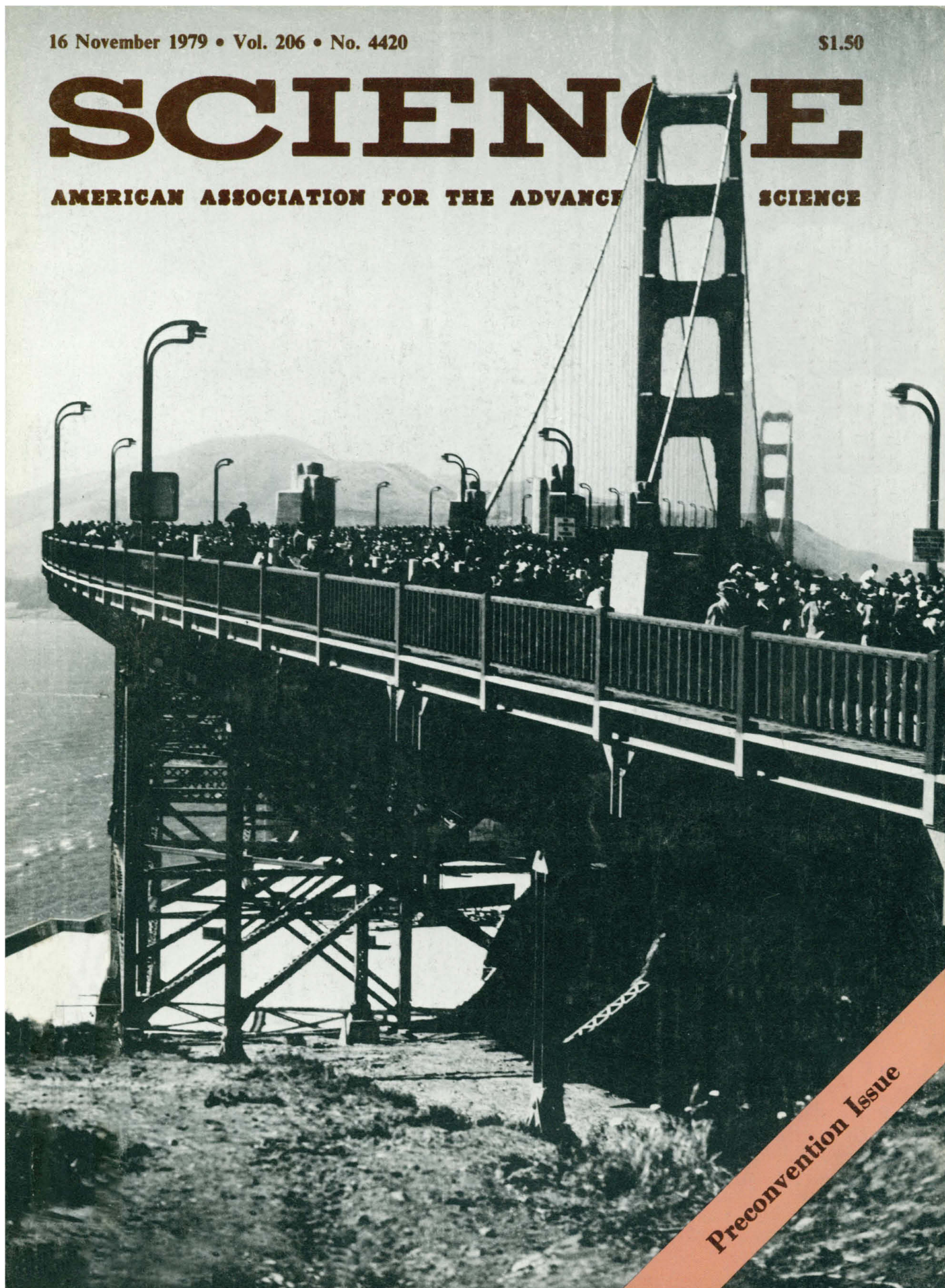


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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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COVER

Opening of the Golden Gate Bridge, 1937, San Francisco. See page 807, AAAS Annual Meeting, 3-8 January 1980. [Courtesy of California Historical Society]

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

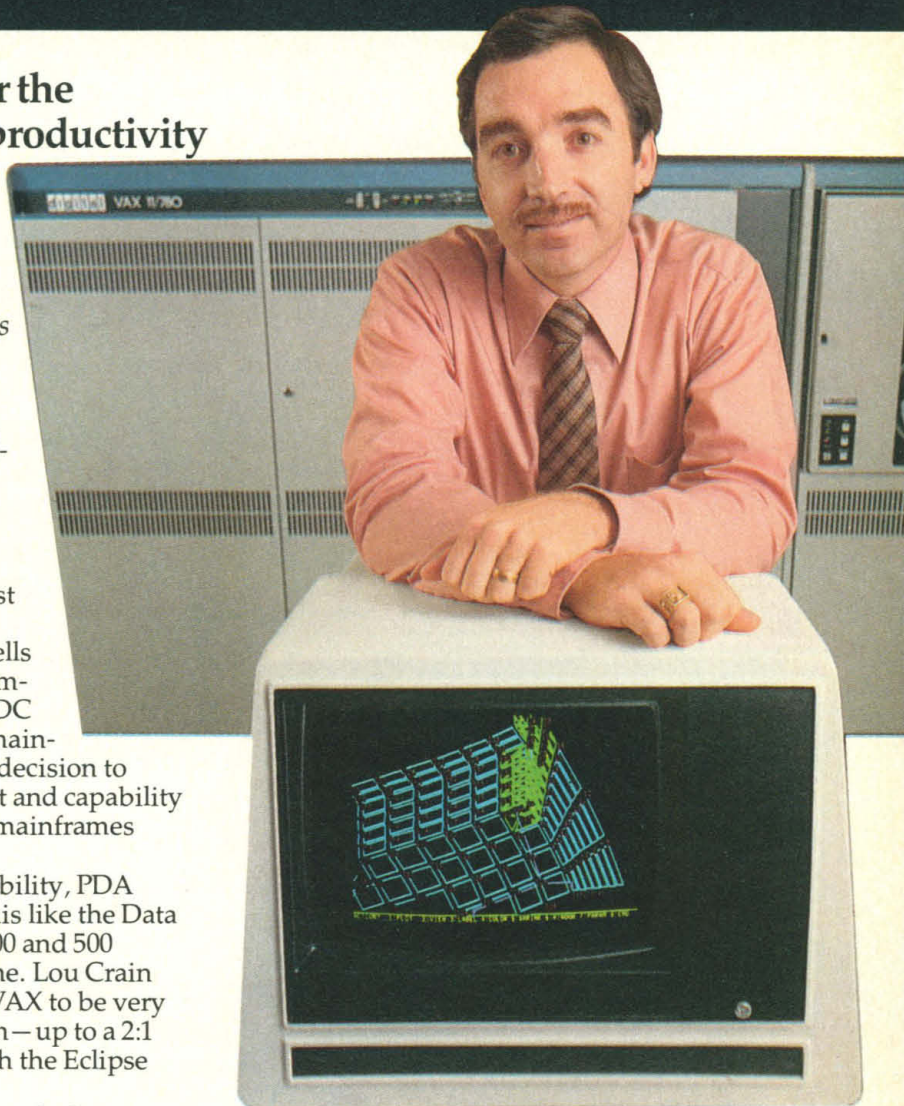
*Lou Crain, Mgr. of Software Products
Prototype Development Associates
Santa Ana, California*

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

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

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

"After installation," Crain concludes, "VAX has lived up to our expectations and has performed impressively. It's resulted in better



products for our customers, as well as improved cost-effectiveness. Having our own interactive capability in-house has meant an increase in engineering productivity of up to 300%."

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

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

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

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

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

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

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

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

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

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

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

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



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

VAX took five.

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

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

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

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

If your application requires large number crunching capability, high floating point accuracy, or lots of high-speed real-time calculations, there is simply no better system.

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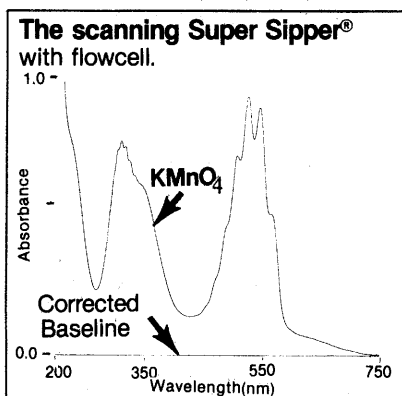
Keyboard Control with UV Performance you can Count On!

Model 552

Perkin-Elmer UV-VIS Recording Spectrophotometers begin with the low in price, high on features, Model 552.

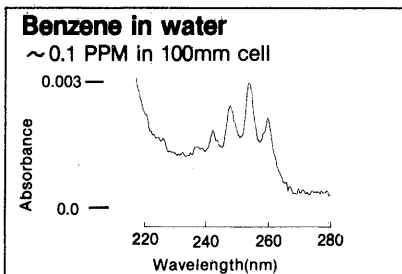
Keyboard Control. Makes operating the instrument fast, accurate, and precise.

Automatic Baseline Compensator. Provides a flat baseline, even when using our scanning Super Sipper.



With the Super Sipper you can even scan. Shown above is a scan of KMnO_4 in our specially designed flowcell. A corrected baseline of the flowcell containing solvent water is shown beneath the scan.

Expandable Keyboard Operation. For a few dollars more, you can add Rep Scan, 1st and 2nd Derivative, and Automatic Concentration Factor. A high performance version is available which uses a fore-monochromator and incorporates a holographic grating to provide stray light of less than 0.002%T at 220 nm.



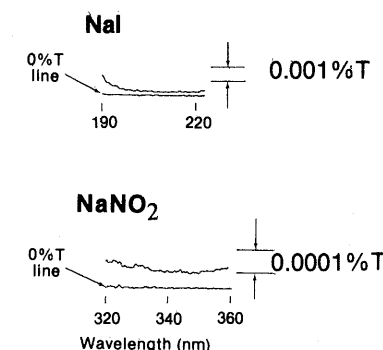
Trace determinations of aromatic hydrocarbons become routine with the baseline compensation power and low noise level of the M552. Benzene in water can easily be detected and quantified at the 100ppb level using 100 mm pathlength cells.

Model 559

The next member of the Perkin-Elmer family of UV-VIS Double-Beam Spectrophotometers is the Model 559. The Model 559's include keyboard control and all the features of the M552, PLUS

Holographic Grating for low stray light and enhanced photometric linearity. High performance version reduces stray light still further.

Stray Light



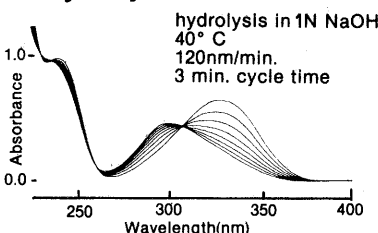
Measured stray light on a typical High Performance 559 (shown above) is well within the specification of 0.002%T at 220 nm and 0.001%T at 340 nm.

Patented Flowchart® Recorder! The "intelligent recorder" from Perkin-Elmer automatically aligns chart to monochromator at all times.

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- 2) Wavelength Programming
- 3) 1st and 2nd Derivative
- 4) Integration

Methyl Salicylate



The patented Flowchart recorder makes repetitive scanning fast, accurate and precise.

Model 320/330

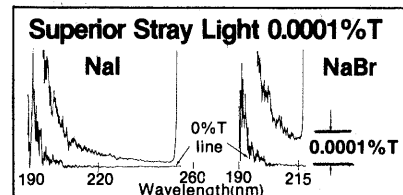
State of the art performance and features highlight the Model 320, for those demanding a research level, completely automatic spectrophotometer.

Double Monochromator provides better than 0.0001%T stray light at 220nm.

Keyboard Control of ALL operating parameters (even slit-width). You asked for, and you expect, unsurpassed versatility in an ultra-high performance instrument.

Smart Recorder. Just position to a grid line once and the 320 remembers. Again, accessories are standard.

- 1) Wavelength Programming
- 2) Repetitive Scanning
- 3) 1st, 2nd, 3rd and 4th Derivative.



Stray light measurements were made on the M320 according to the ASTM method. Measured stray light at 220 nm with sodium iodide was well within the spec of 0.0001%T at 220 nm. Also shown is stray light using NaBr.

The Model 330 is the UV-VIS-NIR version, extending the wavelength range to 2600 nm.

Information or Demonstration

(use the reader service card)

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Circle 221-for information on M552/559

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Bulletin describing derivative scanning with the Models 552 and 559.

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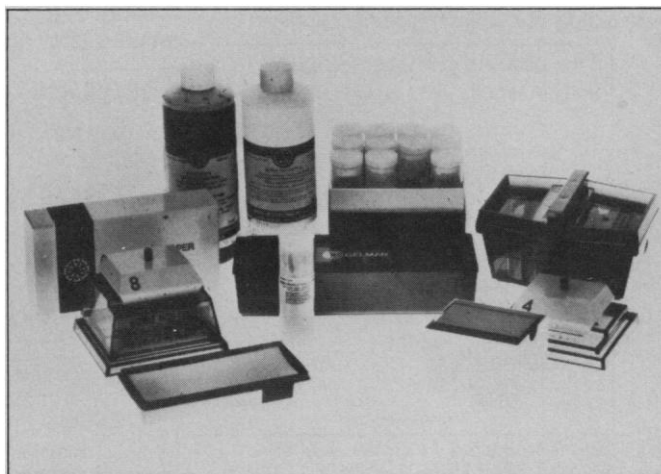
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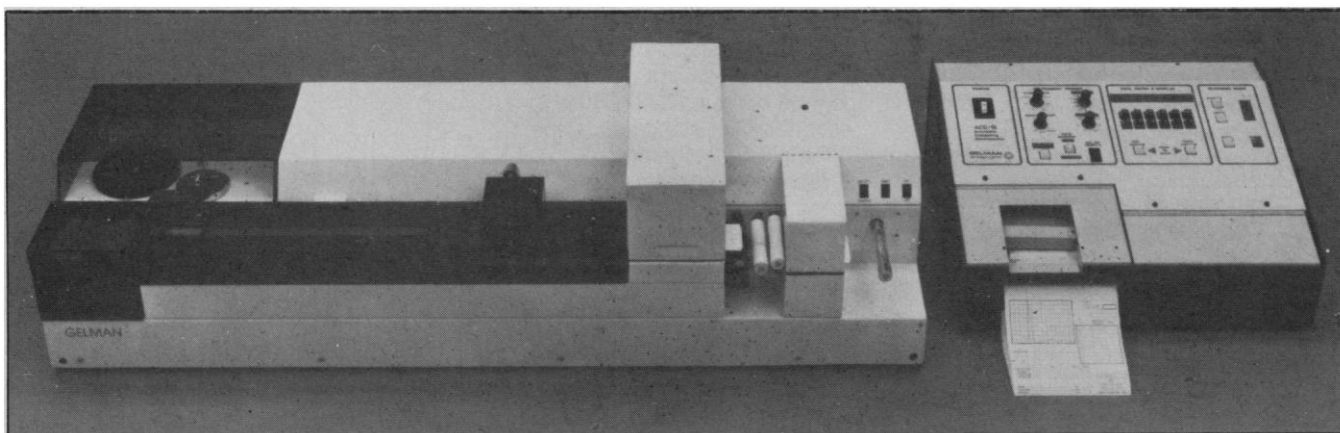
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Automated Electrophoresis System

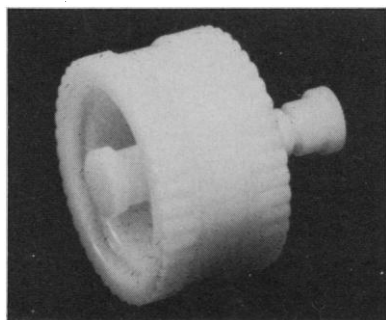
This system can perform up to 128 tests —either serum or hemoglobin samples —fully automatically!

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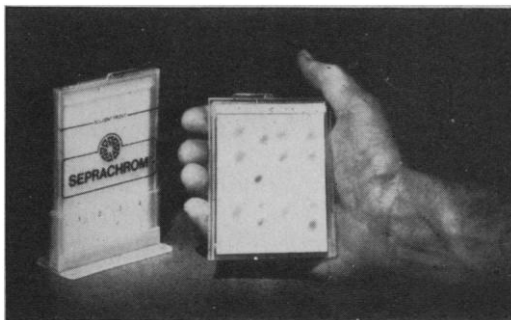
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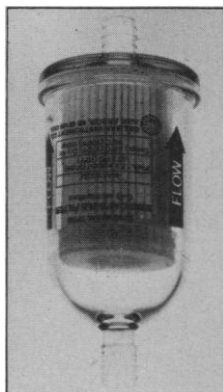
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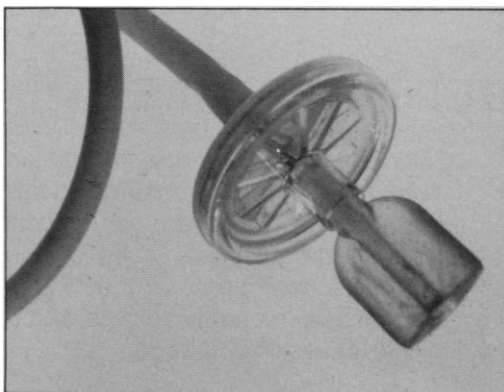
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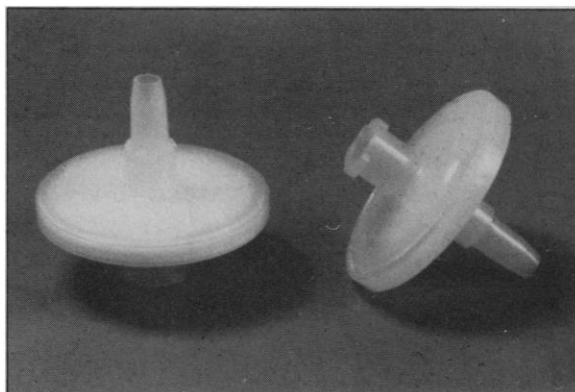
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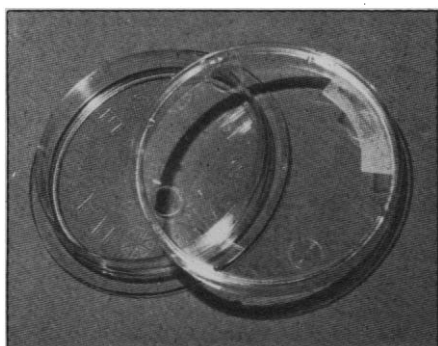


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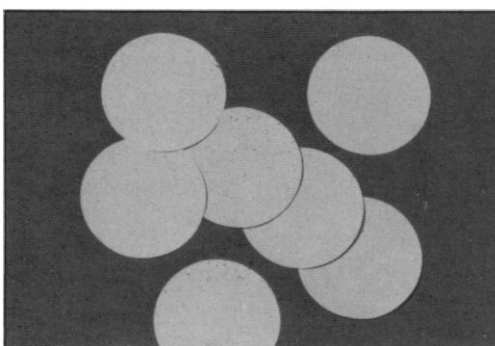
Water Analysis

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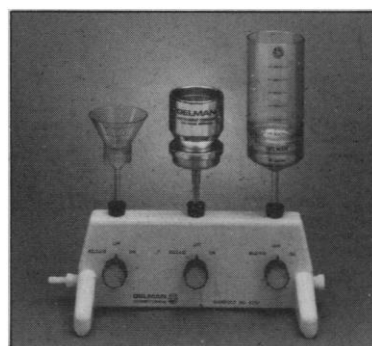
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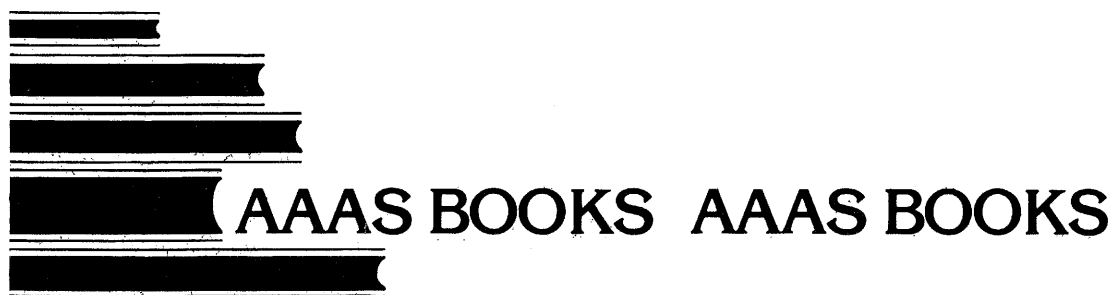
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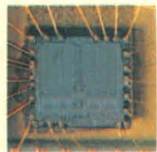
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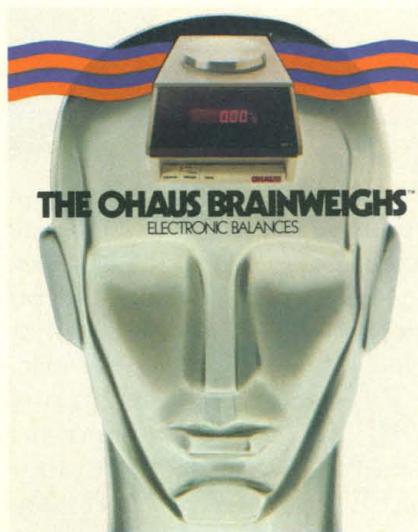
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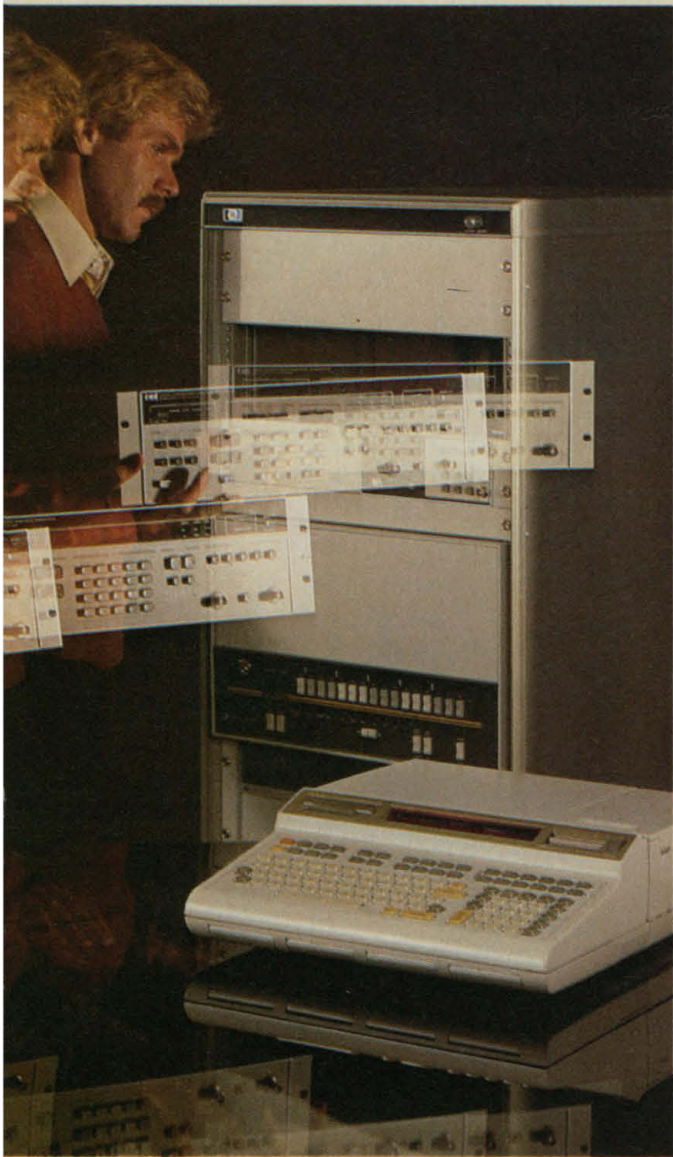
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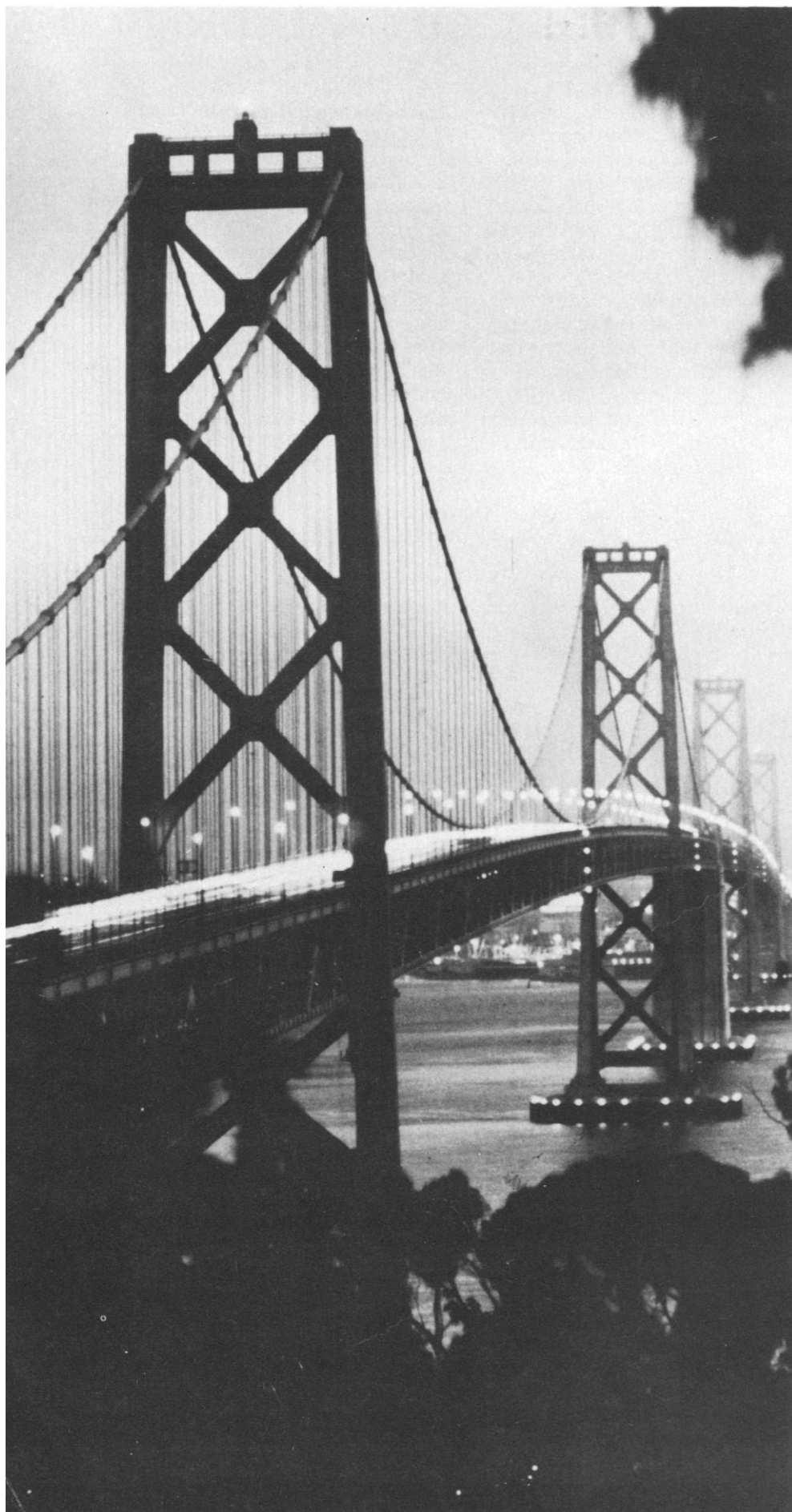
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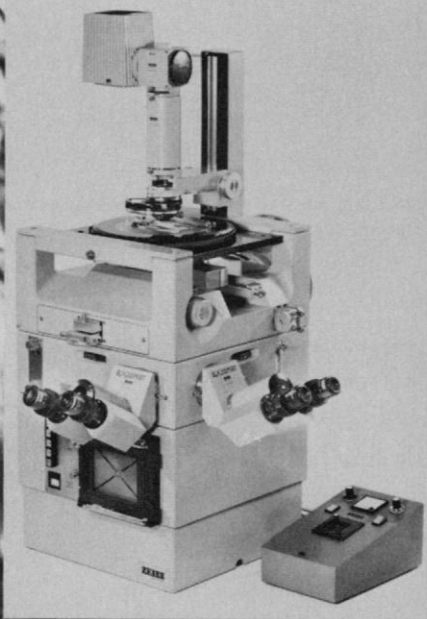
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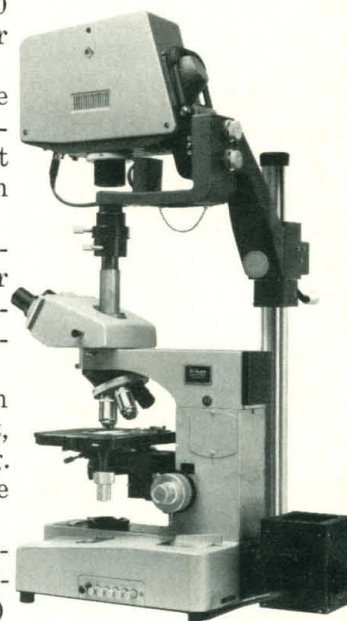
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Scientists, Engineers, and Citizens

Meeting needs for public understanding of science was adopted as federal policy in 1950 legislation creating the National Science Foundation. On the basis of currently low levels of citizen comprehension, that original NSF program can hardly be viewed as successful. But how should we expect any federal program to buck a powerful cultural tide?

Huizinga addressed this issue almost half a century ago.* As he wrote, universal education and modern publicity, instead of raising the level of culture, have produced symptoms of devitalization and degeneration. Science as new knowledge has not settled into the culture, and the aggregate of discoveries cannot be equated to culture.

Among knowledge consumers, with everyone getting a taste of everything, there is depreciation of critical judgment. And that process has been accelerated by techniques of mass entertainment wherein participation slides from active to passive mode, speeding abdication of informed judgment to others. Everyone becomes a trivial, Monday morning quarterback.

As to the scientific community, it has considered its primary role as one of acquiring and extending knowledge, leaving to others the roles both of educating the public about the social implications of science and of exercising responsibility over ways and means for adapting and controlling natural forces. The scientific community may also share in the blame for weakening of an intellectual conscience that underpins critical discernment.

Granted, various groups of scientists have become crusaders for specific issues. A few have tackled broader questions of survival. While not identified with causes as such, other scientists have become activists in their own community, applying their expertise to local issues.

Professional organizations also now get involved. Journals have carried articles on key policy issues to enlighten members. Some organizations have confirmed their tax-exempt status, then summoned up their courage and taken public positions, submitted testimony, and stepped up attention to professional activities in which ethical dimensions of social responsibilities are at stake. The concepts of technology assessment have begun to be integrated into professional engineering practice and teaching.

Looking ahead, the scientific and engineering communities could be of more direct assistance through heavier commitment of their professional societies to public interest activities and to citizen understanding. At present, organizations of scientists and engineers devote the greatest fraction of their income from dues to dissemination of technical information. The public is never excluded, but the content and style of such communication are so highly specialized as to discourage participation by any but the expert.

Thus the scientific community and the engineering professions have failed to help the other 98 percent of the population who are nonspecialists to grasp the technical foundations of modern life and associated threats to survival. Some of the difficulty arises from cultural isolation of the scientific and engineering communities. One antidote lies in a more systematic exposure to issues that concern society generally, especially regarding those whose lives seldom intersect the technical aristocracy, and whose consequently remote concerns and dreams are alien and heard vicariously, if at all. When the technical community recognizes that it must address the stark questions of who wins, who loses, and how much, then they may also recognize that the attack on these questions of cultural and psychological as well as operational effects involves a kaleidoscopic blend of technical with social knowledge. This surely will widen the perspective and enrich the value base intrinsically present in all judgments that the technical community is called upon to make on technology-intensive public policy.—EDWARD WENK, JR., *Professor of Engineering and Public Affairs, University of Washington, Seattle 98105*

This editorial is excerpted from E. Wenk, Jr., *Margins for Survival* (Pergamon, New York, 1979), pp. 144-147.

*J. Huizinga, *In the Shadow of Tomorrow* (Norton, New York, 1936), p. 79.



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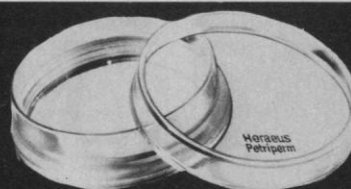
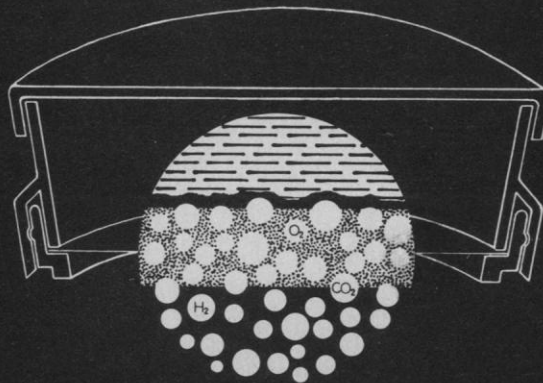
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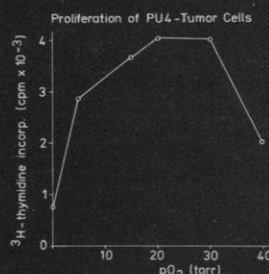


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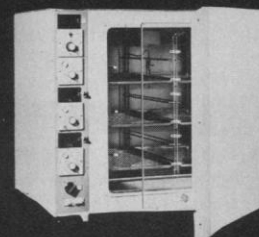
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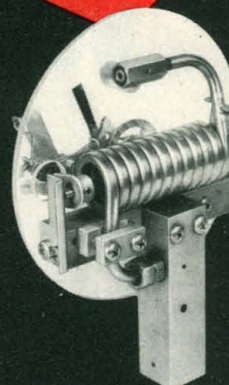
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