SCIENCE

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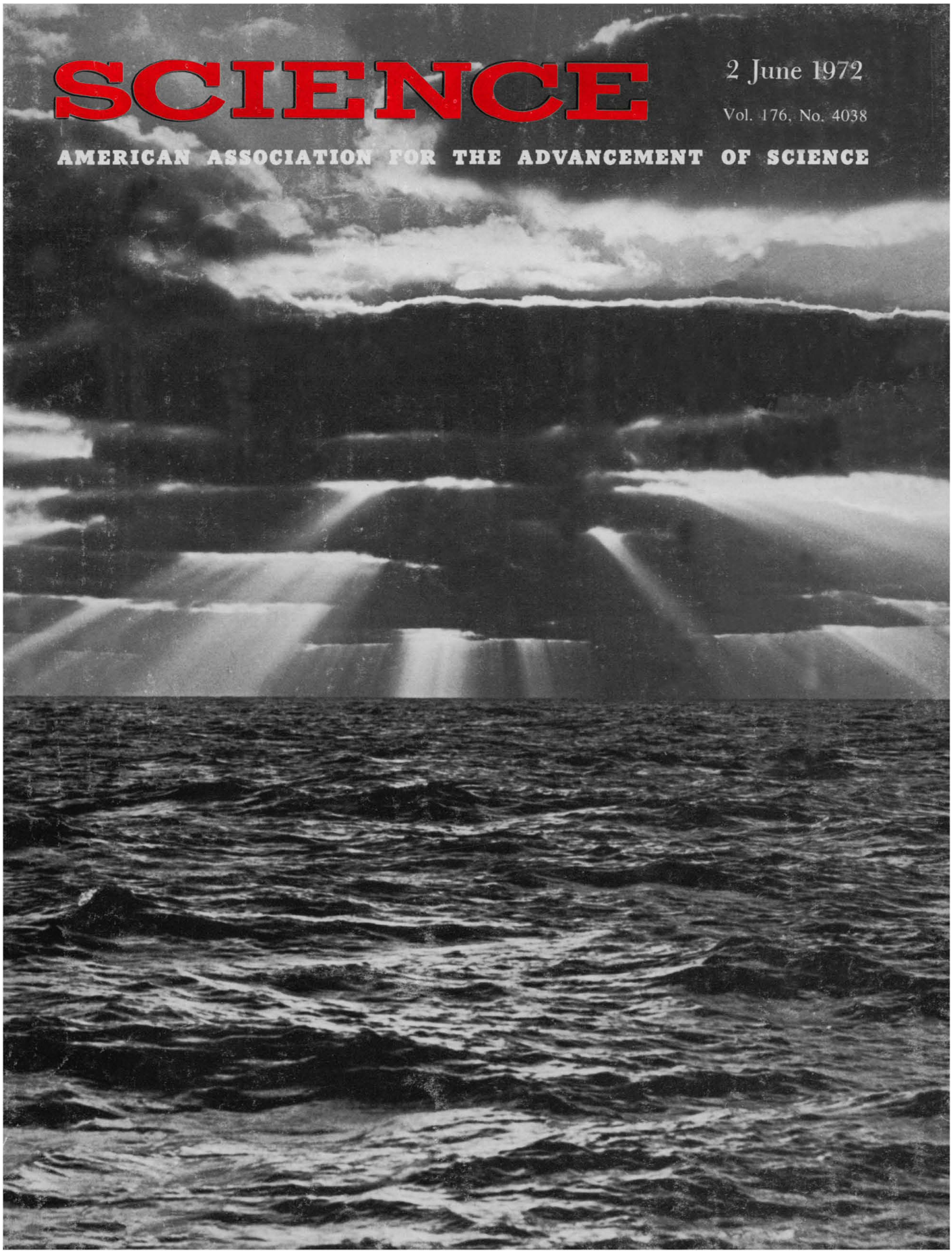
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Some things are changing for the better.

Many people know us as an instrument manufacturer: we make more than 2,000 products for measurement, test and analysis. Others know us as a computer company: more than 10,000 own our programmable calculators and computers. We prefer to think that our business is to serve measurement, analysis and computation needs . . . in science, industry, medicine and education. This is the rationale behind every new instrument, computer or system that we tell you about in these ads. This month:

When the HP 9600 rolls through your door, your real-time and data acquisition tasks become a lot easier to perform. This new systems family's long suit is the efficient and economic handling of multitudes of analog and digital information, simultaneously.

A sensor-based system that makes real sense.

There's a growing demand in industry and research laboratories for sensor-based computer systems that handle great quantities of analog and digital information. Systems built from programmable instruments usually are too expensive; people pay for equipment features that they don't need. Yet the alternative has been a piecemeal approach – break down the customer's problem into several parts and use separate "mini-systems" to solve each part independently.

Now there's a third choice – Hewlett-Packard's new family of compact data acquisition and control systems for cost-effective automation in industry and research. A 9600 Series system monitors, collects, and processes information from sensor-based sources. It then can generate reports, control power supplies, alert operators, drive graphic displays and plotters, and produce control signals for closed loop operations. Although you can't be everywhere at once – supervising and trouble-shooting – our system can.

Two new subsystems within the 9600, one analog and one digital, now do the things a number of programmable instruments used to do. These instrument functions are contained on plug-in cards. Instead of adding individual instruments, you merely slip in an inexpensive printed cirucuit board.

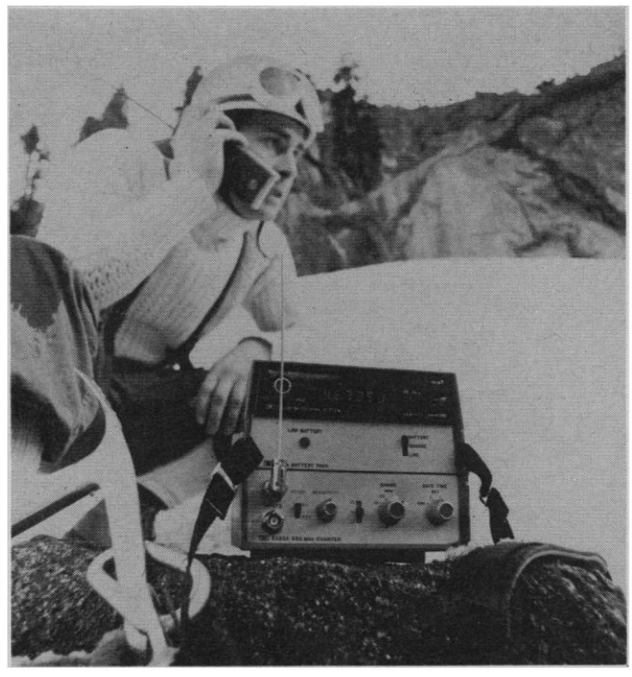
The 9600 data acquisition systems are modular. Start with a minimum low-cost system to control a single test or experiment, and expand with your growing needs.

The full story on the 9600 System family is yours for the asking.

Nothing can outperform this new digital GC-even at twice the price.

Because the gas chromatograph (GC) is essentially a tool for qualitative and quantitative chemical analysis, its value ultimately depends on how well it does this job. Over the years, many new models have been introduced that perform more accurately than previous

This would be an unusual case – using a battery-powered counter to check out the frequency of a mountain rescue-team's radio equipment – but it illustrates that HP's portable instruments can go anywhere service is needed.

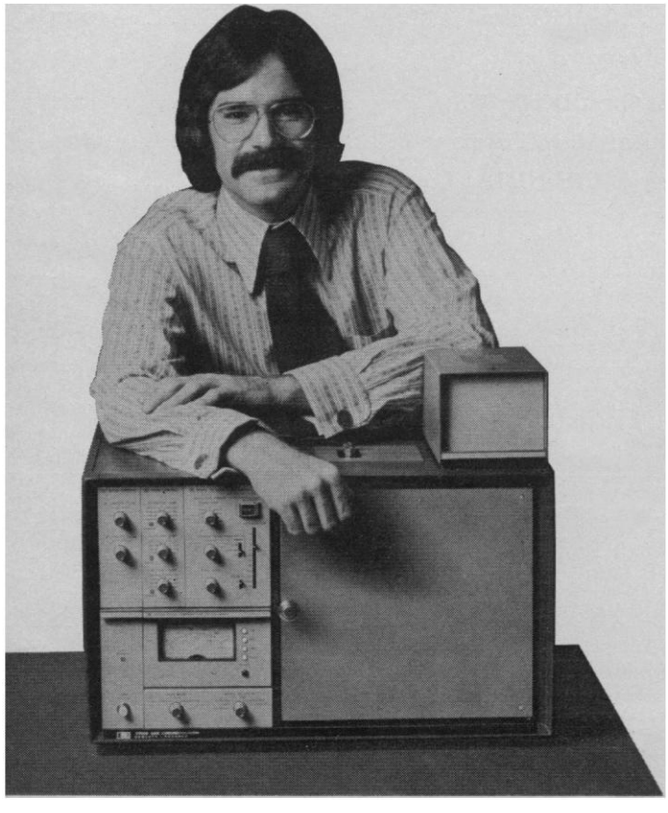


instruments – at a price. The truly amazing thing about the new HP 5700 GC is this: it produces more accurate and precise retention time (qualitative) and peak area (quantitative) data than any GC ever built. Yet it costs about half as much as top-of-the-line GCs of comparable quality.

A new bulletin on the 5700 fully documents this perhaps startling claim. Until you have a chance to study this data consider this: one of the first 5700s off the production line was used "as is" to make two series of replicate analytical runs, one series before and one after an overnight shutdown. The sample used in both series contained seven components, out to C_{17}.

The results speak for themselves. In terms of repeat accuracy, the mean retention time of each of the seven components differed less than 0.01 minute after the overnight shutdown; the normalized area % varied only within ±0.001%. In terms of precision, the standard deviations of the replicate retention time measurements fell within 0.0175, both before and after the overnight shutdown; the standard deviations of the area % data were all within 0.0038. No other GC, regardless of price, can do better.

For a fully documented proof of performance as well as a factual description of this new all-digital, computer-compatible automatic GC, write for Bulletin 5700.



Portable instruments go where the problem is.

Capital equipment such as mobile or remote communications systems and million dollar computers have at least two things in common. They are electronically complex, and they can't be taken into a service center when they need repair. Today's traveling field service engineer must have laboratory quality equipment that will go where he goes.

HP's portable instruments enable service engineers to diagnose and repair this equipment on the spot, reducing expensive downtime. Our portable scopes are small enough to fit under an airliner seat, and, at 24 pounds, are light enough to be carried up antenna masts and into other hard-to-reach places. An HP electronic counter can be held in one hand – it takes only seconds to snap on a function module that provides the specific measuring capability needed. Then there's our multi-function meter – a high performance, instant-reading voltmeter and ohmmeter rolled into one.

And the length of HP's portable measuring capability isn't limited by the distance to the nearest wall socket. Most of our portable instruments feature their own accessory battery pack. Many can run off ordinary car, plane or boat batteries as well as a standard power line. And all of them deliver HP precision in a rugged, portable package.

Ask for the full story on portable instruments that go where the problem is. Write Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304; Europe: 1217 Meyrin-Geneva, Switzerland.

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COVER

Simulation models are necessary tools in studies of total marine ecosystems. Through a family of such models, it may be possible to predict and manage the perturbations of marine coastal areas. See page 969. [B. J. Nixon, Williamsburg, Virginia]

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Another Crusade!

It has been less than a year since the Cancer Crusade legislation was passed. About $1.6 billion was appropriated for 3 years and a critical change in research policy was initiated. The search for causes and cures of cancer is henceforth to be highly systematized, with specific, approved battle plans and a ruling hierarchy of both scientists and laymen. Little significant opposition to this far-reaching legislation has been voiced publicly. Too much money and power are at stake for overt criticism. The plan has not received such kindly treatment in private conversation, however. A new way of life has been dictated to research workers, despite such phenomenally good results from the old way that the American Cancer Society could state that the cure for cancer was just around the corner. They may be right—who knows? But this is soothsaying, not science.

Predictably, heart disease, our deadliest disease, is next in line. It is already assumed that the cancer plan is a success, opening a whole new era in the method of discovery. In such a heady atmosphere, again almost without public discussion, the Kennedy-Rogers bills authorizing $1.3 billion over 3 years will probably pass quickly. "The thrust of the $1.3 billion heart-stroke-lung package drew praise from all witnesses. . . ." How familiar—and how quickly we researchers change our spots! An advisory study panel on heart disease has already been appointed, fortunately under very able John Millis, but the bill seems destined to pass even before the panel has a chance to advise.

All scientists should be aware that this is a gut reorganization of basic biomedical science which deeply involves us all. High levels of organization, hopefully clear lines of authority, enforced by money, are all critical. There are probably many who relish the plan, but the doubters are silent. "Organized medicine," in its broadest connotation, has taken no stand. (It should be noted that the British Select Committee on Science and Technology has recently decided against a science policy for that nation, despite the Rothschild report.) Organized administrators, lobbyists, and those with strong bases of political power have proved their capacity to do a superb job. Probably next on the list of crusades will be nervous and mental diseases.

The resultant activities of the tax collector may emasculate the fund-raising efforts of voluntary health agencies. Those closest to government, the Washington scientific community, emanate frustration, hopelessness, and helplessness. Acceptance of whatever the legislative juggernaut demands seems inevitable. Much of the freedom of science is now being legislated away, and we are approaching the Russian system of directed research—protestations to the contrary. Possibly we need more disciplined research, but do we need the government to administer and define the discipline? Dr. Robert Marston, the director of the National Institutes of Health, has assured me that my fears are exaggerated.

I have often expressed doubt about instituting such vital changes in research without any idea as to their outcome. True, we are going somewhere much faster, but we are not sure where we are going. I appreciate the enormous power of the politics that maneuvered these changes so quickly and painlessly. I hold no brief against politics, except when it fails to expose contrary opinion. We are making decisions that affect life and death in a way that I feel is cavalier. The policy gyrations of the Regional Medical Program should alert us to the rapidity with which political winds change. The uncertainty principle is fully applicable.

—IRVINE H. PAGE, *Editor*, Modern Medicine, *8907 Carnegie Avenue, Cleveland, Ohio 44106*

We want to be useful ...and even interesting

Doing anything July 10th?

Those for whom a total solar eclipse makes a day very important professionally have quite definite plans already for July 10, 1972 and quite definite opinions on what's worth doing that day. The path of totality being what it is through the oft-clouded skies of Alaska, the Northwest Territories, Quebec, and the Maritimes, mere enthusiasts may find themselves luckier. We are told that an opportunity presents itself to confirm photographically the existence of comets or, conceivably, other small celestial objects much nearer the sun than Mercury. We are also told that it will take lots of luck indeed, and lots of coolness, patience, and focal length.

If interested and if there is still time, send to Dept. 916, Kodak, Rochester, N.Y. 14650 for "How to Enjoy the Eclipse."

Spontaneity through information density

We hope that you (or at least your family) have learned in recent weeks of Kodak's pocket principle in photography: film only 16 mm wide in a one-inch-thick camera leads to high-grade 3½"x4½" snapshots, 5"x7" enlargements, or a fine slide show of unusual spontaneity in expression and behavior.

This principle rests on a bewildering interlace of more basic principles in engineering, chemistry, economics, and business law. Most basic of all is the limit on information density set by chemical technology. To suggest that the limit has now been even approached would be self-serving pessimism. A physicist among us gives guidance on what improvements would be noticeable.

Author of a doctoral thesis on fourth sound in HeII, he finds that translating spatial frequency concepts into migration behavior of chemical entities in a photographic color emulsion adequately utilizes his professional capabilities.

The photographic chemists he counsels think like chemists. To deal with the photographic image in terms of Fourier analysis is the way of a communications engineer. The physicist breaks down a photograph into several million data points and processes the data to enhance some spatial frequencies.

See, for example, how an electron micrograph of a cell nucleus can be thus processed to accentuate the spatial frequencies of the mitochondria:

BEFORE

AFTER

Takes too much computer time for routine use. Feasible when a study that correlates subjective judgments of sharpness with patterns of spatial frequency enhancement can be supported by millions of camera-buying spontaneity-seekers.

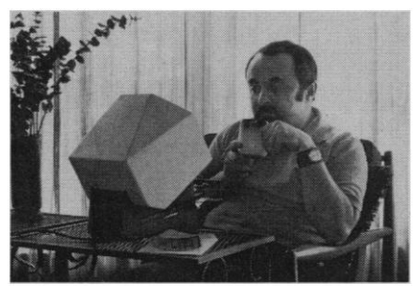
Micropublishing takes great leap forward, attaché cases to lighten

For delivery soon after October 1, 1972, we now offer a $95 microfiche reader. To book order, find Kodak in the Yellow Pages under "Microfilming."

It weighs less than five pounds. Its 12V lamp—autodome type—needs no fan. Soundless. Smart optical design, for a bright, contrasty front-projected image. A minor purchase for the home or office, costing less than a comfortable chair to put in front of it.

If publishers and learned societies can sell the idea that ink is not the vital ingredient in disseminating specialized information and according recognition to authors, prospects for economic viability may brighten. Now it should be easier to sell that idea.

The KODAK EKTALITE 120 Reader can be used like this:



Price subject to change without notice.

Kodak

The limits of photography recede