Group Theoretical Methods in Physics. Papers from a colloquium, Tübingen, Germany, July 1977. P. Kramer and A. Rieckers, Eds. Springer-Verlag, New York, 1978. xviii, 546 pp., illus. Paper, $23.50. Lecture Notes in Physics, vol. 79. *To order circle 606 on Reader Service Card.*

Horizons in Biochemistry and Biophysics. Vol. 5. E. Quagliariello, F. Palmieri, and Thomas P. Singer, Eds. Addison-Wesley Ad-

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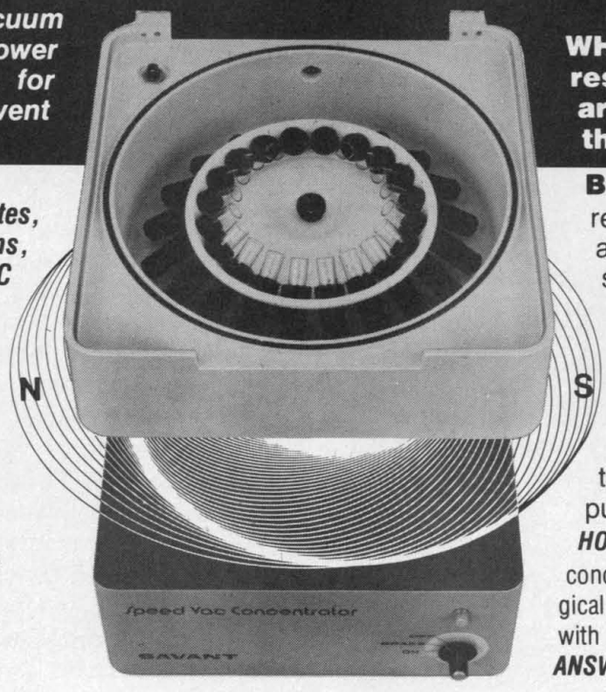

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- How to get started. (See Chapter 3.)
- How to operate your business — a collection of "tricks of the trade." (See Chapter 5.)
- What to charge your clients — plus five helpful rules on fees. (See Chapter 6.)
- Why you should **never** work on a contingency (speculative) basis. (See Chapter 7.)
- Ingenious ways to promote yourself — and make people want your services. (See Chapter 9.)
- Contracts: why you should **avoid** them at all costs. (See Chapter 10.)
- Just what do consultants do all day? (See Chapter 11.)
- How to market your ideas. (See Chapter 11.)
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Perhaps no one is better qualified to have written this book than Hubert Bermont. He has served as consultant to more than 70 major corporations and trade associations, including the U.S. Chamber of Commerce, McGraw-Hill, the Electronic Industries Association, Evelyn Wood Reading Dynamics and the Smithsonian Institution. Yet he made the decision to become a consultant only after being fired from an executive position at the age of 43. You'll learn first-hand how he did it — and how **you** can do it, too!

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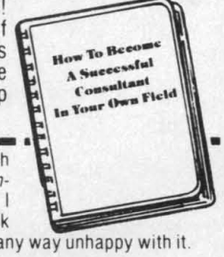

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vanced Book Program, Reading, Mass., 1978. xiv, 322 pp., illus. $22.50. *To order circle 589 on Reader Service Card.*

Hormonal Contraceptives, Estrogens, and Human Welfare. Proceedings of a conference, Berkeley, Calif., Apr. 1977. Marian Cleeves Diamond and Carol Cleaves Korenbrot, Eds. Academic Press, New York, 1978. xiv, 146 pp., illus. $12.50.

How to Live with Diabetes. Henry Dolger and Bernard Seeman. Schocken, New York, ed. 4, 1978. 224 pp. Paper, $4.95.

Humanizing Health Care. Alternative Futures for Medicine. Robert F. Rushmer. MIT Press, Cambridge, Mass., 1978. xiv, 210 pp., illus. Paper, $4.95. Reprint of the 1975 edition.

Implications of History and Ethics to Medicine—Veterinary and Human. Papers from meetings, College Station, Tex., 1976. Laurence B. McCullough and James Polk Morris, III, Eds. Texas A&M University Press, College Station, 1978. xvi, 158 pp. Paper, $5.

Information and Systems. Proceedings of a workshop, Compiegne, France, Oct. 1977. B. Dubuisson, Ed. Published for the International Federation of Automatic Control by Pergamon, New York, 1978. x, 186 pp., illus. $25. *To order circle 624 on Reader Service Card.*

Initiation of Integration. Martin L. Baughman and six others. Electric Power Research Institute, Palo Alto, Calif., 1978. Variously paged. Paper, $6.75. EPRI EA-837.

Inorganic and Organometallic Photochemistry. Papers from a symposium, Chicago, Aug. 1977. Mark S. Wrighton, Ed. American Chemical Society, Washington, D.C., 1978. viii, 232 pp., illus. $30. Advances in Chemistry Series, 168. *To order circle 616 on Reader Service Card.*

Medicine in a Tropical Environment. Proceedings of a symposium, Pretoria, South Africa, July 1976. J. H. S. Gear, Ed. Published for the S.A. Medical Research Council by Balkema, Cape Town, 1977 (U.S. distributor, ISBS, Forest Grove, Ore.). xiv, 818 pp., illus. $50. *To order circle 625 on Reader Service Card.*

Mental Health in the Metropolis. The Midtown Manhattan Study. Leo Srole and Anita Kassen Fischer, Eds. New York University Press, New York, 1978. xviii, 554 pp., illus. $24.50. Reprint of the second edition (1977).

Metallography in Failure Analysis. Proceedings of a symposium, Houston, July 1977. James L. McCall and P. M. French, Eds. Plenum, New York, 1978. viii, 302 pp., illus. $35.

Microbodies/Peroxisomen pflanzlicher Zellen. Morphologie, Biochemie, Funktion und Entwicklung eines Zellorganells. With an English Assessment. B. Gerhardt. Springer-Verlag, New York, 1978. x, 284 pp., illus. $87. Cell Biology Monographs, vol. 5. *To order circle 607 on Reader Service Card.*

The Mississippi River Delta. Legal-Geomorphologic Evaluation of Historic Shoreline Changes. David Joel Morgan. Louisiana State University School of Geoscience, Baton Rouge, 1977. viii, 196 pp., illus. + charts. Paper, $15. Geoscience and Man, vol. 16.

Molecular Movements and Chemical Reactivity as Conditioned by Membranes, Enzymes and Other Macromolecules. Papers from a conference, Brussels, Nov. 1976. R. Lefever and A. Goldbeter, Eds. Interscience (Wiley), New York, 1978. xvi, 346 pp., illus. $32. Advances in Chemical Physics, vol. 39.

Neurology. Proceedings of a congress, Amsterdam, Sept. 1977. W. A. den Hartog Jager, G. W. Bruyn, and A. P. J. Heijstee, Eds. Excerpta Medica, Amsterdam, 1978 (U.S. distributor, Elsevier, New York). x, 438 pp., illus. $67.50.

Neurophysiology of Postural Mechanisms. Tristan D. M. Roberts. Butterworths, Boston, ed. 2, 1978. xvi, 416 pp., illus. $74.50.

Neuro-Psychopharmacology. Proceedings of a congress, Quebec, July 1976. P. Deniker, C. Radouco-Thomas, A. Villeneuve, D. Baron-et-Lacroix, and F. Garcin, Eds. Pergamon, New York, 1978. Two volumes. xlviii, 1738 pp., illus. $170. *To order circle 593 on Reader Service Card.*

Neutral Proteases of Human Polymorphonuclear Leukocytes. Biochemistry, Physiology and Clinical Significance. Proceedings of a symposium, Marburg, Germany, Sept. 1977. Klaus Havemann and Aaron Janoff, Eds. Urban & Schwarzenberg, Baltimore, 1978. xii, 468 pp., illus. $44.50.

Nitrates, Nitrites, and *N*-Nitroso Compounds. World Health Organization, Geneva, 1978 (U.S. distributor, WHO Publications Centre USA, Albany, N.Y.). 108 pp. Paper, $5. Environmental Health Criteria 5.

Noise Control. Handbook of Principles and Practices. David M. Lipscomb and Arthur C. Taylor, Eds. Van Nostrand Reinhold, New York, 1978. xx, 376 pp., illus. $23.50. Van Nostrand Reinhold Environmental Engineering Series. *To order circle 594 on Reader Service Card.*

Oceanography. Concepts and History. Margaret B. Deacon, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1978 (distributor, Academic Press, New York). xx, 396 pp., illus. $25. Benchmark Papers in Geology, vol. 35.

On Systems Analysis. An Essay Concerning the Limitations of Some Mathematical Methods in the Social, Political, and Biological Sciences. David Berlinski. MIT Press, Cambridge, Mass., 1978. xii, 186 pp., illus. Paper, $4.95. Reprint of the 1976 edition.

Operating Experience with Nuclear Power Stations in Member States in 1976. International Atomic Energy Agency, Vienna, 1977 (U.S. distributor, Unipub, New York). viii, 328 pp. Paper, $24.

Optical Data Processing. Applications. D. Casasent, Ed. Springer-Verlag, New York, 1978. xiv, 286 pp., illus. $43. Topics in Applied Physics, vol. 23. *To order circle 608 on Reader Service Card.*

Propranolol and Schizophrenia. Proceedings of a conference, Santa Ynez, Calif., Dec. 1976. Eugene Roberts and Peter Amacher, Eds. Liss, New York, 1978. viii, 152 pp., illus. $15. The Kroc Foundation Series, vol. 10. *To order circle 595 on Reader Service Card.*

Psychobiology of Stress. A Study of Coping Men. Holger Ursin, Eivind Baade, and Seymour Levine, Eds. Academic Press, New York, 1978. xvi, 236 pp., illus. $17.50. Behavioral Biology.

The Psychology of Person Identification. Brian R. Clifford and Ray Bull. Routledge and Kegan Paul, Boston, 1978. xiv, 254 pp. $20.

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