SCIENCE

26 April 1968

Vol. 160, No. 3826

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

'67 VW, '68 RGA.

Just by looking, it's hard to tell our new model from last year's, too. But run it through its paces and you'll see all the major improvements in the 1968 Ultek/EAI QUAD 150A residual gas analyzer. Our Ultek salesmen can give you a demonstration, even one a bit more exhaustive than the one shown above. Some of the improved features are: (1) mass range selections (1 to 150 or 10 to 300); (2) resolution of 600 using $m/\Delta m$; (3) calibrated sweep speed. Also included are ease of operation, resistance to contamination, and reliable solid state plug-in construction. The basic QUAD 150 RGA has been proven in use in air pollution control studies, vacuum tube exhaust analysis, molecular beam studies and space satellite research, biological and medical research, dry box systems, thin film work, and as a comprehensive leak detection system for all types of gases in a variety of high vacuum applications. Your local Ultek salesman has a 1968 RGA demonstrator ready to go. Call him today, or contact us at the address below.

QUAD is a trademark of Electronic Associates, Inc.

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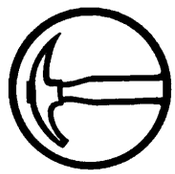
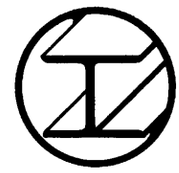
AGRICULTURAL
Na–.00032
K–.0007
Ca–.0001
Mg–.000025



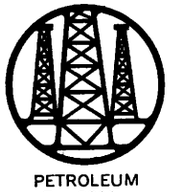
GEOLOGICAL
Au–.0035
Ag–.0010
Te–.015
Pt–.032

POLLUTION
Zn–.00035
Cr–.00030
Ni–.0050
As–.4

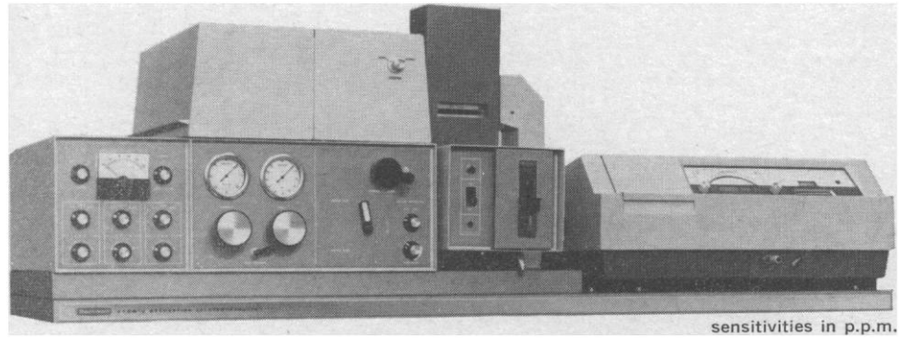


METALLURGICAL
Ni–.0050
Sn–.25
Al–.12
Tr–.012

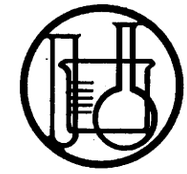
CLINICAL/MEDICAL
Ca–.0001
Fe–.0011
Li–.001
Zn–.00035



PETROLEUM
Fe–.0011
Ni–.0050
Pb–.012
V–.025
Cu–.00030



sensitivities in p.p.m.



CHEMICAL
Cr–.00030
Mn–.00015
Ni–.0050
Si–.050
Te–.015

Talk about sensitivity!

This will test your metal to the limits of Atomic Absorption today: Beckman's multi-purpose, completely automated Model 979 AA Spectrophotometer. Check its detection limits for your area of application. Then make us prove it.

Get the facts from AA to Z—our sales representative will be glad to tell you about the "sensitivity gap" between Beckman and others. Ask him about the exclusive Laminar Flow Burner that permits the Model 979 to deliver 5 to 20 times greater sensitivity *in your field of inquiry* than any comparable instrument. Ask him where your area of application fits into the 979's wide wavelength range of from 190-770 mμ (190-852 mμ optional). Have him show you how our precision optical system can assure you the accuracy you need to resolve those perplexing analytical problems. And don't forget to pin down your Beckman man on the automation question. Make him show you how the Automated Sample Changer can hasten your analytical determinations without sacrificing accuracy. Here's a real toughy to close with—ask our man to explain what our instrument is doing in so many different fields of inquiry.

Go ahead, ask him—our instruments are sensitive, but our salesmen aren't! For openers, write for Data File 501K.

The people out front in background and back-up...

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26 April 1968
Vol. 160, No. 3826

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

"Boy Smoking," a painting by an unknown artist in the style of Hals. A method of discerning between old and modern white lead has objectively confirmed the 20th-century origin of this painting and others which at one time were falsely attributed to old masters and so purchased. See page 413. [Courtesy of Gröninger Museum voor Stad en Lande, Gröningen, Netherlands]

Our new atomic absorption spectrophotometer for people who can't afford a new atomic absorption spectrophotometer.

It's the Bendix A3000—a full-size, full-capability system that does everything a good atomic absorption spectrophotometer should do. Except cost like one.

Here is a low-cost instrument that gives you all the benefits of analysis with atomic absorption. It can detect trace metals in less than a minute for any number of applications, including clinical chemistry, metal analysis and food chemistry, And it does it with all the performance you'll ever need for practical lab work.

Another thing you'll like about the A3000 is its completeness. Everything normally required is included as standard equipment. There's a minimum number of optional accessories needed or offered. And controls are kept to a minimum, too, for ease of use. Anyone who can read and count can perform routine analysis with the A3000.

Can you afford the A3000? Chances are, you can't afford to be without it. Get complete information on it by writing: The Bendix Corporation, Scientific Instruments Division, 3625 Hauck Road, Cincinnati, Ohio 45241.

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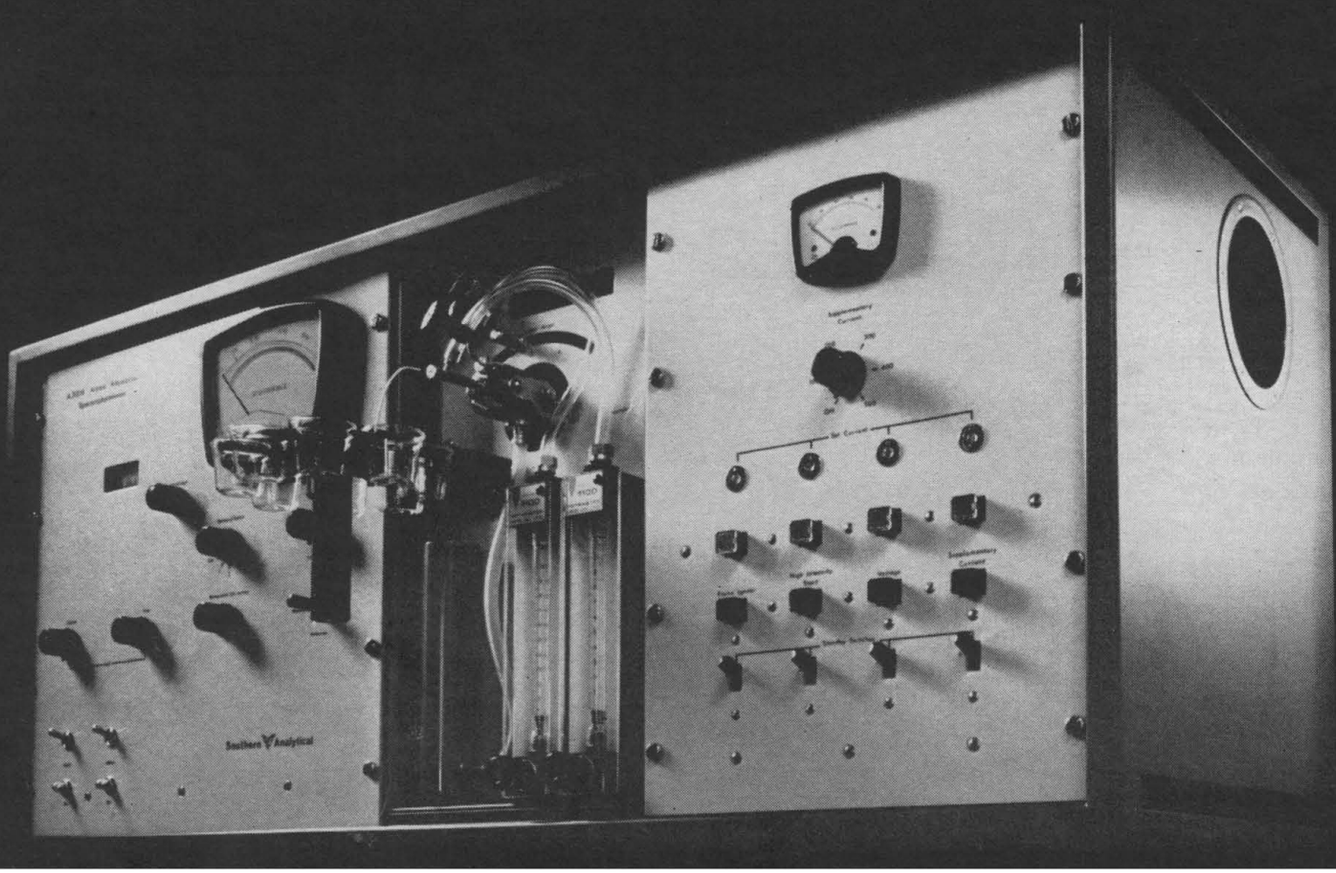
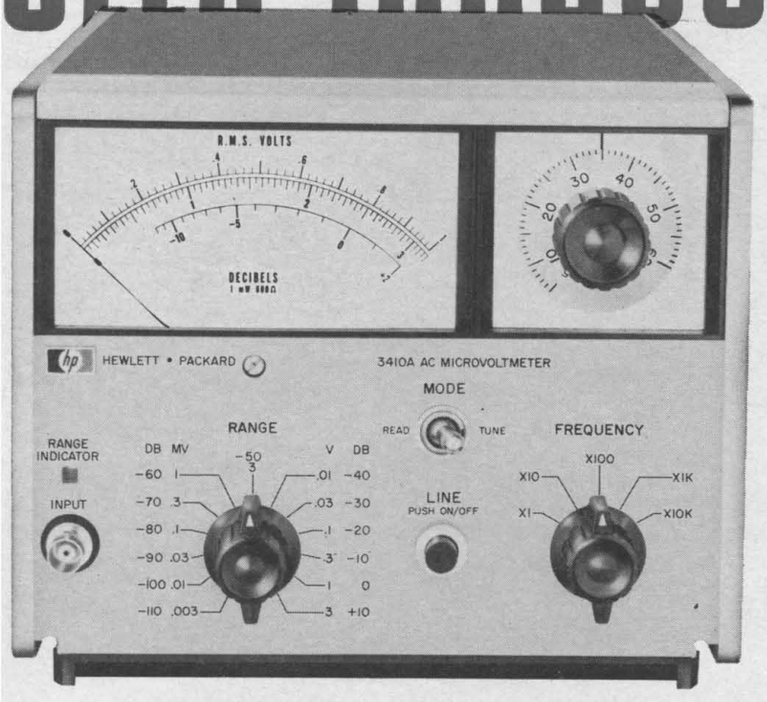


AC MICROVOLTMETER SEES THROUGH NOISE!

New hp 3410A Measures 300 nanovolts Buried in Noise



New hp Model 3410A AC Microvoltmeter measures low level repetitive signals obscured by noise—3 μV to 3 V full scale—accuracy ±3%. RMS noise voltages up to 20 dB above full scale *do not affect* readings. Sensitivity, low cost and ease of operation are the 3410A's contribution.

This new microvoltmeter uses an hp designed phase-locked synchronous detector to separate effects of noise from signal. The detector is an electronic gate controlled by an oscillator phase-locked to the input signal. No external reference is required to lock to the input signal. Simply adjust front panel tuning control within 1% of signal frequency and phase-lock circuits *lock-on and track* input signal with ±5% variation in the 5 Hz to 600 kHz frequency range. Phase-lock circuits track 0.5%/sec change in signal frequency without a change in voltmeter accuracy. Input impedance is 10 MΩ shunted by 20 pF.

The new Model 3410A has two outputs on the rear panel. One is a dc recorder output for monitoring long term drifting ac voltage amplitudes. The other is an output for driving an electronic counter to make precise frequency measurements.

For full specifications on the new hp Model 3410A AC Voltmeter, call your hp field engineer. Or, write to Hewlett-Packard, Palo Alto, California 94304. Europe: 54 Route des Acacias, Geneva. Price: hp Model 3410A, $875.00.

097/11 R

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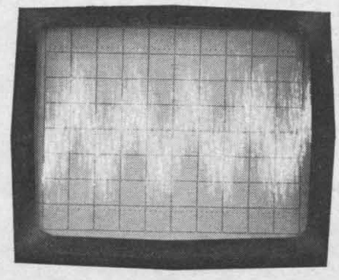
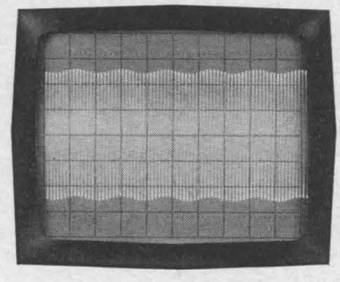
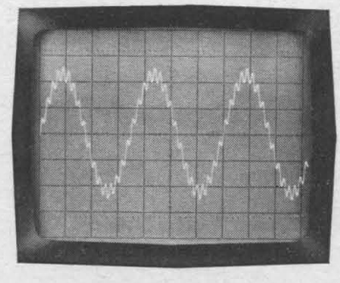


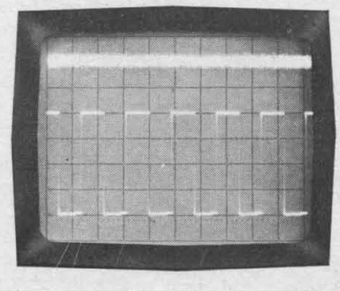
Measure 1 μV, 500 kHz signal out of 40 dB noise.



Measure 10 mV, 5 Hz amplitude modulating 1 V, 400 Hz.

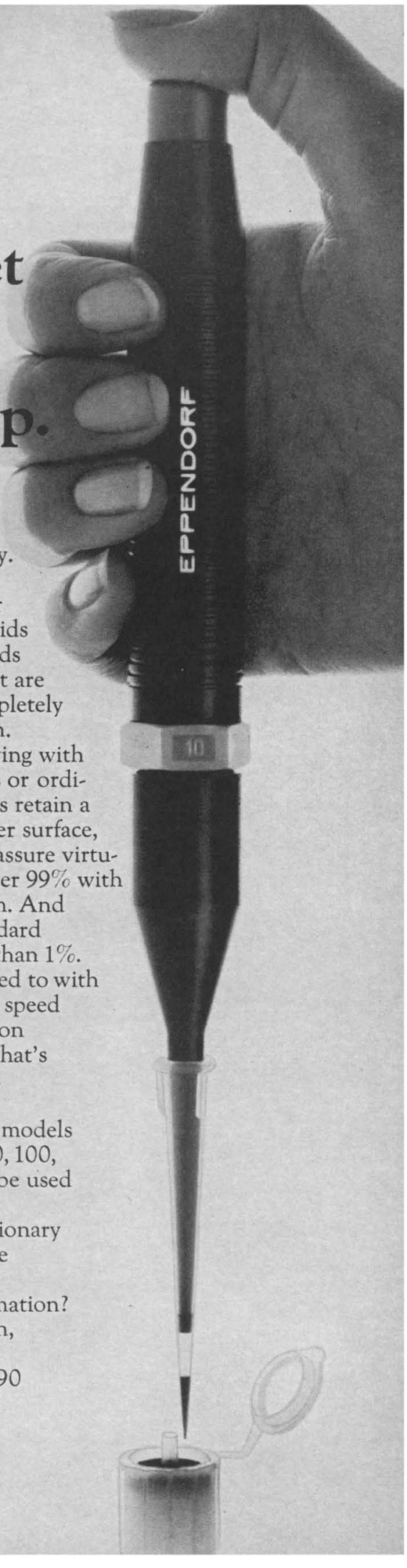


Measure 300 nanovolts, 10 kHz. signal superimposed on 10 μV, 1 kHz



Measure frequency of signal in noise up to 560 kHz by using square wave output, i.e. as a counter preamplifier.

This is the revolutionary micropipet with an unbelievably accurate tip and a completely automatic top.



Take the new Eppendorf automatic micropipet in hand and be prepared to have your pipetting habits changed...radically.

For example, you won't have to wash or wipe pipets anymore, or worry about contamination or liquids in your mouth. The Eppendorf holds liquid in disposable plastic tips that are instantly interchangeable and completely separate from the pipet mechanism.

You'll also have to unlearn living with significant pipet error. Unlike glass or ordinary plastic pipet tips which always retain a significant liquid film on their inner surface, the Eppendorf polypropylene tips assure virtually complete sample recovery—over 99% with aqueous solutions, 97% with serum. And look at this precision: at 5 μl, standard deviation is under 0.04 μl, or less than 1%.

But the easiest thing to get used to with the new Eppendorf is the ease and speed of pipetting. Just press the button on top to fill. To empty, press again. That's all. Blowout of the entire sample is automatic and complete.

The Eppendorf is available in models dispensing volumes of 5, 10, 20, 50, 100, 200, 500 and 1,000 μl. It can even be used with acids and organic solvents.

Once you've tried the revolutionary Eppendorf, you'll never want to use conventional micropipets again.

May we send you more information?

Just write: Eppendorf Division, Brinkmann Instruments, Inc., Cantiague Rd., Westbury, N.Y. 11590

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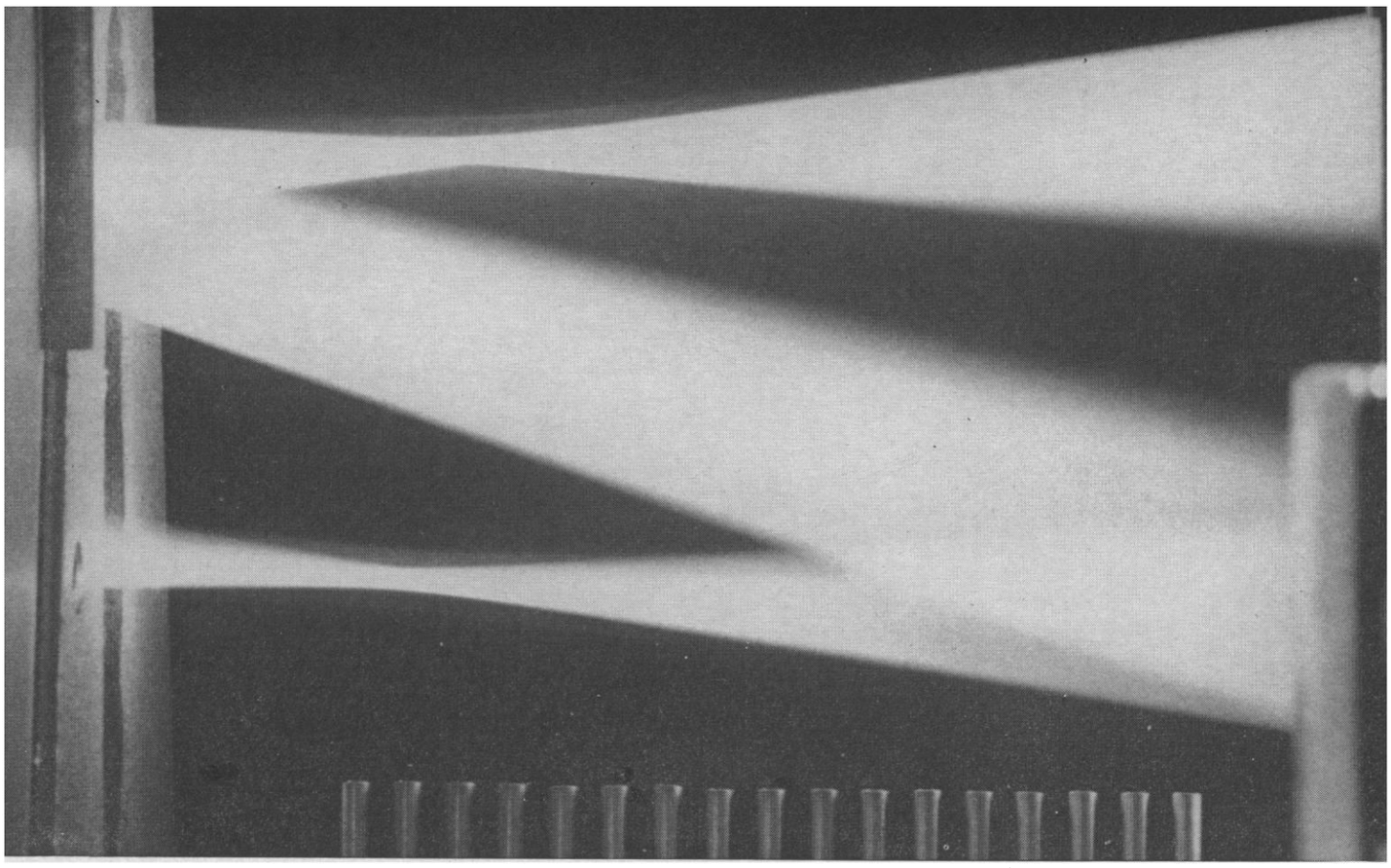

How do we squeeze big-instrument performance into our FA-2 Atomic Absorption Module?

We fold the beam.

The Zeiss Spectrophotometer PMQ II with its compact FA-2 Atomic Absorption module can easily compete with the largest single-purpose units. How can it be made so small? Because the beam of the hollow cathode passes the flame three times . . . using the *entire* flame for absorption.

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You can choose from four monochromators. Scale expansion up to 5x is built in. An additional unit will expand the scale up to 30x.

The FMA-2 is a *complete* atomic absorption and flame emission instrument of unmatched precision. You can change from flame absorption to emission by turning a single switch. If you already own a basic PMQ II Spectrophotometer, it's a simple matter to add the compact Atomic Absorption module.

Write for details, Carl Zeiss, Inc., 444 Fifth Ave., New York, N.Y. 10018. In Canada: 14 Overlea Blvd., Toronto 17, Ontario.

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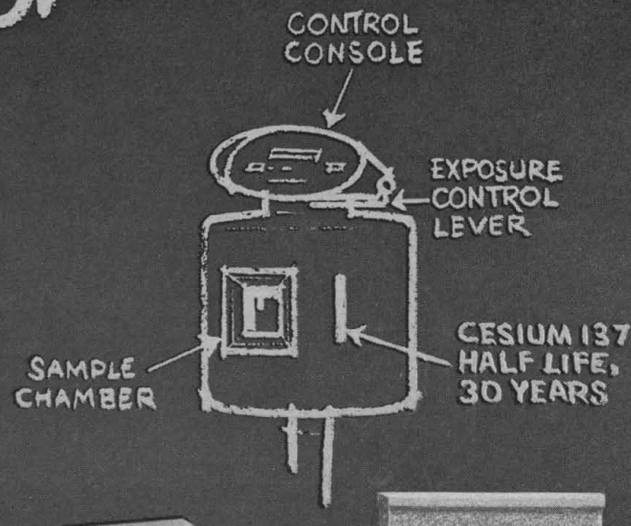

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With this professional equipment you can teach and experiment with gamma radiation in the classroom in perfect safety. Prepare your students today in the fields of the life sciences, chemistry, and physics for the nuclear age of the 1970's.

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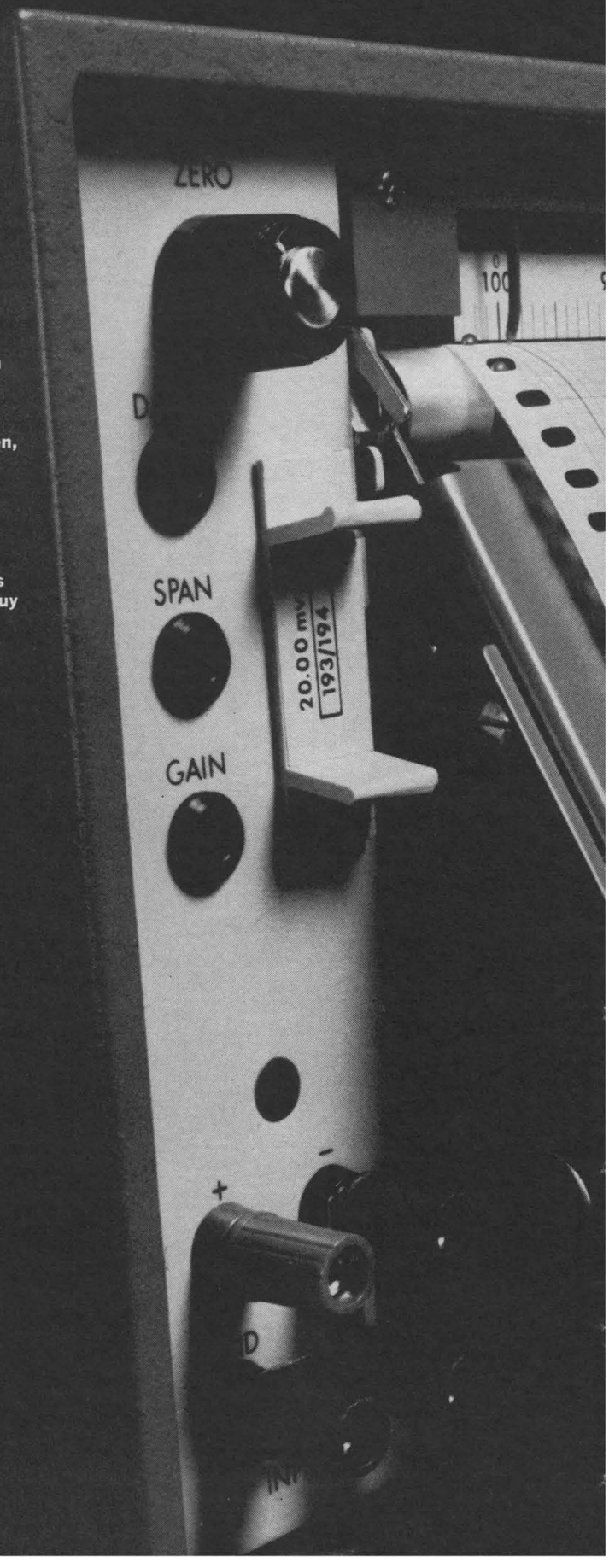
Honeywell presents its latest all-around recording artist . . .



This versatile servo potentiometer recorder gives an outstandingly accurate and reliable performance wherever you put it to work—in laboratory analyzer recording, in engine testing, in quality control, in product development, or in general research.

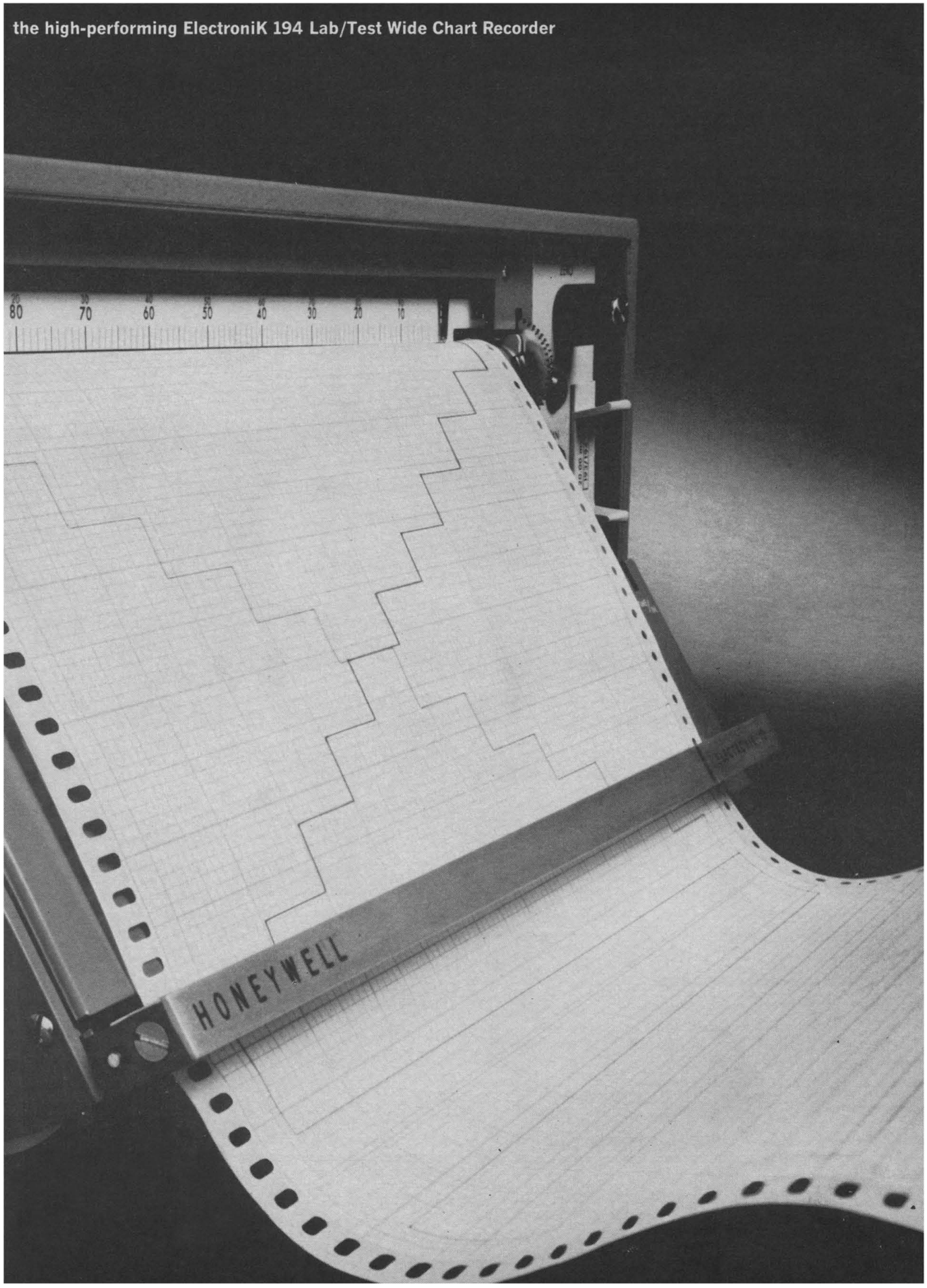
In its price class, the "194" gives you unequalled rangeability. You have 19 spans from 100 microvolts to 100 volts dc with multi-range models, or you can select spans from 500 microvolts to 100 volts dc with plug-in fixed-span models.

The compact ElectroniK 194 weighs only 35 to 45 pounds, depending on choice of one- or two-pen model. Its exclusive space-saving profile needs only 7 inches of vertical relay rack mounting space. Bench models have a rugged case that will support 300 pounds of stacked laboratory equipment.

The nominal 10-inch calibration of this human-engineered instrument gives you high resolution and readability. The chart is driven over a tilting platen, letting you make notations easily while the recorder is operating. You can direct the chart across a bench top for rapid scanning or let it reroll automatically.

There are many other high-performance features and options that make the "194" your best buy for lab/test work. Write for brochure D312 and specifications to Honeywell Inc., Industrial Division, Mail Station 440-A, Fort Washington, Pa. 19034.

Honeywell


the high-performing ElectroniK 194 Lab/Test Wide Chart Recorder
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70
60
50
40
30
20
10
HONEYWELL

SPRINGER-VERLAG NEW YORK INC.

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EXECUTIVE VICE-PRESIDENT

April, 1968

Gentlemen:

Some confusion and misunderstanding about the identity of Springer-Verlag has arisen.

Please let us clarify a few points.

Springer-Verlag New York Inc. is closely affiliated with Springer-Verlag Berlin-Heidelberg and Springer-Verlag Wien.

None of these three firms has any family or business relationships with the German publishing concern of Axel Springer und Sohn (G.m.b.H.) Berlin-Hamburg which was recently publicized by controversial articles in this country.

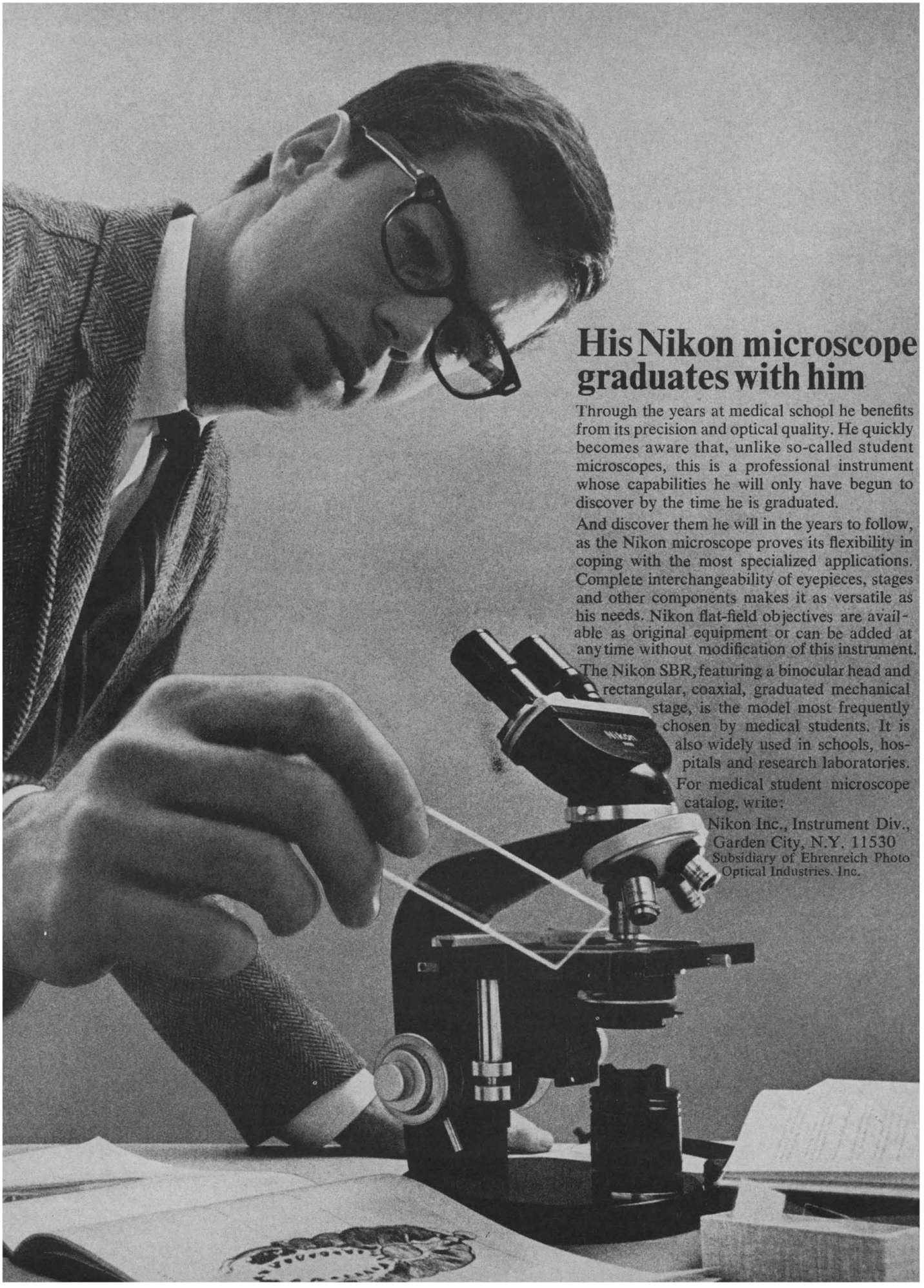
For over 100 years, Springer-Verlag has served the scientific community only as publishers of scholarly books and journals. Well known for such famous publishing accomplishments as "Beilsteins Handbuch der organischen Chemie" and "Handbuch der Physik", we like to emphasize our identity.

Please do not be misled by the similarity of names which is incidental.

Sincerely,

Gunter Holtz

GH:bl



His Nikon microscope graduates with him

Through the years at medical school he benefits from its precision and optical quality. He quickly becomes aware that, unlike so-called student microscopes, this is a professional instrument whose capabilities he will only have begun to discover by the time he is graduated.

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Subsidiary of Ehrenreich Photo Optical Industries, Inc.

How to get a free computer with every signal averager you buy

Time was, a laboratory that needed a signal averager would buy a wired program signal averager. It could average signals. But that was before the LAB-8.

LAB-8 will average signals. But it will also calculate and display the trend of the data, the standard deviation of the data, blow-ups of particular areas of interest, control the experiment for you, and then . . .

. . . it will also serve as a desk calculator, a small laboratory computer center, an on-line, real-time computer for data collection and analysis, and, indeed, do everything that a fully expandable, FORTRAN speaking, 1.5 μsec, 4096 core memory general purpose computer will do. LAB-8 has the brand new integrated circuit PDP-8/I inside.

For roughly the same price as a wired program signal averager and attachments. $16,900.

DIGITAL provides the programs. Not only for signal averaging and all the other things serious scientists want to do with signals, but for the desk calculations as well. And if new methods of analysis become useful, DIGITAL will work with you. LAB-8 can not become obsolete.

Setting up the LAB-8 for a run, incidentally, is also unique. Conversational. Questions appear on the face of your scope. You type the answers on a teletype. More questions. More answers. Three minutes later, you have a paper tape, good for this run and every run afterward, that feeds the run parameters to the computer without error, without ommission, without effort.

DIGITAL has made and delivered more small, general purpose computers for the scientific laboratory than anyone else in the world. Sooner or later, they were bound to aim one at signal averaging. LAB-8 is it.

In addition to the LAB-8, other PDP-8/1 computer-based systems for the laboratory are now here too: GasChrom-8, NMR-8, and PHA-8. Write for details.

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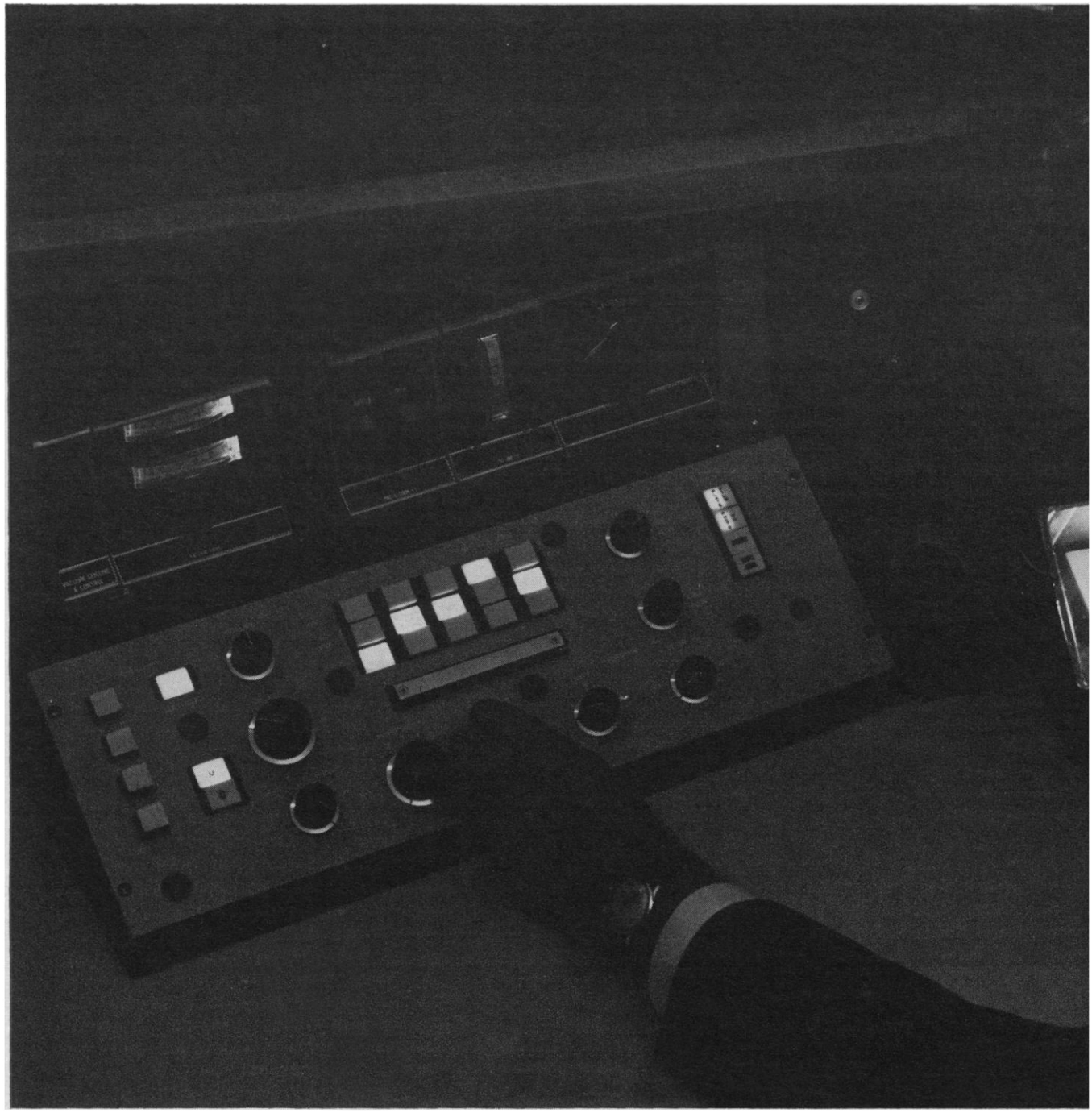


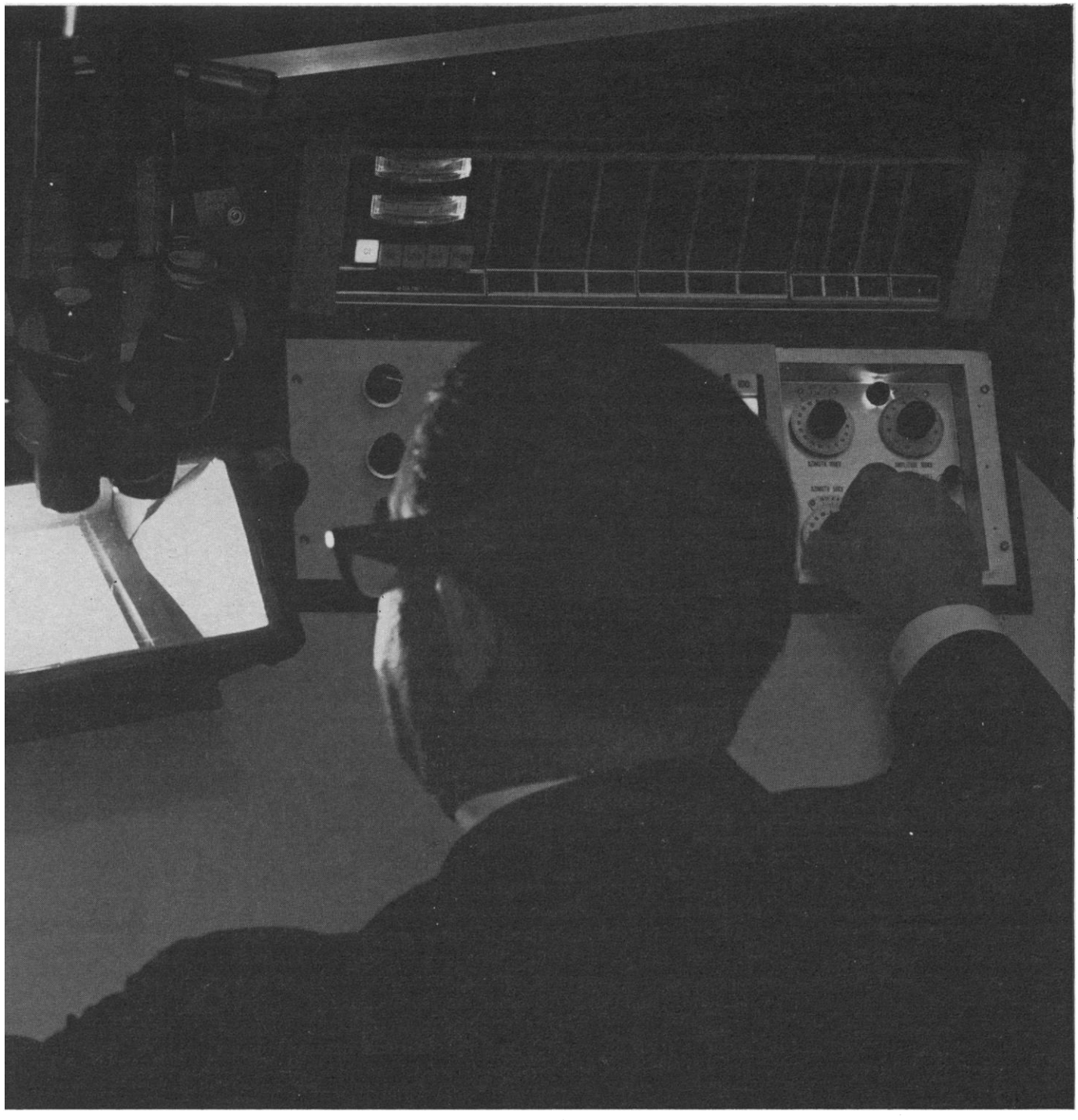
The EMU-4 electron microscope

Now that there are more than 50 EMU-4 electron microscopes in operation, the evidence of instrument superiority is clear: The EMU-4 consistently outperforms its own promises of performance. Read on . . .

Resolution capability exceeds the 8-angstrom *guarantee:* The greatest point-to-point resolution reported so far is 2.8 angstroms, achieved in a *stock* instrument, *without* "cold fingers" or other devices that enhance resolution capabilities.

Image contrast capability outstanding: The result of a *permanent* objective aperture feature which places the aperture at the rear focal plane and applies controlled heat that literally inhibits contamination. No longer must the "ideal" (most-effective) aperture diameter be compromised for aperture "life."

*Less than 0.0017Å per second (0.1Å/minute) using accessory anti-contamination devices.



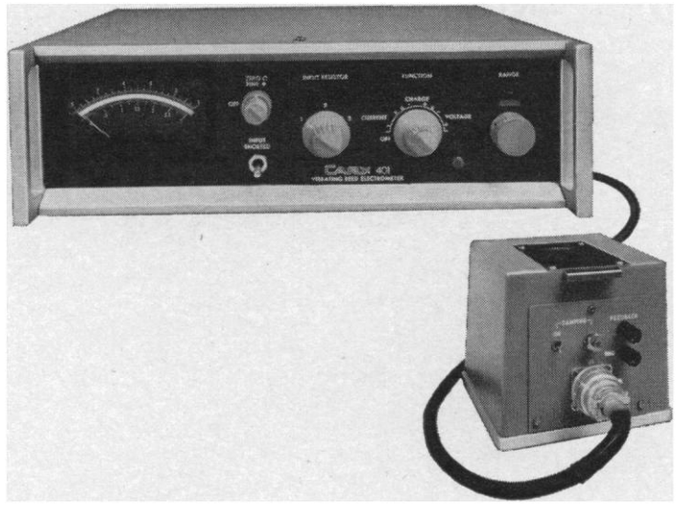
outperforms its own promises!

Specimen contamination negligible: Rates of less than 0.5Å per second* are routine, even under "micro-spot" illumination and without cold fingers or other anti-contamination devices. The EMU-4, like its predecessor, is unchallenged in terms of low specimen contamination.

If resolution, contrast and low specimen contamination are among the things important to you in an electron microscope, consider the EMU-4. For more information, contact the nearest regional office in Atlanta, Camden (N.J.), Chicago, New York and San Francisco. In Canada, RCA Victor Company, Ltd., Montreal; Europe, RCA International Marketing S.A., Geneva. Look in the white pages of the telephone book under "RCA" for addresses.

RCA Scientific Instruments

This vibrating reed electrometer has greater sensitivity than any device for measuring currents from high-impedance sources.



Buy less, pay later.

As a compact, solid state unit, the CARY 401 has all the capability you'll ever need. Don't settle for less.

Suppose today you're measuring ion transfer, potentials, and resistances across membranes. Or studying molecular systems in biochemistry — steroids, fatty acids, amino acids — by radioactive labeling techniques in conjunction with gas chromatography. Or, possibly, investigating intermediary metabolism and polysaccharide synthesis and degradation. Fine, the 401 will serve your needs.

What about tomorrow? If, for example, you need to detect pH changes as low as 0.0005 pH with glass electrodes. Perform in-vivio respiratory analyses using C^{14} O_2. Maybe even make isotope ratio studies such as in geological age-dating where ion current ratios must be measured to high accuracy. The 401 works perfectly for any of these, too.

Several built-in features enhance the 401's versatility: Critical damping gives fast response; remote switching between three input resistors and remote input shorting provide operator convenience. And the instrument has the ability to measure potentials from grounded or above-ground sources. Additionally, two power modes afford operational freedom — battery cuts-in automatically when line power fails, cuts-out when power resumes.

Then there's the extraordinary sensitivity. More than you'll need in some applications, necessary for others. It detects current less than 10^{-17} ampere, charges as small as 5×10^{-16} coulomb, potentials down to 2×10^{-5} volt, and resistances as high as 10^{16} ohms.

We have an interesting brochure on this electrometer for today and a lot of tomorrows. Write Cary Instruments, A Varian Subsidiary, 2724 S. Peck Road, Monrovia, California 91016. Ask for Data File E707-48.

CARY 401

The new HU-11E: the world's highest resolution electron microscope. It also offers the maximum in operating convenience.

The Hitachi-Perkin-Elmer Model HU-11E has a guaranteed resolution of five Angstroms. Better than 1.5 Angstroms has been demonstrated.

And we've made the HU-11E as automatic and as easy to operate as possible. It's easy to align, easy to compensate, easy to focus. So it's easy to take ultra-high resolution micrographs with it.

For instance, we've incorporated a new electromagnetic gun-tilting device that gives you perfect alignment of the electron gun with respect to the condenser lenses. Plenty of brightness is available at direct magnifications to 300,000X.

Beneath the condensers we've added an exclusive new alignment coil. It keeps the beam centered from the lowest to highest magnifications.

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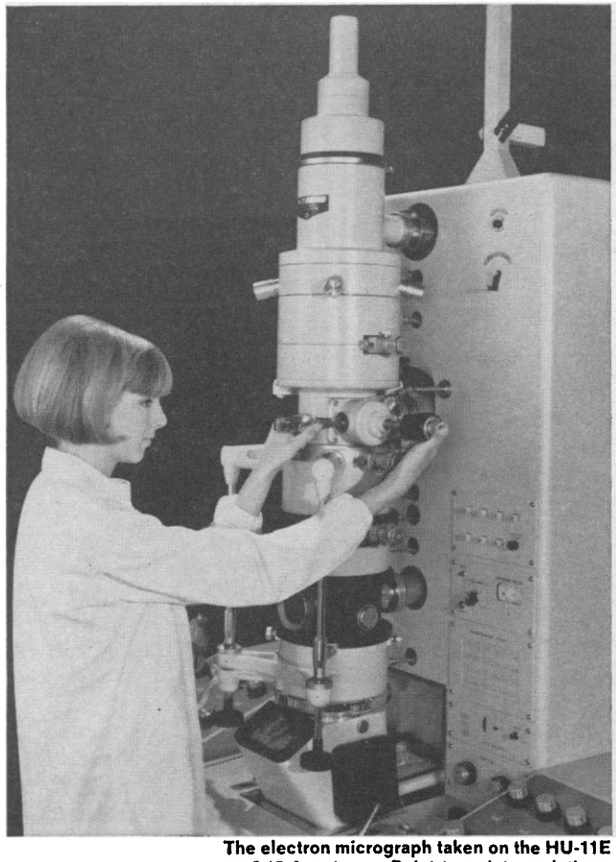

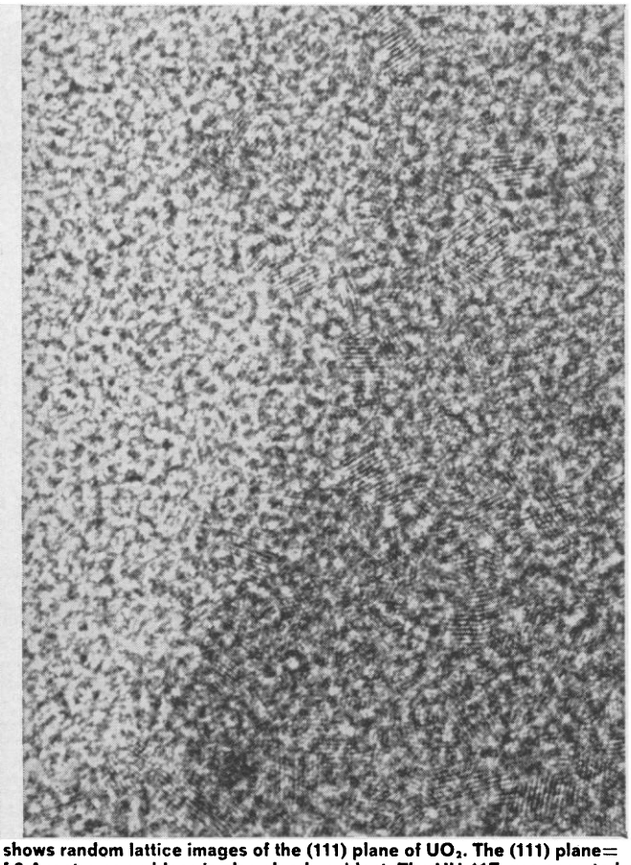

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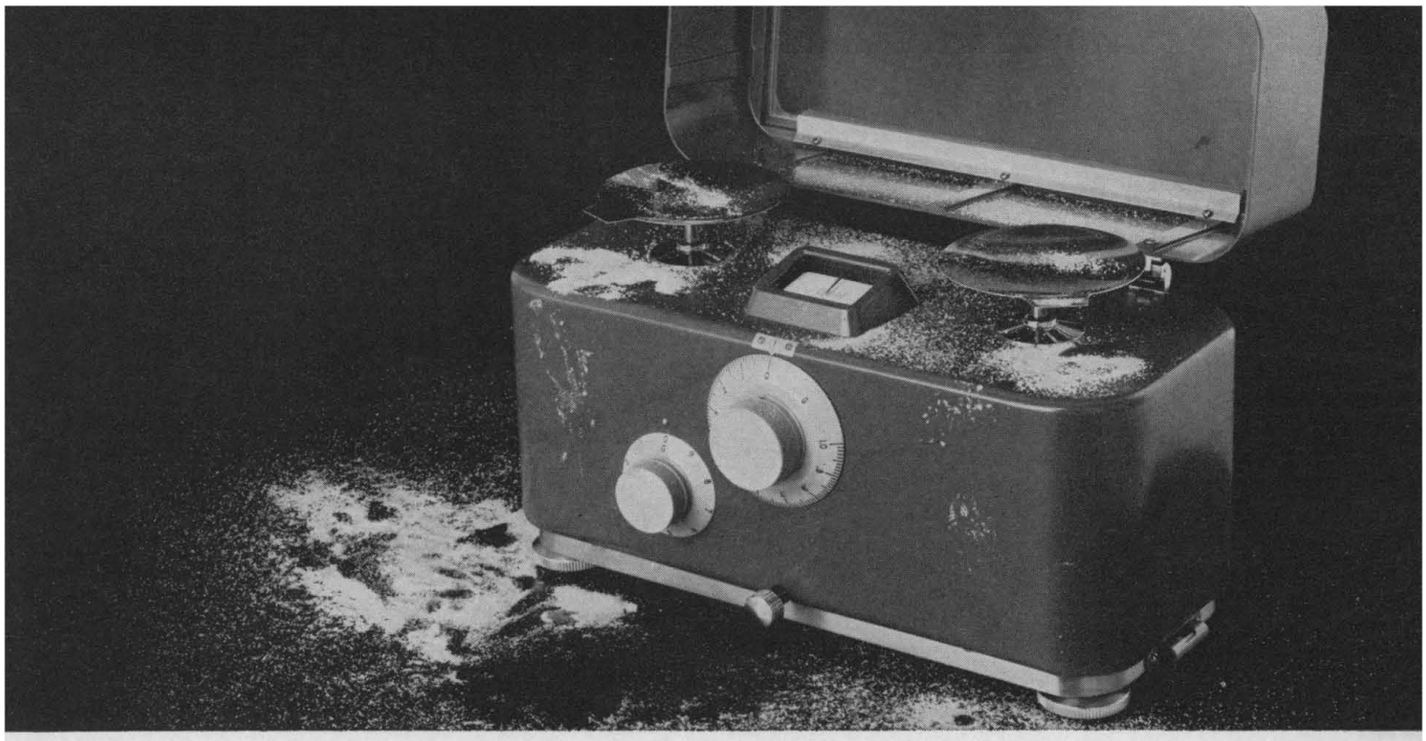

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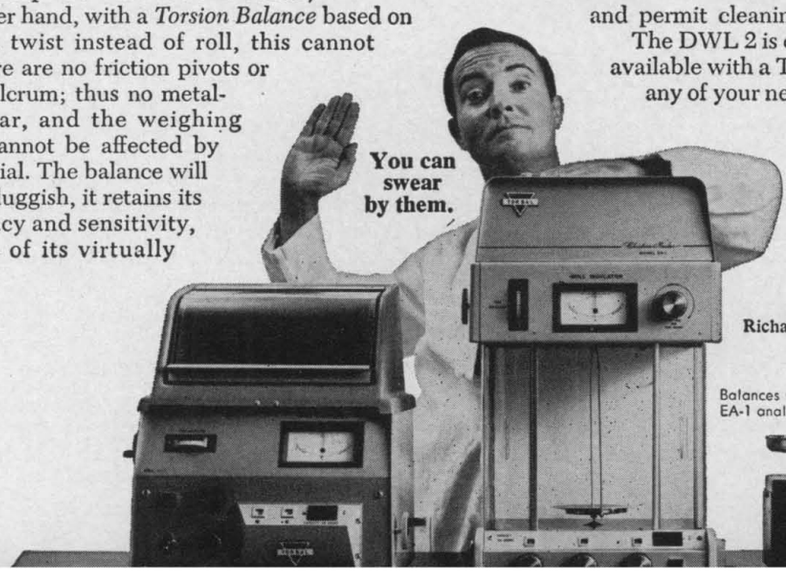

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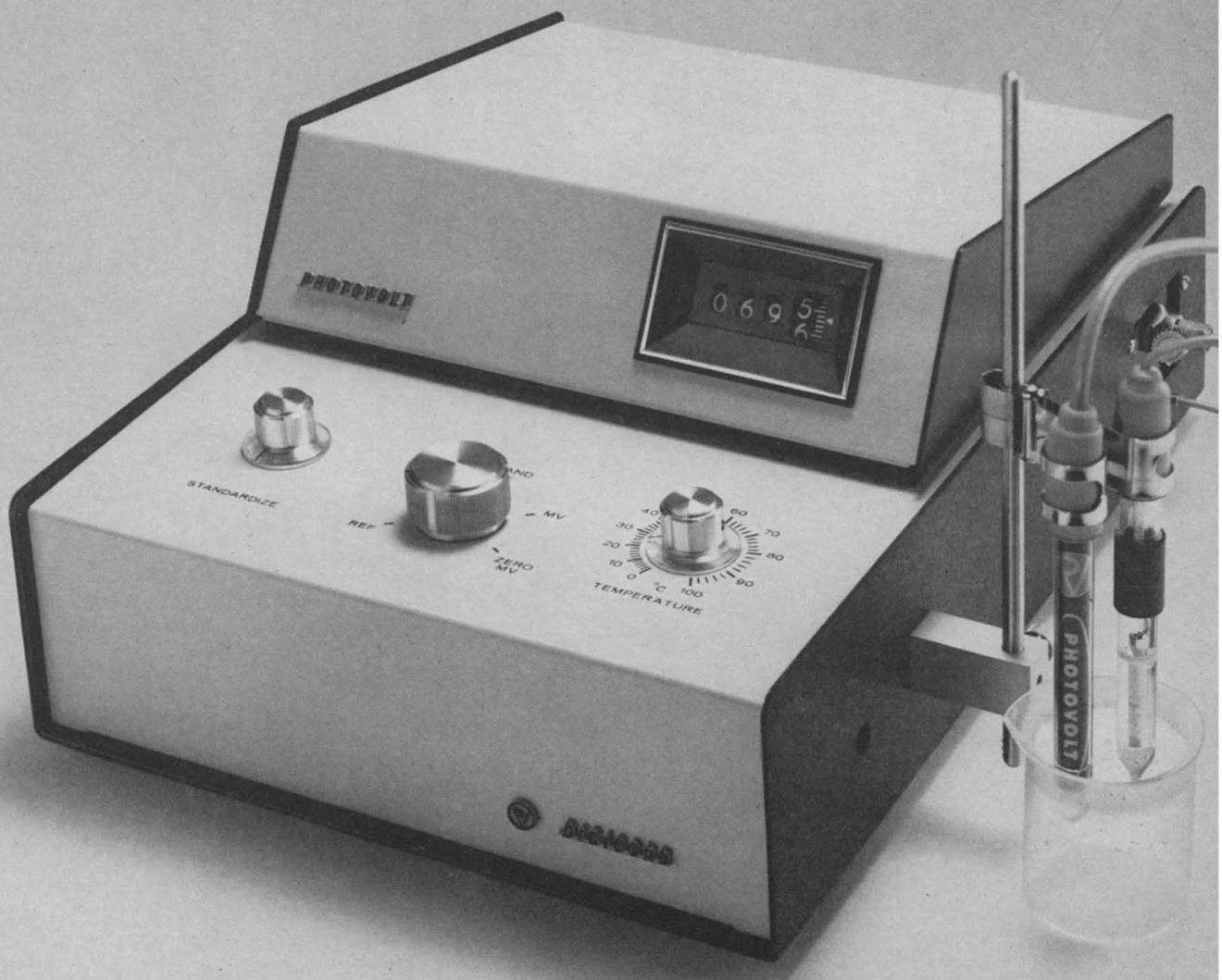

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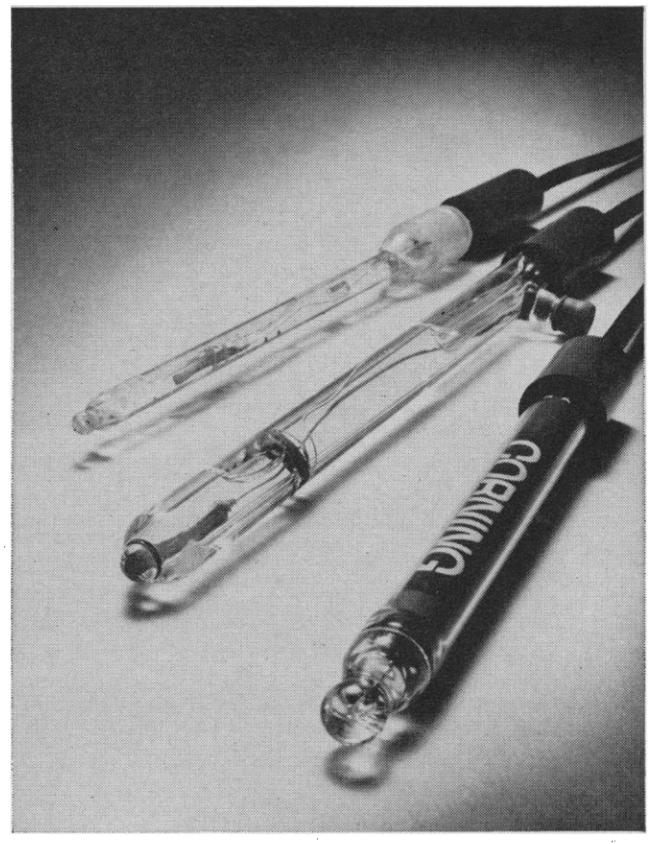

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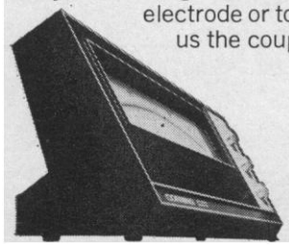

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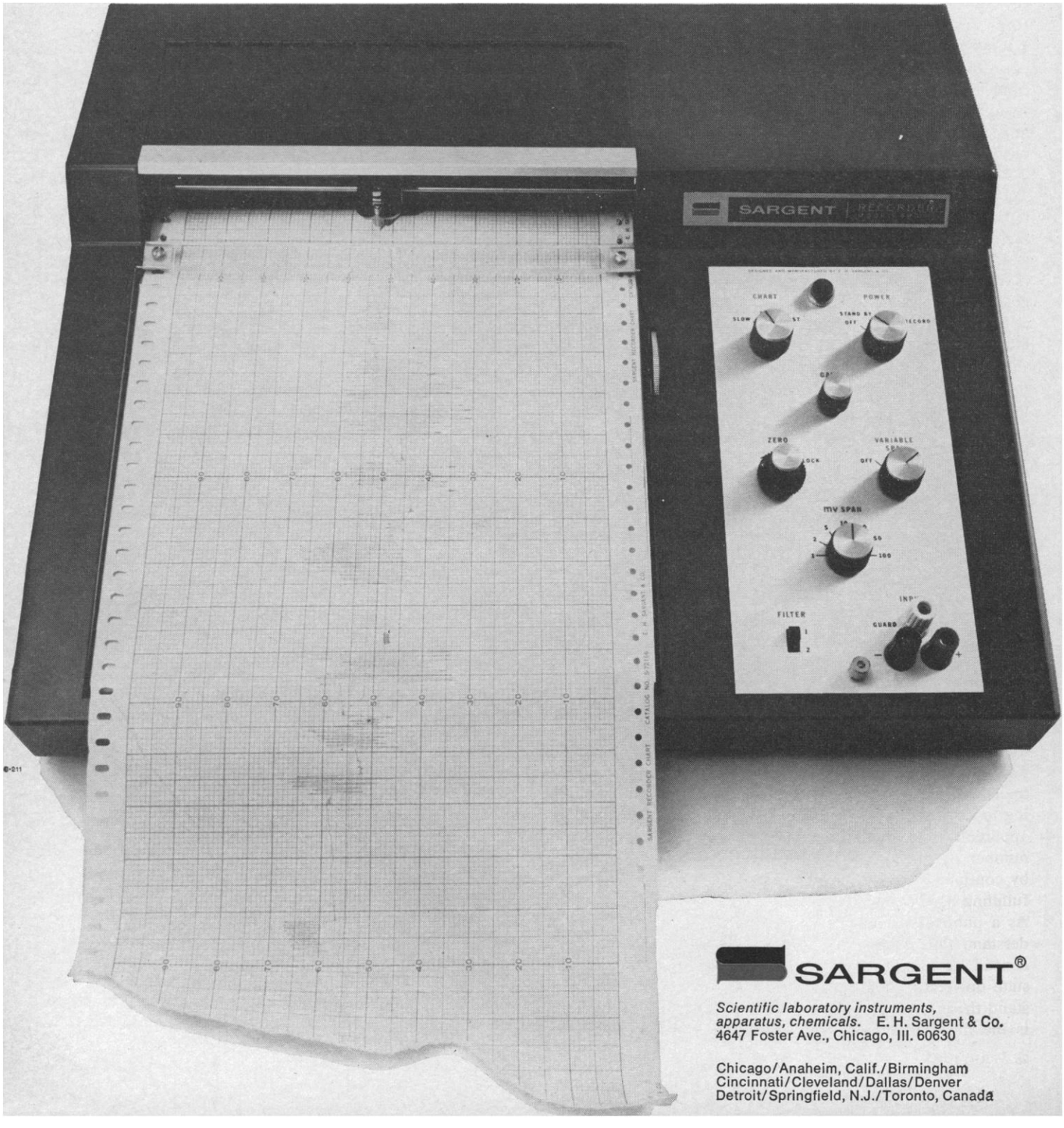

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order of probability with respect to some of the chronic diseases, then dramatic breakthroughs in their elimination are not to be expected.

Control of the factors which exacerbate disease brings us to the second of Rogers' challenges. Will knowledge of the values and goals of societies or subsets of societies lead to public health policies congruent with these goals and values? I doubt it. Controversies over fluoridation, pollution, cigarette advertising, and a number of other problems, some of which were mentioned by Rogers, suggest that the goals and values at different levels of society (individual, family, and various levels of government) and among various groups in society (corporations, professional groups, and so forth) are often basically incompatible. In a democratic society, the multiple allegiance of individuals to a number of these groups is probably one of the basic deterrents to the war of all against all. Health values and goals occupy a variable position in this labyrinth of value and organizational structures. The result may be a uniqueness of each type of health problem which prevents one from developing an overall rational health plan.

There is little doubt that medical sociologists have much to contribute and could make their findings more relevant to clinical medicine and public health. And the pessimism expressed above does not mean that one should not try to accomplish the ends outlined by Rogers. However, as every good scientist knows, one must be prepared for failure.

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Rogers is concerned that public health and medical sociology are frustrated in the absence of a "holistic ecological concept of human organization." Sociology has been, and still remains, primarily an investigative field. It has filled libraries with detailed descriptions (sometimes mathematical) of how man acts or interacts in given situations. The point is, however, that it has never developed a conceptual responsibility of action. It has never set for itself the practical goal of how man should change as part of action to effect change. A "holistic ecological concept of human organization" is a nice academic formulation. In practice, it is

quite utopian. What is needed is a human ecology that is action-oriented—that puts practice as primary. In this context public health fundamentally is practice. The philosophy will emerge only from the experience of action.

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Daly City, California 94015

Medical Research: Fragmented or Goal-Oriented

I agree with Leaf ("Government, medical research, and education," 9 Feb., p. 604) that, in our rush to fund increased application of medical research, we should not allow funding of basic and applied medical research to falter. Not only must this research compete increasingly with other welfare programs, but it becomes increasingly expensive as it becomes more and more complex and detailed; hence the funding should probably accelerate. . . .

Leaf's attack on the awarding of some medical research contracts to industrial research laboratories (as opposed to awarding all research grants and research contracts to universities and university-operated research laboratories) is unwarranted. Has Leaf ever worked in private industry and experienced the freedom of action and goal-oriented programing possible when everybody on a project is working 100 percent of the time on the project, and is not splitting himself up into many little pieces between research, teaching, patient care, committee meetings, seminars, and government consultation? The point Leaf seems to be missing is that some industrial research laboratories are actually better qualified than any university group to do a certain task by virtue of hard-won expertise. After all, it is industry which gives us many of our really great scientific and technological breakthroughs . . . and even some of the medical ones.

HENRY LEE
Epoxylite Corporation,
South El Monte, California 91733

All of us undoubtedly share Leaf's frustrations with the effort report and would welcome its abolition. But even if the report cannot be stopped, at least it could be changed so that it makes sense. Effort reports should have a fourth category, self-education. Tabulated under this heading would be the many hours of the week spent in reading,

listening, and chatting with colleagues and with visitors. After all, the outstanding feature of a great university is that it provides a way of life favoring the activities of self-education, as well as the tools of research. Therefore, granting agencies will not be astonished that self-education is a major and honorable consumer of their investigator's time. The availability of this category will remove a part of the ambiguity and outright dishonesty in filing the effort report.

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New York University Medical Center,
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Subpoenas: Show Probable Cause

Readers of *Science*, including especially Stamler and Hall ("Un-American activities: Court rule aids Stamler in contempt case," 1 Dec., p. 1249) and Glass and Pond (Letters, 1 Mar.), may be interested in a "Note" in the *Minnesota Law Review* [**52**, 665 (1968)] entitled "The application of the Fourth Amendment to congressional investigations." Brief excerpts will suffice:

It is suggested that the (Supreme) Court should require a showing of probable cause, as required by the fourth amendment, before allowing the issuance of a subpoena requiring an appearance before a congressional investigation.

The whole philosophical basis for the fourth amendment's protection against searches and seizures without probable cause is the notion that the individual has the right to keep the affairs of his life private. While this right is admittedly not absolute . . . it is a right so basic to our concept of limited government that it should not be lightly disregarded.

Furthermore, the right of privacy must protect the individual's mind as well as his possessions. The Court has protected certain contents of the mind from governmental invasions in criminal proceedings under the fifth amendment. However, the basic recognition that a person's mind is his most sacred possession and should be accorded the greatest protection from governmental invasion is equally applicable to all forms of governmental action. Moreover, the individual's mind should be accorded as much, if not more, protection than his possessions for he therein keeps his most private possessions—his memory and his thoughts.

The protection which this requirement would afford the witness, in comparison with the burden it imposes upon Congress, is significant. The individual will be able to force investigators to show reason to believe that he will be able to provide useful information before they can interrupt this life. This will force the investigation to

evaluate its need for his testimony before going to the trouble of subpoenaing him. Once subpoenaed, the individual will have a basis upon which to contest his duty to testify. He will not have to risk criminal prosecution in order to contest this duty for he will be able to challenge the probable cause for his subpoena prior to testifying. If the court finds that the individual does have a duty to testify, he will either have to rely on the fifth amendment, risk criminal prosecution for contempt, or provide the information required.

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Laboratory of Physiological Hygiene, University of Minnesota, Minneapolis

A Just View of Systematics

When a systematist talks to his own set, a congratulatory tone is expected. But publication of Mayr's address, "The role of systematics in biology" (*1*), exposing it to the nonsystematic public, irresistibly invites a rejoinder! Systematists may not have received due credit for their great contributions to biology but neither perhaps have they got just treatment for abetting biologists in the mistaken belief that taxonomic aggregates, such as populations, are substantial objects-in-nature.

Every ecologist, for example, who sets it down in chapter one that *population and community* are levels-of-integration (and hence "systems") comparable in status to, though midway in complexity of organization between, individual organisms and individual ecosystems is a victim of taxonomy. The levels-of-integration that are demonstrable in nature and those that exist in the minds of systematists are rarely if ever discriminated. Some of the resulting problems were adumbrated in Ehrlich and Holm's article "Patterns and populations" (*2*) where the authors wrote (unfortunately at the end rather than at the beginning): "The basic units of population biology (*sic*) are not communities, species or even populations, but individual organisms," and in a footnote that should be pondered: ". . . if historically we had begun to think about biology in ecological rather than taxonomic terms we would now deal with biological 'facts' very differently."

J. S. ROWE
Department of Plant Ecology, University of Saskatchewan, Saskatoon, Canada

References

1. E. Mayr, *Science* **159**, 595 (1968).
2. P. R. Ehrlich and R. W. Holm, *ibid.* **137**, 652 (1962).

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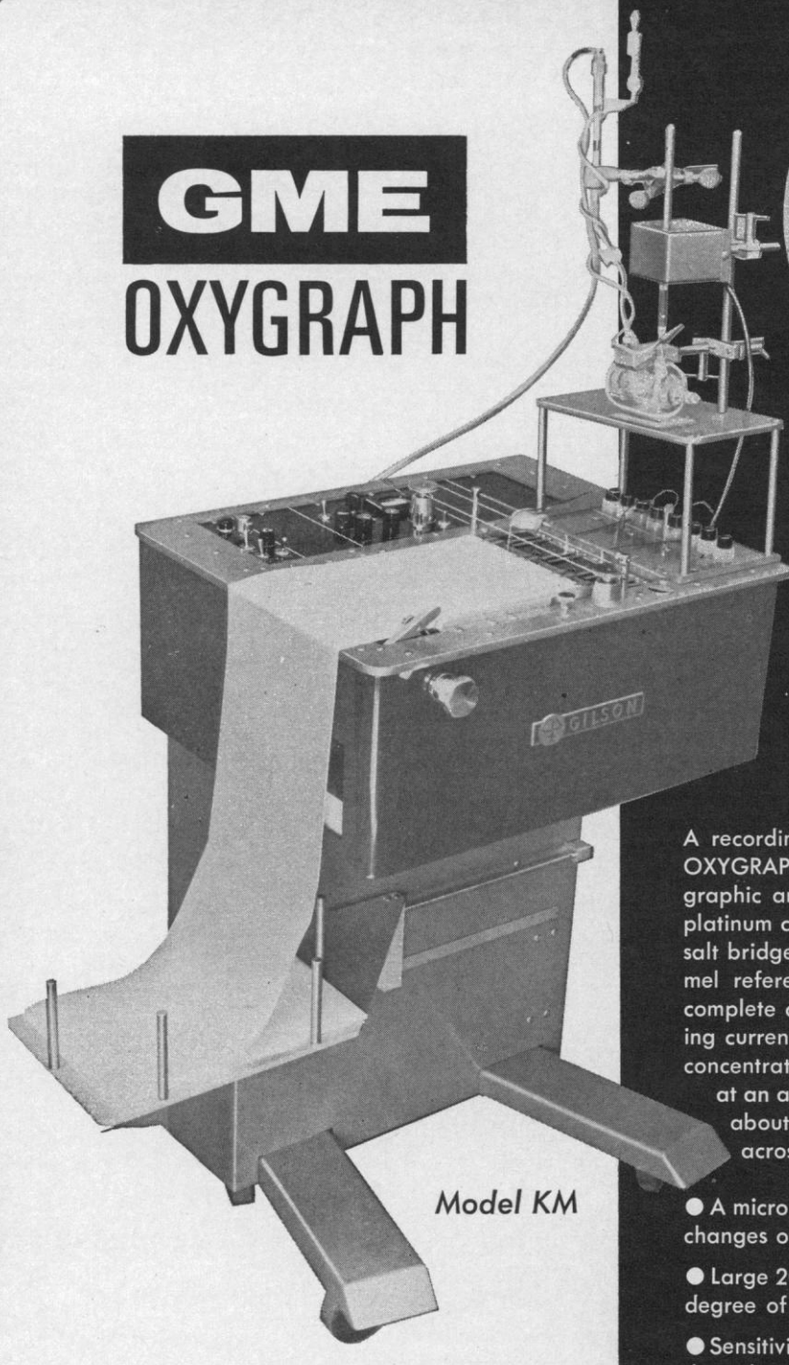

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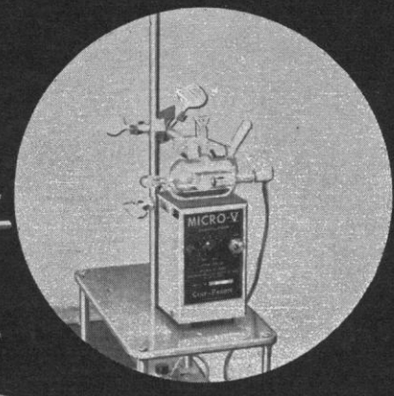

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Universities and the Technology Gap

In a provocative and sure-to-be controversial analysis* of the origins of what has come to be called the technology gap, Professor Joseph Ben-David of Israel last month told the ministers of science of the OECD countries that the gap began around the turn of this century, and began in the universities. American university departments could keep pace with science and its applications because their flexibility of organization allowed them to follow up on the implications and ramifications of new developments. European universities, being bound by tradition and centralized authority, remained frozen in the 19th-century mode. German universities continued the system that had earlier served them so remarkably well: a professorial chair, an associated institute, and a few assistants and *Privatdozenten*. British universities were somewhat freer, for they were more influenced by the American pattern, but in France the only changes were those aimed "at incorporating the by then obsolete German experience."

The key to the American success is what Ben-David calls the entrepreneurial system. The way to maximize the practical uses of science "is not by trying to guess in advance (and in vain) what will be useful, but by developing science according to its immanent potentialities (as perceived by the scientific community) and by subsequently exploiting the scientific findings through imaginative enterprise for whatever purposes they may be useful."

And the way to encourage practical, imaginative enterprise is "by increasing the density of both . . . [fundamental and practical work] and the velocity of the circulation of ideas and problems from both areas of activity in spaces which ensure interaction."

The best "spaces" for ensuring interaction between fundamental science and practical problems are large, complex universities and large, multipurpose research institutions, in either of which there is a mixture of basic and applied interests. The United States has many such places; Europe has few. Ben-David thinks the number could be increased through more effective use of whatever funds a central government can put into higher education and research. Most of his recommendations were directed at Europe, but his recommendations for getting maximum value from the money a national government can provide for higher education and university research are worth considering here. This is what he proposes:

1) Money for higher education should be allotted among universities in proportion to the number of students.

2) Part of the money for research should be granted to universities competitively, on the basis of their overall research attainment during, say, the preceding 5 years.

3) The remaining research money should be granted competitively for individual projects.

4) To foster competition and cooperation among institutions and mobility and interchange of individuals—all of which increase the velocity of interchange of ideas and problems—the universities should be free to use funds in categories 1 and 2 as their own judgment determines.

The prescription is partly based on the success of American practices and experience, but, except for item 3, it goes beyond our standard practice in decentralization of responsibility. In suggesting to European governments a means to narrow the gap, Ben-David has also offered the U.S. Government a challenging prescription for getting greater returns from the monies it invests in higher education and university research.

—DAEL WOLFLE

* J. Ben-David, *Fundamental Research and the Universities* (Organisation for Economic Co-operation and Development, Paris, 1968).

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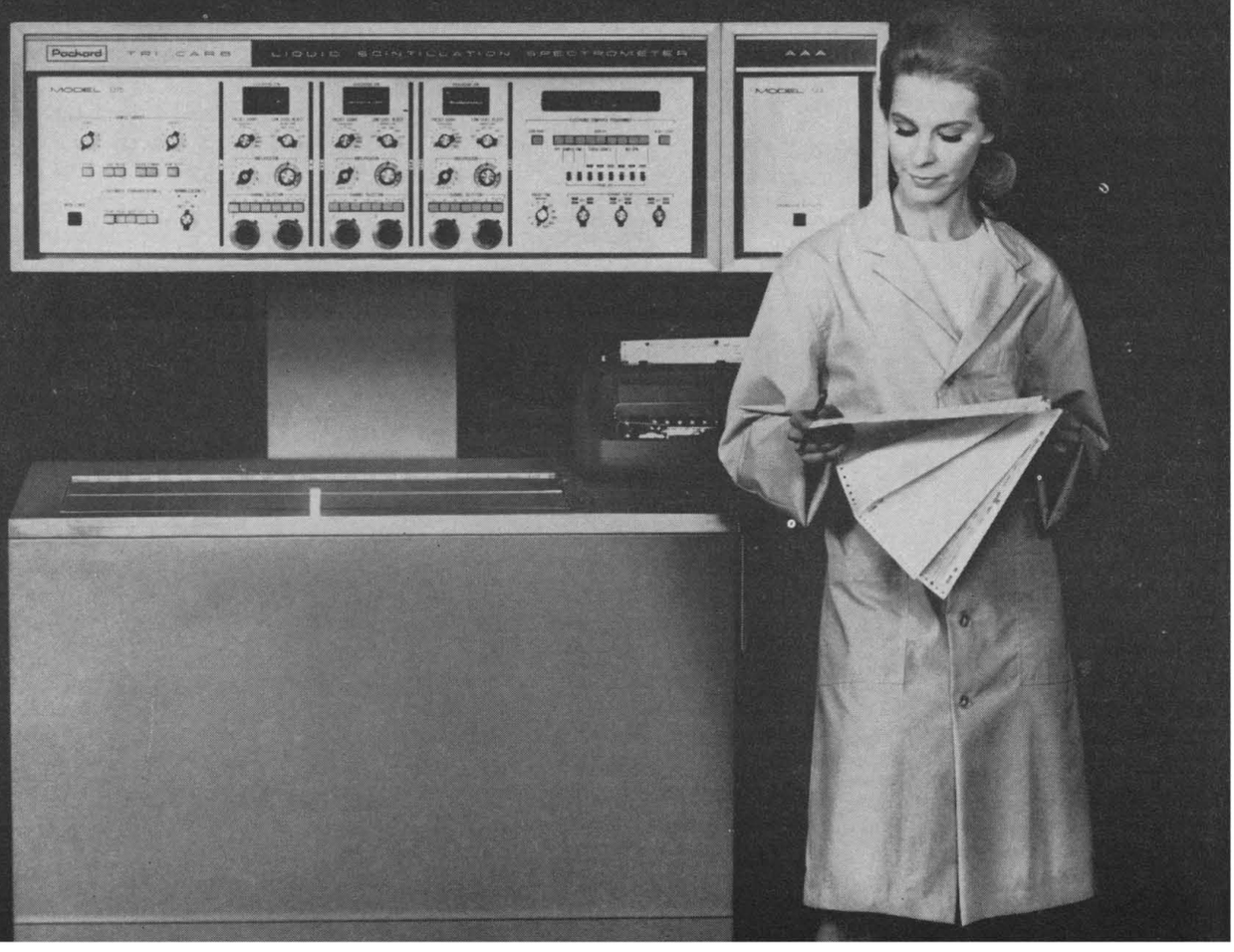


relations for organomercuric compounds and on the mechanism of fungicidal action. The action of two fungicidal organophosphorus compounds useful in rice blast control, *O,O*-diethyl and *O,O*-diisopropyl *S*-benzyl phosphorothiolates, was reported by M. Kado (Ihara Chemicals Co., Shimizu, Shizuoka). Pentachlorobenzyl alcohol is highly active for rice blast control; it specifically prevents penetration of hyphae into leaves but fails to control other plant diseases. M. Ishida (Sankyo Co., Tokyo) reported that, when pentachlorobenzyl alcohol-C^{14} is administered orally to rats in metabolism studies, the unchanged compound is excreted in the feces, and pentachlorobenzoic acid and the β-glucuronide of pentachlorobenzyl alcohol appear in urine.

Strychnine nitrate is potentially useful for control of brown bears, which frequently are a pest in Hokkaido; it is metabolized in the bear so that toxic products do not persist in the meat (T. Inukai, Hokkaido University, Sapporo).

Insecticide metabolism and mode of action were the major topics of discussion. The general steps involved in radiotracer studies on insecticide action include (i) selection of the site of radiolabeling, (ii) performing the radiosynthesis, (iii) introduction of the labeled compound into an appropriate biological system or degradation situation, (iv) determination of the chemical and physical fate of the compound, and (v) interpretation of the results in relation to the mechanism, selectivity, and efficiency of action of the insecticide chemical (J. Casida, University of California, Berkeley). The toxicity of nicotinoids is conferred by the highly basic nitrogen, a carbon-atom bridge, and the pyridine ring (I. Yamamoto, Tokyo University of Agriculture, Setagaya, Tokyo). Studies on structure-activity relations and metabolism of pyrethroids and rotenoids were also reviewed. Detoxification primarily involves initial oxidation of one methyl group in the isobutenyl moiety of pyrethroids and of the isopropenyl group of rotenone.

Specificity in cholinesterase inhibition and in detoxification are factors contributing to the selective toxicity of *O,O*-dimethyl trichlorohydroxyethyl- and dichlorohydroxyethyl phosphonates and related compounds (T. Saito, Nagoya University). The type of biological activity of saligenin cyclic phosphorus esters is remarkably affected by the exocyclic substituent group on the phosphorus (M. Eto, Kyushu Univer-

sity). The inhibitor specificity for target esterases is also greatly influenced by steric factors resulting from varying the size of the exocyclic substituent group, although the reactive site with the esterase is probably, in all cases, the enolic ester portion of the hetero ring.

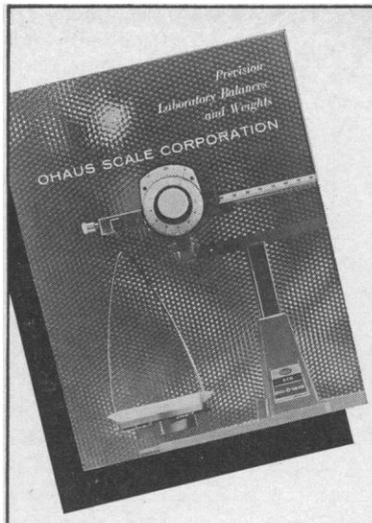
Toxicity of certain organophosphorothionates to mammals is antagonized by compounds that induce microsomal enzymes; these enzymes catalyze detoxification reactions, particularly phosphorothionate cleavages (S. Murphy, Harvard University School of Public Health, Boston). Increased activity of liver A-esterase and of liver and plasma aliesterase, in response to certain drugs, may result in additional sites for reaction with the esterase inhibitors, thus sparing the more vital target enzyme, acetylcholinesterase. Organophosphorus esters potentiate malathion and dimethoate if, at low doses, they inhibit carboxyesterases and carboxyamidases in species in which these pathways of detoxification are critical. According to K. Fukunaga (National Institute of Agricultural Sciences and Institute of Physical and Chemical Research, Tokyo), soluble enzymes from mammalian liver and insect fat body and midgut, which require reduced glutathione for activity, may contribute to the selective toxicity of *O,O*-dimethylphosphorothionates by virtue of their *O*-demethylation activity. Pathways for diazinon metabolism by oxidation, hydrolysis, and conjugation reactions were defined by in vitro studies with enzyme preparations from rats and American cockroaches. Studies with insect microsomal enzymes, which oxidize many insecticides, are limited by natural inhibitors of the enzymes released during homogenization. The mechanism of low mammalian toxicity of sumithion, as compared with methyl parathion, was discussed by J. Miyamoto (Sumitomo Chemical Co., Osaka). Differences in metabolism by pathways involving phosphorothionate oxidation, hydrolysis, and *O*-demethylation probably do not play a major role in the selective toxicity of the two compounds. The low toxicity of sumithion probably results, in part, from the relatively poor penetration of sumioxon into the brain compared to that of methyl paraoxon and, as a result, there is a lower degree of brain cholinesterase phosphorylation in the case of sumioxon.

Acetylcholinesterase from housefly heads differs from that purified from vertebrate sources in hydrolyzing butyrylcholine as well as acetylcholine

(C. Kearns, University of Illinois, Urbana). Chromatography of diethylaminoethyl-cellulose partially resolves the fly preparation into two fractions, which differ in extent of activation by butanol and in the ratio of activity on acetyl- and butyrylcholine. Nerve components from insects and mammals were also considered with respect to the binding of various insecticides. Data were presented on the marked differences in binding of dieldrin, DDT, BHC, phthalthrin, and nicotine to nerve components which were prepared and separated centrifugally from rat brain, and from axonic and ganglionic portions of cockroach nerve cords (F. Matsumura, University of Wisconsin, Madison). Electrophysiological approaches (involving arthropod nerve preparations) to the mode of action of insecticides were discussed by T. Narahashi (Duke University Medical School, Durham, North Carolina). The voltage-clamp method proved highly successful in analyzing the actions of DDT and allethrin. DDT delays the turning-off process of peak sodium current and suppresses steady-state potassium current. Allethrin suppresses both peak sodium and steady-state potassium currents from either side of the nerve membrane and it also delays the turning-off process of peak sodium current when applied internally.

Insecticide resistance mechanisms in houseflies in relation to biochemical genetics were reviewed by M. Tsukamoto (Nagasaki University). The linkage-group distribution of major insecticide resistance factors was defined and the importance of factors on each of the 2nd, 3rd, 4th, and 5th chromosomes was emphasized. Enzymes involved in insecticide metabolism, including DDT-dehydrochlorinase, organophosphate-detoxifying esterases, and mixed functional oxidases of microsomes depend on factors present on the 5th chromosome. A factor on the 2nd chromosome confers low nerve sensitivity to DDT.

A relation was reported between electronic and hydrophobic characters of substituents and the activity of substituted phenols causing chlorosis in *Lemna minor* (T. Fujita and M. Nakajima, Kyoto University). The results suggest action or factors limiting the action, such as a one-step partitioning involving adsorption of the molecule to the cell surface. With regard to organophosphorus insecticides, there is good correlation between anticholinesterase activity and reactivity of the phosphorus ester, as determined by such parameters



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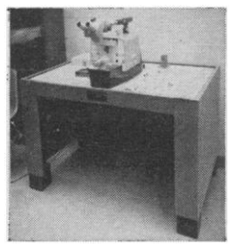

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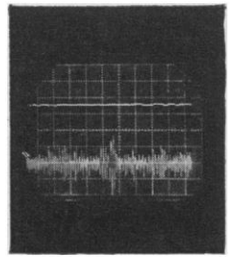
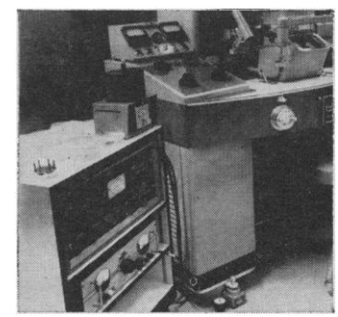


Unretouched comparison of the typical dynamic motion of a floor (lower trace) versus the response of a mass supported on a Serva-Levl system (upper trace).



Our Bulletin 7 goes into the details in depth, although not as well as one of our Field Engineers can. Whichever one you would like to see is readily available. Just call or write us.

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as hydrolysis and solvolysis, Hammett's sigma constants, and shifts in infrared absorption (T. Fukuto, University of California, Riverside). Improved correlations result from taking steric factors into account. Additional effects are: (i) the stereospecificity in cholinesterase inactivation associated with an asymmetric center, and (ii) the possible contribution to selective toxicity of the significant structural difference between insect and mammalian enzymes. Absorption phenomena on the surface of insects and considerations of insecticide chemical transport into the body were discussed by M. Suwanai (Tokyo University of Agriculture and Technology, Fuchu, Tokyo). A method for calculating the rate of insecticide action based on kinetic and diffusion equations was illustrated.

The papers presented at the Nikko seminar are scheduled for publication as a separate volume of the international book series, *Residue Reviews*, edited by F. Gunther and published by Springer-Verlag New York, Inc.

Both Japan and the United States were among the first to recognize certain serious problems resulting from the adverse effects on animals and plants arising from the rapidly increasing use of pesticides. Cooperation between the two countries can accelerate a solution to problems arising from contamination by pesticides.

J. E. CASIDA
Division of Entomology, University of California, Berkeley

K. FUKUNAGA
National Institute of Agricultural Sciences and *Institute of Physical and Chemical Research, Tokyo, Japan*

Calendar of Events

May

National Meetings

3–4. **Physical Medicine and Rehabilitation**, Northwest Assoc., Palo Alto, Calif. (J. C. Montero, Div. of Rehabilitation Medicine, Stanford Univ. School of Medicine, Palo Alto 94394)

3–4. Society for **Pediatric Research**, Atlantic City, N.J. (Secretary, The Society, % Dept. of Pediatrics, J. H. Miller Health Center, Univ. of Florida, Gainesville, Fla.)

3–5. **Parts, Materials, and Packaging** Technical Conf., Washington, D.C. (W. Hepner, Electronic Industries Assoc., 2001 Eye St., NW, Washington, D.C. 20006)

4. American Society for **Clinical Nutrition**, Atlantic City, N.J. (A. B. Eisenstein, Secretary-Treasurer, The Society, 818 S. Meramec Ave., St. Louis, Mo. 63105)

4–5. **Economics and Evaluation** Symp.,

Dallas, Tex. (J. A. Chrichton, 1100 Vaughan Bldg., Dallas 75201)

4–9. American Soc. of **Planning Officials**, natl. planning conf., San Francisco, Calif. (The Society, 1313 E. 60 St., Chicago, Ill. 60637)

5. American Federation for **Clinical Research**, annual mtg., Atlantic City, N.J. (J. E. Bryan, Executive Secretary, AFCR, 2000 P St., NW, Washington, D.C. 20036)

5–7. American Assoc. of **State Geologists**, 60th annual, Tuscaloosa, Ala. (T. A. Simpson, Assistant State Geologist, Geological Survey of Alabama, P.O. Drawer O, University 35468)

5–8. American Inst. of **Chemical Engineers**, 64th natl., Tampa, Fla. (R. W. Fahien, Univ. of Florida, Gainesville)

5–8. **Industrial Research** Inst., Boca Raton, Fla. (G. W. McBride, Secretary-Treasurer, The Institute, 100 Park Ave., New York 10017)

5–8. American Soc. of **Lubrication Engineers**, annual mtg., Cleveland, Ohio. (D. B. Sanberg, Executive Secretary, The Society, 838 Busse Highway, Park Ridge, Ill. 60068)

5–8. American Soc. of **Maxillofacial Surgeons**, annual mtg., Philadelphia, Pa. (D. Goulian, Jr., Executive Secretary, The Society, 116 E. 68 St., New York 10021)

5–9. American Soc. of **Brewing Chemists**, annual mtg., St. Paul, Minn. (B. A. Burkhart, Executive Secretary, The Society, 501 N. Walnut St., Madison, Wis. 53705)

5–9. American Soc. for **Microbiology**, 68th annual, Detroit, Mich. (Executive Secretary, The Society, 115 Huron View Blvd., Ann Arbor, Mich.)

5–9. **Electrochemical** Soc., Inc., 133rd natl., Boston, Mass. (The Society, 30 E. 42 St., New York 10017)

5–10. American **Pharmaceutical** Assoc., Miami Beach, Fla. (G. B. Griffenhagen, Director, Division of Communications, The Association, 2215 Constitution Ave., NW, Washington, D.C. 20037)

5–10. Society of **Plastics Engineers**, 26th annual technical conf., New York, N.Y. (R. D. Forger, Director of Memorial Activities, 65 Prospect St., Stamford, Conn. 06902)

6. **Clinical Investigation**, annual mtg., Atlantic City, N.J. (D. S. Fredrickson, National Heart Inst., Bethesda, Md. 20014)

6–7. **Human Factors in Electronics**, symp., Washington, D.C. (R. M. Emberson, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

6–7. Institute on **Lake Superior Geology**, 14th annual, Superior, Wis. (A. B. Dickas, Dept. of Geology, Wisconsin State Univ., Superior)

6–8. American **Public Power** Assoc., annual conf., Seattle, Wash. (The Association, Suite 830, 919 18th St., NW, Washington, D.C. 20006)

6–8. American Soc. for **Quality Control** 22nd annual technical conf. and exhibit, Philadelphia, Pa. (R. W. Shearman, The Society, 161 W. Wisconsin Ave., Milwaukee, Wis.)

6–8. Cine Angiographic Techniques in **Cardiovascular Pulmonary Diseases**, Cleveland, Ohio. (H. L. Kruse, Executive Assistant, American College of Chest Physicians, 112 E. Chestnut St., Chicago, Ill.)

6–8. **Coding Theory**, symp., Madison, Wis. (H. B. Mann, Mathematics Research Center, Univ. of Wisconsin, Madison)

6–9. **Aerospace Medical** Assoc., 39th annual science mtg., Miami Beach, Fla. (W. J. Kennard, Washington National Airport, Washington, D.C. 20001)

6–9. **Aerospace Meteorology**, 3rd conf., New Orleans, La. (K. C. Spengler, American Meteorological Soc., 45 Beacon St., Boston, Mass. 02108)

6–9. American College of **Obstetricians and Gynecologists**, Chicago, Ill. (M. Newton, 79 W. Monroe St., Chicago 60603)

6–9. **Civil Aviation Medical** Assoc., annual mtg., Miami Beach, Fla. (W. Gillespie, The Association, 3720 Washington St., St. Louis, Mo. 63108)

6–9. American Soc. of **Mechanical Engineers**, Fluids Engineering Div., Philadelphia, Pa. (Meetings Manager, The Society, 345 E. 47 St., New York 10017)

6–9. Soc. of **Aeronautical Weight** Engineers, natl. conf., New Orleans, La. (N. J. Carraway, Box 60024, Terminal Annex, Los Angeles, Calif. 90054)

7–8. Association of **American Physicians**, annual mtg., Atlantic City, N.J. (E. Stead, Jr., Executive Secretary, The Association, Duke Hospital, Durham, N.C.)

7–9. **Industrial and Commercial Power Systems**, technical conf., St. Louis, Mo. (Inst. of Electrical and Electronics Engineers, Office of the Technical Activities Board, 345 E. 47 St., New York 10017)

7–9. Purdue **Industrial Waste** Conf., Lafayette, Ind. (D. E. Bloodgood, Civil Engineering Bldg., Purdue Univ., Lafayette 47907)

7–9. Soc. of **Aerospace Material and Process Engineers**, 13th natl. symp., Chicago, Ill. (P. Fina, 222 Scottswood Drive, Riverside, Ill.)

7–10. Society of **Experimental Stress Analysis**, spring mtg., Albany, N.Y. (B. E. Rossi, Executive Secretary, 21 Bridge Sq., Westport, Conn. 06880)

8–10. American Assoc. of **Genitourinary Surgeons**, annual mtg., Ponte Vedra, Fla. (H. M. Spence, Executive Secretary, The Association, 4105 Live Oak St., Dallas, Tex. 75221)

8–10. American **Helicopter** Soc., 24th annual natl. forum, Washington, D.C. (H. M. Lounsbury, Executive Secretary, 141 E. 44 St., New York 10017)

8–10. **Electronic Components**, technical conf., Washington, D.C. (W. Hepner, Electronic Industries Assoc., 2001 Eye St., NW, Washington, D.C. 20006)

9. Recent Significant **Developments in Medicine and Surgery**, John F. Kennedy symp., Boston, Mass. (E. G. Toomey, Concord Medical Center, Concord, Mass.)

9–10. American **Chemical** Soc., central regional, Akron, Ohio. (G. Brown, Dept. of Chemistry, Kent State Univ., Kent, Ohio)

9–10. The **Child with Heart Disease**, Richmond, Va. (W. D. Nelligan, Executive Director, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

9–11. **Anesthesiology**, midwest conf., Chicago, Ill. (A. P. Winnie, Illinois Soc. of Anesthesiologists, 1825 W. Harrison St., Chicago 60612)

9–11. Society of **American Archeology**, 33rd annual, Sante Fe, N.M. (Museum of New Mexico, P.O. Box 2087, Sante Fe 87501)

9–11. American Inst. of **Industrial Engineers**, Tampa, Fla. (R. C. Hutchinson, IMC, Box 867, Bartow, Fla.)

10–11. **Arizona Acad. of Science**, Flagstaff. (K. E. Bean, Faculty Box 4058, Northern Arizona Univ., Flagstaff 86001)

10–11. Association of **University Radiologists**, Columbus, Ohio. (S. Rogoff, Dept. of Radiology, Univ. of Rochester Medical School, Rochester, N.Y. 14620)

10–13. American **Psychoanalytic** Assoc., Boston, Mass. (H. Fischer, The Association, 1 E. 57 St., New York 10022)

11. Kroeber **Anthropological** Soc., 12th annual, Berkeley, Calif. (A. J. Almquist, Dept. of Anthropology, Univ. of California, Berkeley 94720)

12–16. American Assoc. of **Orthodontists**, San Francisco, Calif. (J. E. Brophy, Executive Secretary, 7477 Delmar Blvd., St. Louis, Mo. 63130)

12–16. Technical Assoc. of the **Pulp and Paper** Industry, 19th coating conf., Miami Beach, Fla. (D. Most, Box 542, Marblehead, Mass.)

12–17. **Mass Spectrometry**, 16th annual conf., Pittsburgh, Pa. (J. L. Franklin, Dept. of Chemistry, Rice Univ., Houston, Tex. 77001)

13–15. **Aerospace Electronics**, natl. conf., Dayton, Ohio. (Inst. of Electrical and Electronics Engineers, Dayton Office, 1220 E. Third St., Dayton 45402)

13–15. American **Astronomical** Soc., 14th annual, Dedham, Mass. (J. Crone, Northrop-Nortronics, 100 Morse St., Norwood, Mass.)

13–15. **Power Instrumentation** Symp., 11th natl., Chicago, Ill. (R. K. LaCrosse, Sargent and Lundy, 140 S. Dearborn St., Chicago 60603)

13–16. Corporate **Aircraft Safety** Seminar, Chicago, Ill. (C. Etnyre, Director of Special Affairs, Flight Safety Foundation, 468 Park Ave., S., New York 10016)

13–17. American College of **Psychiatrists**, Boston, Mass. (J. M. Myers, American College of Psychiatrists, 111 N. 49 St., Philadelphia, Pa. 10139)

13–17. American **Industrial Hygiene**, conf., St. Louis, Mo. (G. D. Clayton, Executive Secretary, The Association, 14125 Prevost St., Detroit, Mich.)

13–17. American **Nurses** Assoc., Dallas, Tex. (A. R. Warner, Director, PR Program, 10 Columbus Circle, New York 10019)

13–17. **Environmental Engineering** Conf., Chattanooga, Tenn. (W. H. Wisely, American Soc. of Civil Engineers, 345 E. 47 St., New York 10017)

13–17. Soc. for **Applied Spectroscopy**, 7th natl., Chicago, Ill. (J. W. Burroughs, % Borg-Warner Corp., R. C. Ingersoll Research Center, Wolf and Algonquin Rds., Des Plaines, Ill. 60018)

14. **Heart Sounds and Murmurs**, Loma Linda, Calif. (W. D. Nelligan, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

14–16. **Power Sources** Conf., 22nd annual, Atlantic City, N.J. (H. W. Schwartz, Power Sources Div., AMSEL-KL-PT, Fort Monmouth, N.J. 07703)

14–18. American Assoc. for **Contamination Control**, 7th annual technical mtg. and exhibit, Chicago, Ill. (W. T. Maloney, Executive Secretary, Suite 620, 6 Beacon St., Boston, Mass. 48201)

14–18. **Armed Forces Communications and Electronics** Assoc., 22nd annual conv.,

Washington, D.C. (W. J. Baird and J. H. Shreve, The Association, 1725 Eye St., NW, Washington, D.C. 20006)

15. American Soc. for **Gastrointestinal Endoscopy**, annual mtg., Philadelphia, Pa. (B. H. Sullivan, Jr., The Society, 2020 E. 93 Street, Cleveland, Ohio 44106)

15–16. American **Urological** Assoc., Miami Beach, Fla. (W. P. Didusch, Executive Secretary, The Association, 1120 N. Charles St., Baltimore, Md.)

15–17. American **Petroleum** Inst., Div. of Refining, 33rd midyear mtg., Philadelphia, Pa. (R. R. Wright, The Institute, 1271 Ave. of the Americas, New York 10020)

15–17. **Pulp and Paper**, 14th conf., Milwaukee, Wis. (Inst. of Electrical and Electronics Engineers, Office of the Technical Activities Board, 345 E. 47 St., New York 10017)

15–17. **Treatment of Myocardial Infarction**, Atlanta, Ga. (W. D. Nelligan, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

15–18. American **Gastroenterological** Assoc., annual mtg., Philadelphia, Pa. (H. D. Janowitz, % Mt. Sinai Hospital, 11 E. 100 St., New York 10029)

15–18. **Neurosurgical** Soc. of America, annual mtg., San Francisco, Calif. (C. H. Davis, Jr., Bowman Gray School of Medicine, Winston-Salem, N.C. 27103)

16–17. **Metallurgical** Soc., 22nd New England regional conf., Hartford, Conn. (J. V. Richard, The Society, 345 E. 47 St., New York 10017)

16–17. Southern **Textile Research** Conf., Hilton Head Island, S.C. (E. E. St. Louis, % Astro Chemical Corp., 1613 E. North St., Greenville, S.C. 29607)

16–19. Association of **Clinical Scientists**, spring mtg., Little Rock, Ark. (R. P. MacFate, The Association, 300 N. State St., Chicago, Ill. 60610)

17–19. American **Osteopathic Acad. of Orthopedics**, instructional courses, Detroit, Mich. (J. P. Leonard, Secretary, The Academy, 2673 W. Grand Blvd., Detroit 48208)

19–22. American **Thoracic** Soc./National **Tuberculosis** Assoc., joint mtg., Houston, Tex. (S. Wicker, National Tuberculosis Assoc., 1740 Broadway, New York 10019)

19–22. **Analysis Instrumentation** Symp., 14th natl., Philadelphia, Pa. (R. G. Krueger, Leeds and Northrup Co., 4901 Stenton Ave., Philadelphia 19144)

19–23. Institute of **Food Technologists**, annual mtg., Philadelphia, Pa. (C. L. Willey, Executive Secretary, 221 N. La Salle St., Chicago, Ill. 60601)

20–22. **Microwave** Symp., Detroit, Mich. (M. C. Horton, Bendix Research Laboratories Div., Southfield, Mich. 48075)

20–23. **Cement** Industry, technology conf., St. Louis, Mo. (Inst. of Electrical and Electronics Engineers, R. M. Emberson, 345 E. 47 St., New York 10017)

20–24. **Fire Protection** Assoc., 72nd natl., Atlanta, Ga. (D. Richardson, Manager, PR Dept., National Fire Protection Assoc., 60 Batterymarch St., Boston, Mass.)

20–24. Inter-American Conf. on **Materials Technology**, San Antonio, Tex. (R. D. Wylie, Southwest Research Inst., 8500 Culebra Road, San Antonio)

20–24. Society of **Automotive Engineers**, midyear mtg., Detroit, Mich. (W. I. Marble, Meetings Div. Manager, The Society, 485 Lexington Ave., New York 10017)

21–23. **Computer**, joint spring conf., Atlantic City, N.J. (H. G. Asmus, American Federation of Information Processing Societies, 211 E. 43 Street, New York 10017)

21–23. National **Microfilm** Assoc., Chicago, Ill. (V. D. Tate, Executive Secretary, The Association, Box 386, Annapolis, Md.)

21–23. **Telemetering**, 18th natl. conf., Hollywood, Fla. (R. E. Blue, IBM Corp., 7900 N. Astronaut Bldg., Cape Kennedy, Fla. 32920)

21. Association for the **Advancement of Psychoanalysis**, New York, N.Y. (E. Schattner, Secretary, The Association, 147 E. 50 St., New York 10022)

22–23. American **Iron and Steel** Inst., general mtg., New York, N.Y. (The Institute, 150 E. 42 St., New York 10017)

22–25. Society of **Technical Writers and Publishers**, 15th annual, Los Angeles, Calif. (C. T. Youngblood, Suite 421, 1010 Vermont Ave., NW, Washington, D.C.)

23–24. **Marine Aquiculture**, conf., Newport, Ore. (W. J. McNeil, Oregon State Univ., Marine Science Center, Marine Science Drive, Newport 97365)

23–25. American **Gynecological** Soc., annual meeting, Hot Springs, Va. (G. W. Douglas, The Society, 550 First Ave., New York 10016)

23–25. **Biomedical Sciences**, instrumentation symp., Pittsburgh, Pa. (R. D. Allison, Scott and White Clinic, Temple, Tex. 76501)

24–25. American **Podiatry** Assoc., 6th regional mtg., Sioux Falls, S.D. (M. D. Scofield, Chairman, 120 W. 11 St., Sioux Falls 57102)

24–25. American **Podiatry** Assoc., 12th regional mtg., San Francisco, Calif. (A. G. Roos, Room 412, 209 Post St., San Francisco 94108)

27–29. American **Ophthalmological** Soc., Hot Springs, Va. (S. D. McPherson, Secretary-Treasurer, The Society, 1110 W. Main St., Durham, N.C. 27701)

International and Foreign Meetings

12–14. **Sugar Industry Technologists**, 27th annual, Montreal, P.Q., Canada. (P.O. Box 47, Medford, Mass. 02155)

12–16. **Automobile Technical** Congr., 12th intern., Barcelona, Spain. (Sociedad de Technicos de Automacion, Av. Generalisimo 999, Barcelona 14)

12–16. Canadian **Anaesthetists** Soc., 19th annual, Montebello. (S. M. Campbell, Executive Director, The Society, 178 St. George St., Toronto 5, Ont., Canada)

12–16. Pacific Coast **Oto-Ophthalmological** Soc., Vancouver, B.C., Canada. (G. E. Morgan, The Society, 960 E. Green St., Pasadena, Calif. 91101)

12–17. Federation of Societies of **Cosmetic Chemists**, 5th intern. congr., Tokyo, Japan. (T. Koyama, Shiseido Co., Ltd., 3, Ginza Hishi, 7-Chome, Chuo-Ku, Tokyo)

12–18. Universal Aspects of **Atmospheric Electricity**, 4th intern. conf., Tokyo, Japan. (S. C. Coroniti, % Space Systems Div., Avco Corp., 201 Lowell St., Wilmington, Mass. 01887)

12–19. **Data Processing for Climatological Purposes**, Asheville, N.C. (World Meteorological Organization, 41, Avenue Guiseppe Motta, Geneva, Switzerland)

13–16. Canadian **Public Health** Assoc.,

56th annual, Vancouver, B.C., Canada. (Executive Director, The Association, 1255 Yonge St., Toronto 7, Ont., Canada)

13–16. **Circumventricular Organs and Cerebrospinal Fluid**, symp., Reinhardsbrunn, Germany. (G. Sterba, Zoologisches Institut, Karl-Marx-Universität, Talstr. 33, Leipzig, Germany)

13–17. International Congr. **Against Noise**, 5th, London, England. (Mr. Connel, % Noise Abatement Soc., 6 Old Bond St., London, W.1.)

13–17. **Mechanical Pulping**, 6th intern. congr., Atlanta, Ga. (K. G. Chesley, Technical Secretary, Technical Assoc. of the Pulp and Paper Industry, 360 Lexington Ave., New York 10017)

13–18. **Instruments, Electronics, and Automation**, intern. exhibition, London, England. (Industrial Exhibitions Ltd., 9 Argyll St., London, W.1)

13–18. International Union for **Electroheat**, 6th intern. congr., Brighton, England. (British Natl. Committee on Electroheat, 2 Savoy Hill, London W.C.2, England)

13–18. **Water Studies**, 21st intern. conf., Liege, Belgium. (Ceredeau, 2, rue A. Stevart, Liege)

14–16. **Steam Generating and Other Heavy Water Reactors**, conf., London, England. (A. McDonald, Secretary, British Nuclear Soc., 1-7 Great George St., Westminster, London, S.W.1)

14–17. **Quantum Electronics**, intern. conf., Miami Beach, Fla. (L. Winner, 152 W. 42 St., New York, 10036)

14–19. European Federation of **Chemical Engineering**, 4th symp., Brussels, Belgium. (J. G. Van De Vusse, Koninklijke/Shell Laboratorium Badhuisweg 3, Amsterdam, Netherlands)

15–17. Canadian **Phytopathological** Soc., annual mtg., Winnipeg, Manitoba, Canada. (W. C. McDonald, Canada Dept. of Agriculture, Research Station, 25 Dafoe Rd., Winnipeg 19)

16–18. **Experimental Zoology**, intern. congr., Vienna, Austria. (Wiener Medizinische Akademie, Reisedienst Stadiongasse 6-8, A-1010 Vienna)

17–19. Royal **Astronomical** Soc. of Canada, general assembly, Calgary, Alta. (The Society, 252 College St., Toronto 2B, Ont., Canada)

18–22. **Cytology**, 3rd intern. congr., Rio de Janeiro, Brazil. (C. Ferreira, Emilio Berla 46-3 Copacabana, Rio de Janeiro)

18–28. **Eocene Stratigraphy**, symp., Paris, France. (Ch. Pomerol, Laboratoire de Geologie, 1, rue de la Brosse, Paris 5)

19–22. Canadian **Urological** Assoc., annual mtg., Houston, Tex. (A. H. Irvine, 1105 Carling Ave., Suite 207, Ottawa 3, Ontario, Canada)

19–26. **Elementary Particle Theory**, Nobel symp., Goteborg, Sweden. (Nobel Foundation, Sturegatan 14, Stockholm 5, Sweden)

20–23. **Powder Technology**, intern. conf., Chicago, Ill. (M. Jackson, Research Inst., Illinois Inst. of Technology, 10 W. 35 St., Chicago 60616)

20–24. **Acoustical** Soc. of America, spring mtg., Ottawa, P.Q., Canada. (E. A. G. Shaw, Natl. Research Council, Sussex Drive, Ottawa)

20–24. **Inelastic Scattering of Neutrons**, symp., Copenhagen, Denmark. (International Atomic Energy Agency, Karntner Ring 11, Vienna 1, Austria)

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