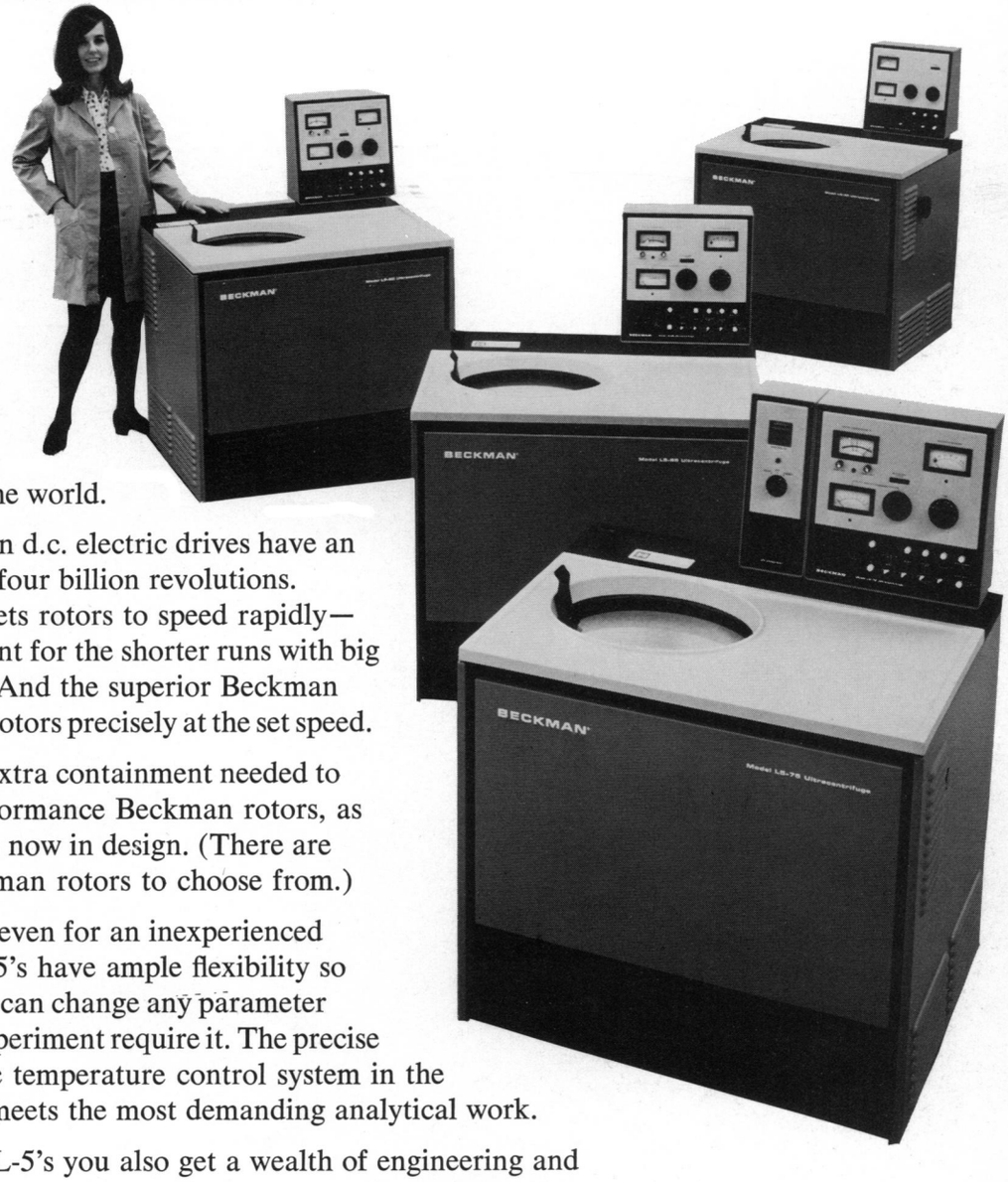
SCIENCE

14 June 1974

Vol. 184, No. 4142

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The Beckman L-5's are the Four Best Ultracentrifuges in the World.



From every standpoint, the new Beckman L-5's offer you more than any other preparative ultracentrifuges in the world.

The proven Beckman d.c. electric drives have an average life of over four billion revolutions. Their high torque gets rotors to speed rapidly—particularly important for the shorter runs with big volumes of sample. And the superior Beckman speed control holds rotors precisely at the set speed.

The L-5's have the extra containment needed to run the highest performance Beckman rotors, as well as the new ones now in design. (There are more than 30 Beckman rotors to choose from.)

Operation is simple even for an inexperienced operator, yet the L-5's have ample flexibility so that the investigator can change any parameter at will, should his experiment require it. The precise infrared radiometric temperature control system in the L5-50, 65, and 75 meets the most demanding analytical work.

With the Beckman L-5's you also get a wealth of engineering and applications experience developed through years of research and field contact. And no matter where you are there is a Beckman ultracentrifuge service specialist near you; there are 166 in the U.S. alone.

We'd like to tell you more about the L-5's—the four best ultracentrifuge values in the world. Write for brochure SB-400 to Beckman Instruments, Inc., Spinco Division, 1117 California Avenue, Palo Alto, California 94304.

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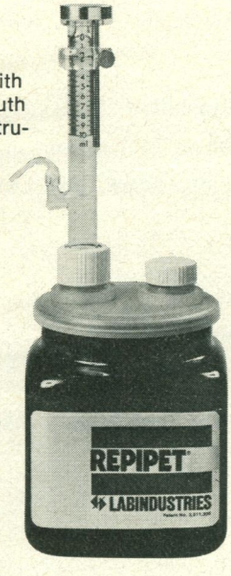
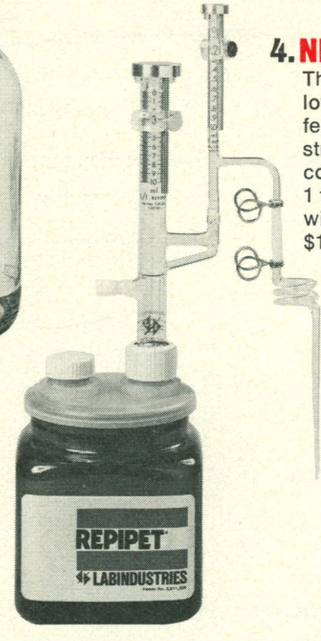


4. NEW REPIPET Dilutor. This simple, precise and low cost Dilutor now features sturdier construction and low profile container. Many models 1 to 50 ml. 10 ml model with 1 ml aspirator $118.50.



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14 June 1974

Volume 184, No. 4142

SCIENCE

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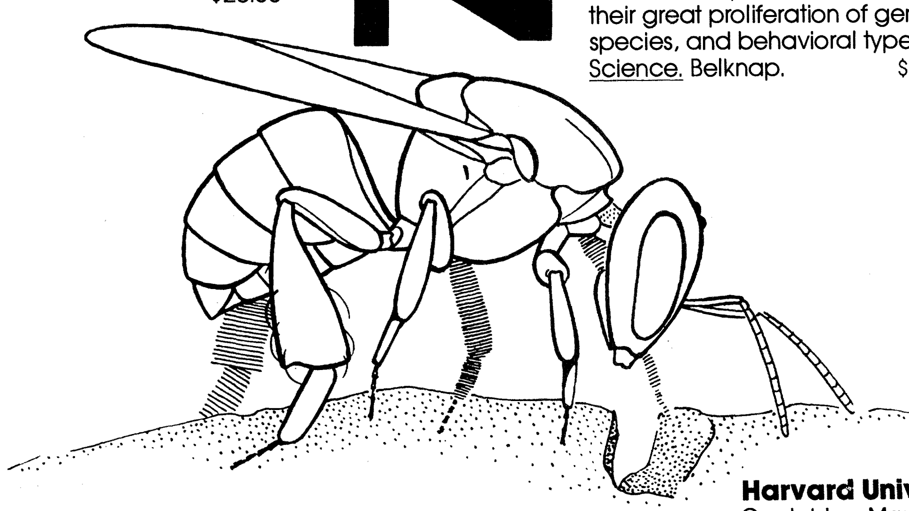
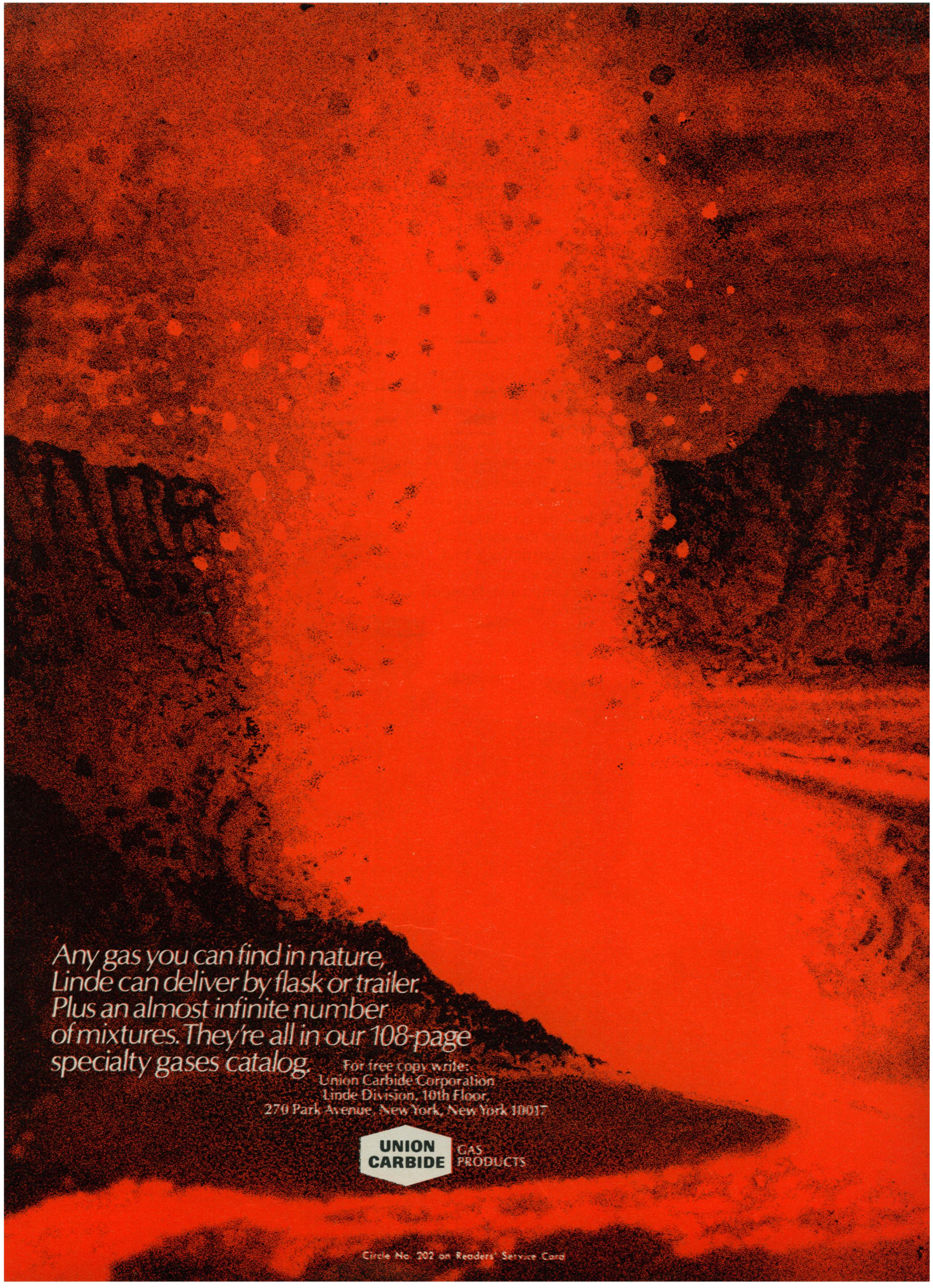
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Pigment mutants in the Mexican axolotl. (Left) White (d/d); (center) yellow albino (a/a, D/D); and (right) dark, wild type (D/D). See page 1142. [G. M. Malacinski, Indiana University, Bloomington]





A new GC that tells you what its measurements mean.

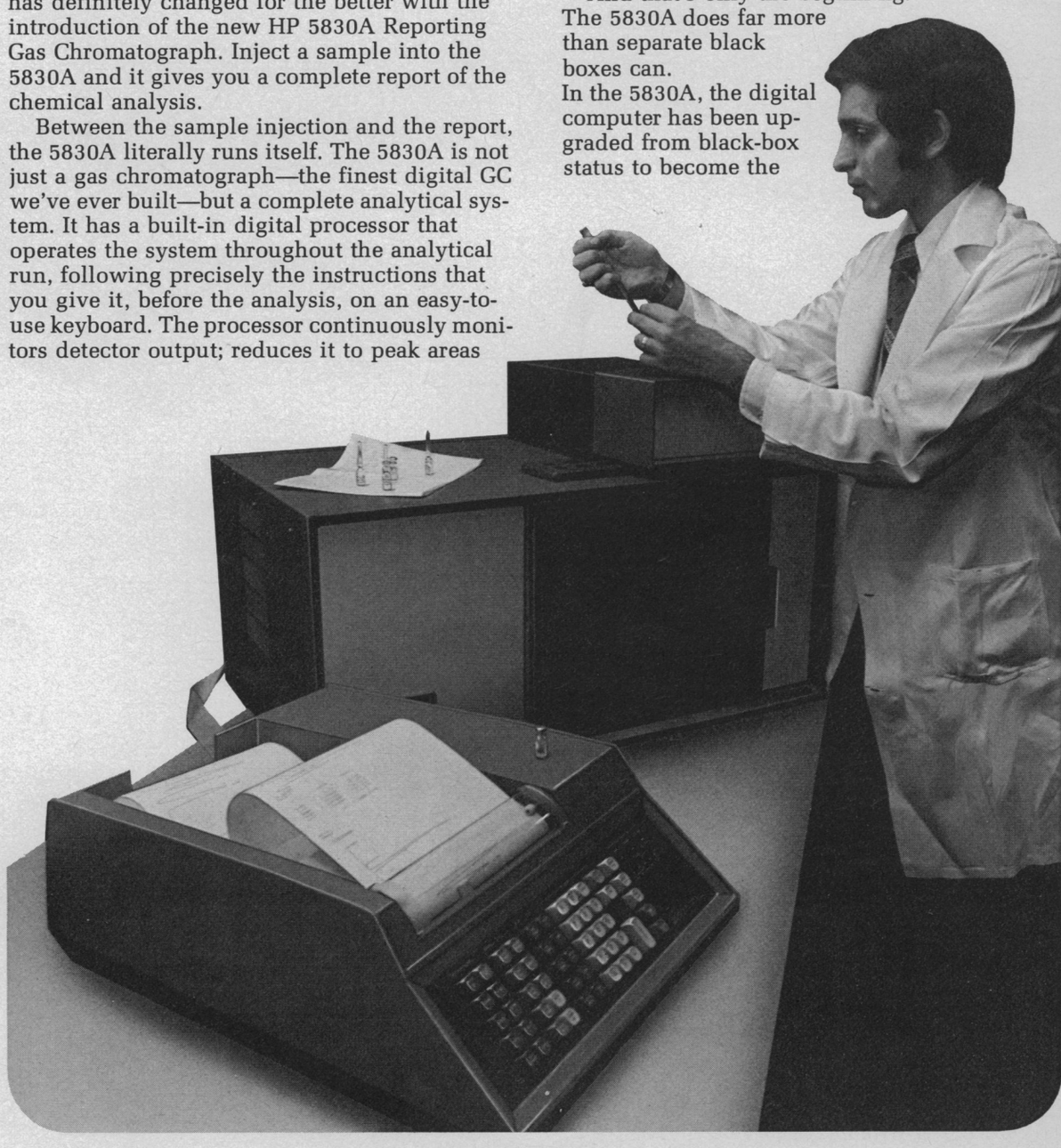
The gas chromatograph is easily the most widely used instrument in the history of chemical analysis. Chemists, biologists, and scores of other scientists use the GC to get answers to all sorts of analytical problems — *after* they've recorded its signal output, integrated individual component peaks, and reduced the quantitative data.

This rather involved process of getting the analytical answer (from the basic measurement) has definitely changed for the better with the introduction of the new HP 5830A Reporting Gas Chromatograph. Inject a sample into the 5830A and it gives you a complete report of the chemical analysis.

Between the sample injection and the report, the 5830A literally runs itself. The 5830A is not just a gas chromatograph—the finest digital GC we've ever built—but a complete analytical system. It has a built-in digital processor that operates the system throughout the analytical run, following precisely the instructions that you give it, before the analysis, on an easy-to-use keyboard. The processor continuously monitors detector output; reduces it to peak areas and times according to a sophisticated integration algorithm; identifies the sample components and computes their concentrations; and generates the chromatogram. Then it presents a complete analytical report, including a list of analysis conditions, as well as the chromatogram and the component concentrations on its own built-in printer/plotter.

No longer do you have to assemble a series of expensive black boxes to do the job, and still wind up doing much of the work manually. The 5830A does it all for you, automatically.

And that's only the beginning. The 5830A does far more than separate black boxes can. In the 5830A, the digital computer has been upgraded from black-box status to become the



intelligent control center of the entire analytical system. From the keyboard, you can instruct the 5830A to alter conditions automatically, throughout the analysis, at times that you specify beforehand. You can give it up to 100 such time-programmed commands for each analysis—to make changes in GC conditions, detector operation, chromatogram presentation, integration and data reduction parameters, operation of accessories and even of external instruments and devices.

Is it any wonder we call the 5830A the Analytical Answer Machine? Prices start at $7995.*

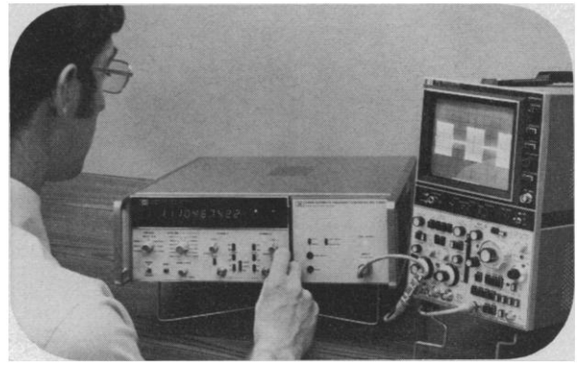
A radically new performance standard for frequency and time measurements.

Based on a new HP-designed-and-built family of monolithic IC's capable of sub-nanosecond switching, the HP 5345A plug-in electronic counter fundamentally improves frequency and time measurements. That's why we don't hesitate to call it "radically" new; to say anything less would amount to calling a mountain a molehill.

In only one second, you can measure any frequency from 1 Hz to 500 MHz with 9-digit resolution; or sample a signal up to 5000 times per second, with 4-digit resolution. You can resolve one-shot time interval measurements to 2 nanoseconds; or automatically average repetitive measurements to get 1-picosecond resolution, while HP's unique random dithering technique assures you of a valid answer. You can measure 100-mV signals using standard 10 megohm oscilloscope probes; or use 50-ohm input cables.

You can measure RF burst frequencies and the carriers of microwave pulses, accurately and automatically. Using a gate time of<50 nsec, you can get inside a pulse and count the carrier frequency profile or use external gating to do frequency averaging within narrow pulses, as brief as 50 nsec.

With the new fully automatic 4.0 GHz frequency converter plug-in, you can make CW measurements that are immune to very high



The new HP 5345A counter with optional frequency converter plug-in automatically measures CW or very brief pulsed signals well into the microwave region. Here, the counter measures the pulsed signal displayed on the scope.

levels of FM — and also automatically lock onto microwave pulses as short as 250 nsec.

You can make full-bandwidth ratio measurements directly since both channels have sensitive, wideband input amplifiers. In digital communications, for example, you can compare a very fast clock with an error signal as small as 2 nsec, occurring at 10 mV levels and widely spaced intervals.

With the optional third plug-in input C channel, you can examine an isolated portion of a bit stream in high-speed digital circuits by using the A and B channels to start and stop the measurement.

When equipped with the HP Interface (ASCII) Bus option, you can easily combine the 5345A with HP calculators and programmable accessories (as detailed in a series of HP application notes) for automatic operation, data reduction, statistical analysis, and self-calibration.

Cost of the 5345A counter is $3450;* automatic frequency converter adds $1950;* C-channel plug-in adds $850;* Interface bus (ASCII input/output) adds $800.*

For more information on these products write to us. Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304.

*Domestic USA prices only. 00430

Mail to: Hewlett-Packard, 1507 Page Mill Road, Palo Alto, CA 94304
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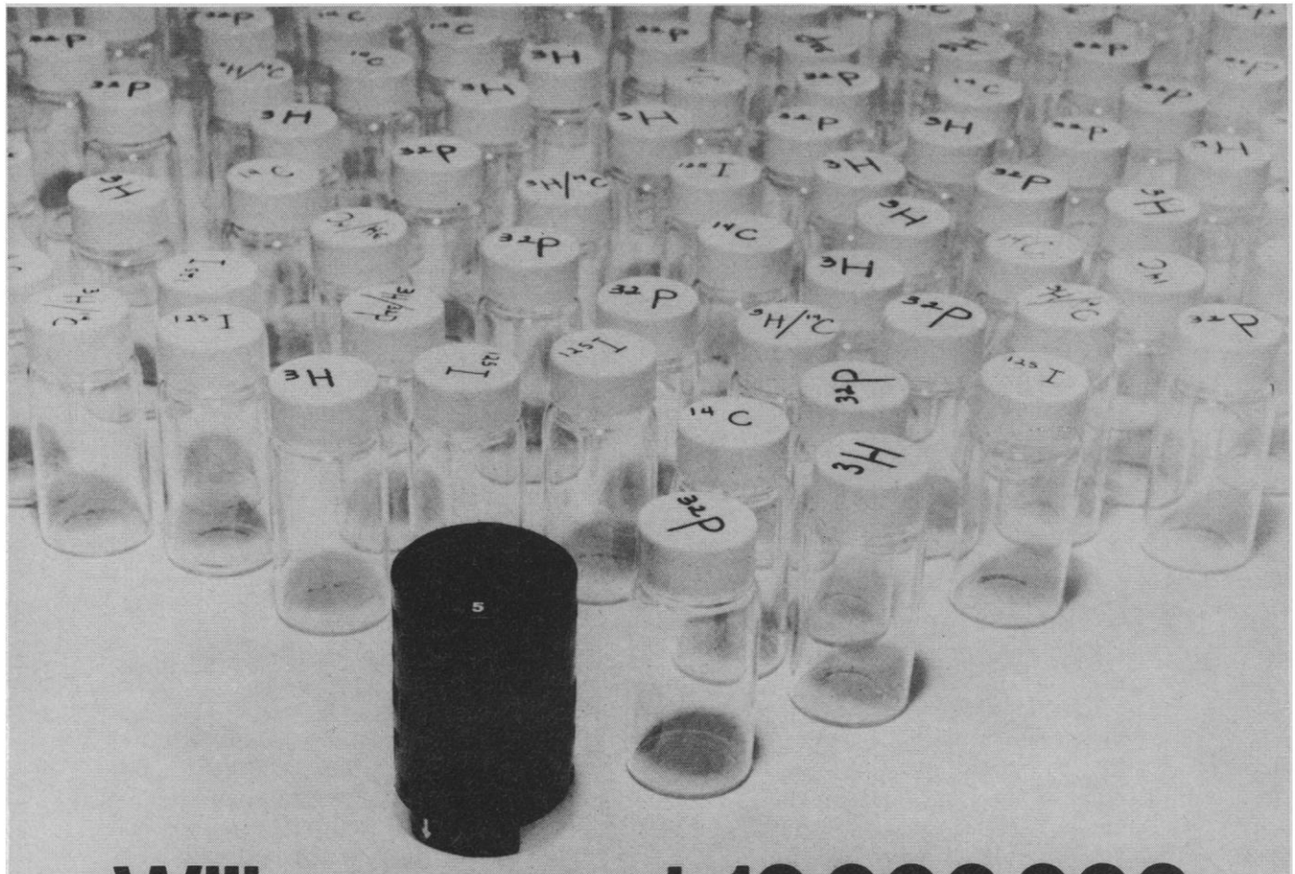

Will you count 10,000,000 liquid scintillation samples in 1974? Isocap/300 will.

The Searle Analytic Isocap/300's well established reliability and truly unique ease of use have gained wide acceptance in the research community.

6 reasons the Isocap/300 may belong in your laboratory:

1. Unattended intermixed batch programming is done automatically; researchers are free for other projects.
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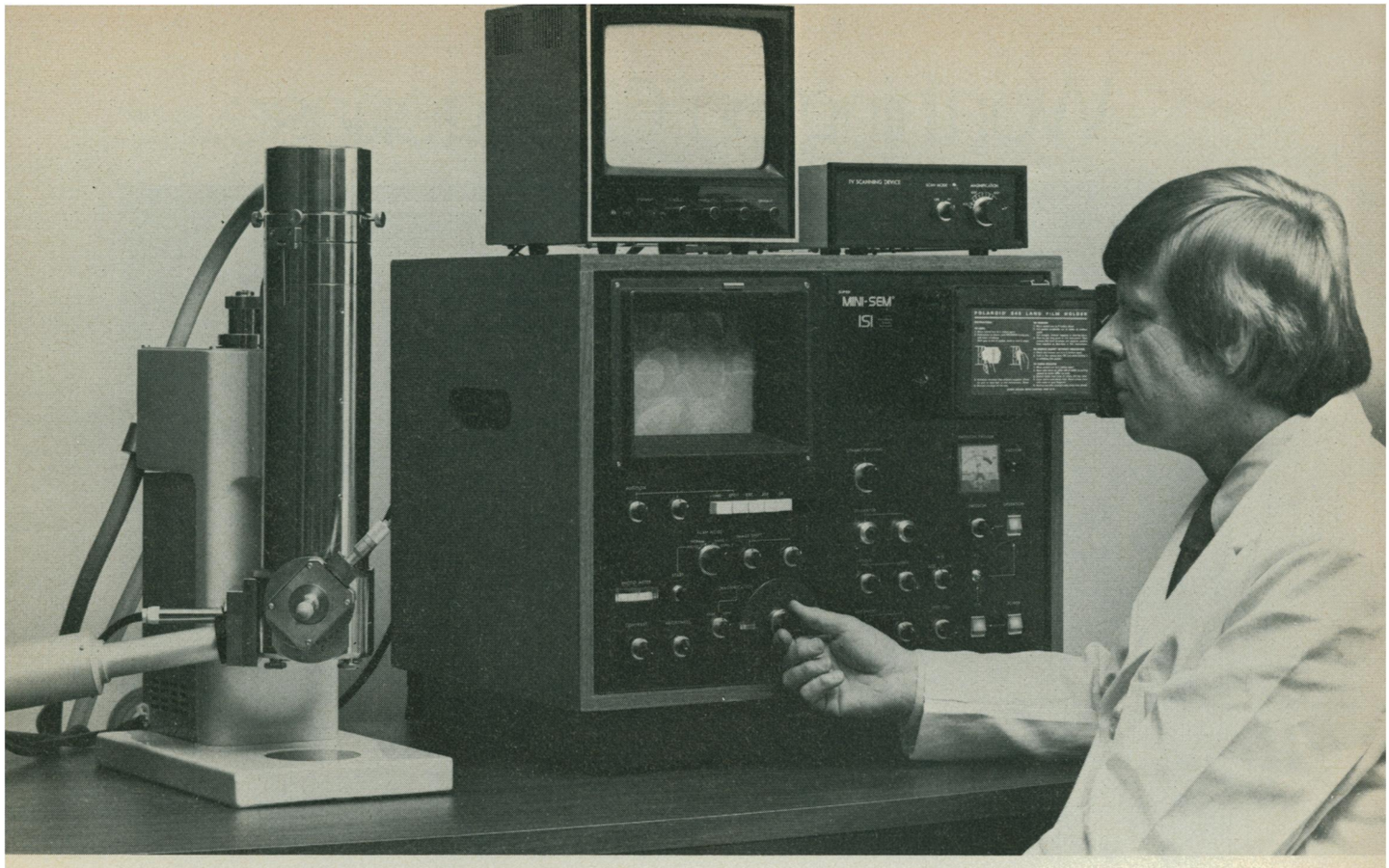

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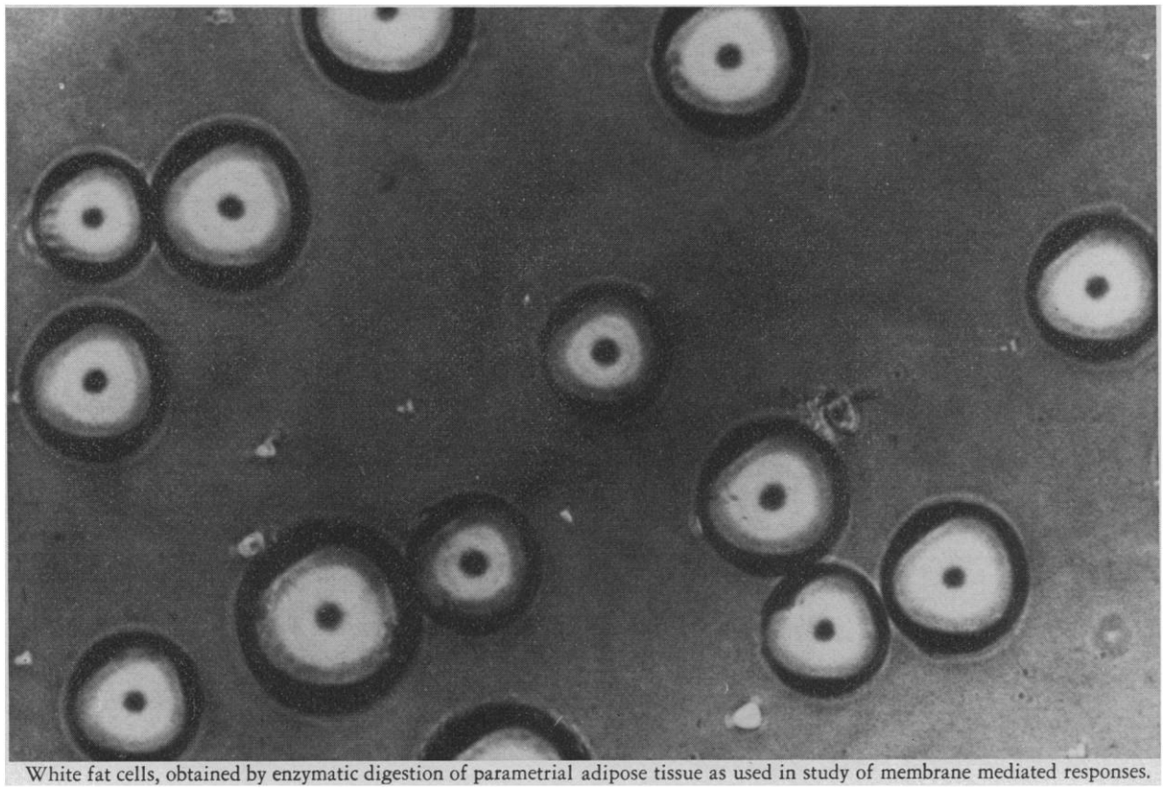
Worthington Collagenase...



White fat cells, obtained by enzymatic digestion of parametrial adipose tissue as used in study of membrane mediated responses.

specifically blended for cell isolation.

In microbiological studies of animal cells, it often is desirable to isolate and separate the cells for further study. The researcher's need is to separate the cells from the connective and cementing materials without damaging the cells themselves.

Many researchers found that a natural mixture of digestive enzymes produced by a non-toxigenic strain of the bacterium *Clostridium histolyticum* provided the separation remarkably well. The enzymes, without the toxin that many of the *Colstridia* produce, effectively digest away the materials connecting the cells into a tissue, but leave the cells themselves virtually untouched.

The enzyme mixture is named after its more unique member, *Collagenase.* Worthington supplies Collagenase in several degrees of purity ranging from crude to highly-purified; researchers have generally found that the less purified material is more effective in releasing intact cells from tissues. The effectiveness, however, seemed to differ with different tissues, and it did not always match the quantitative differences noted in our assay labs.

A program was therefore initiated by Worthington aimed at correlating effectiveness of samples on specific tissues with results of our own biochemical assays. We enlisted the support of several dozen prominent researchers; they evaluated more than a hundred samples of regular production and specially prepared lots of Collagenase in their own studies.

Evaluation of these studies has enabled us to categorize our crude Collagenase into four different types which are blended and classified according to the specific tissues for which each is best suited. The four types are available as listed in our current catalog.

TYPE	CHARACTERISTIC	TISSUE BEST SUITED
I	Normal balance	Fat cells; Adrenal tissue
II	High Clostridiopeptidase	Liver, Bone, Thyroid
III	Low Proteases generally	Mammary
IV	Low Tryptic activity	Pancreatic Islet cells

The increasing use of Collagenase in cell isolation is encouraging. Credit for the program's success is due to the many researchers who cooperated so openly with their time and talent.

Your comments and interest are welcome. Additional information on this application of Collagenase and a copy of our current catalog are available on request.

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Series 3000
over $4,000

Two reasons why the sophisticated new, electronic Sartorius 3000 might not interest you.

Ever wish for a top-loader that eliminated dialing-in of weights and guessing at the readout? The fully automatic new Sartorius 3000 is such a balance. Electronic display of indicated weight (no readout error!) and completely automatic weight compensation (no dialing-in of weights!) combine to speed up weighings by as much as 50%. BCD output for connection to data processing equipment is built-in. The Sartorius 3000 comes in two weighing ranges: Model 3014 has 1,000g capacity with 0.01g readability; Model 3015, with 160g capacity, is the only fully automatic top-loader readable to 0.001g.

The electronic Sartorius 3000 costs over $4,000, but not every laboratory needs a balance as sophisticated as this. In fact, two reasons why the 3000 might not interest you at all are our Series 1100 and 2250 top loaders. These Sartorius 'workhorses' are tops in value and performance for virtually all routine weighings.

The 1104 is a compact, economical torsion balance with 1,000g capacity, 0.1g accuracy, built-in 500g optical taring, and costs only $495. The Series 2250 offers capacities from 160 to 5,000g, all-digital readouts, large, clear numerals, built-in taring, exceptional stability, plus many optional features. Prices begin at $1,000.

Whichever Sartorius you're interested in, we'll gladly send literature. Just write: Sartorius Balances Div., Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590.

Series 1100
$495 & up

Series 2250
$1,000 & up

sartorius balances

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Skepticism

Skepticism is a stock trade of science. Thus, the promise of the green revolution is weighed against its actual costs . . . the potential of geothermal energy is squared against problems, environmental and political . . . confident 20th-century conceptions of prehistory are critically examined . . . our understanding of natural phenomena — volcanoes, earthquakes, hurricanes — is questioned. This third volume of *Speaking of Science* offers a wide ranging sampling of skepticisms — from population policy to views of man's violent behavior. Knowledgeable people take a sharp-eyed look at twelve different problems involving science and technology. An insight is gained into current attitudes toward some familiar problems . . . and a few new ones.

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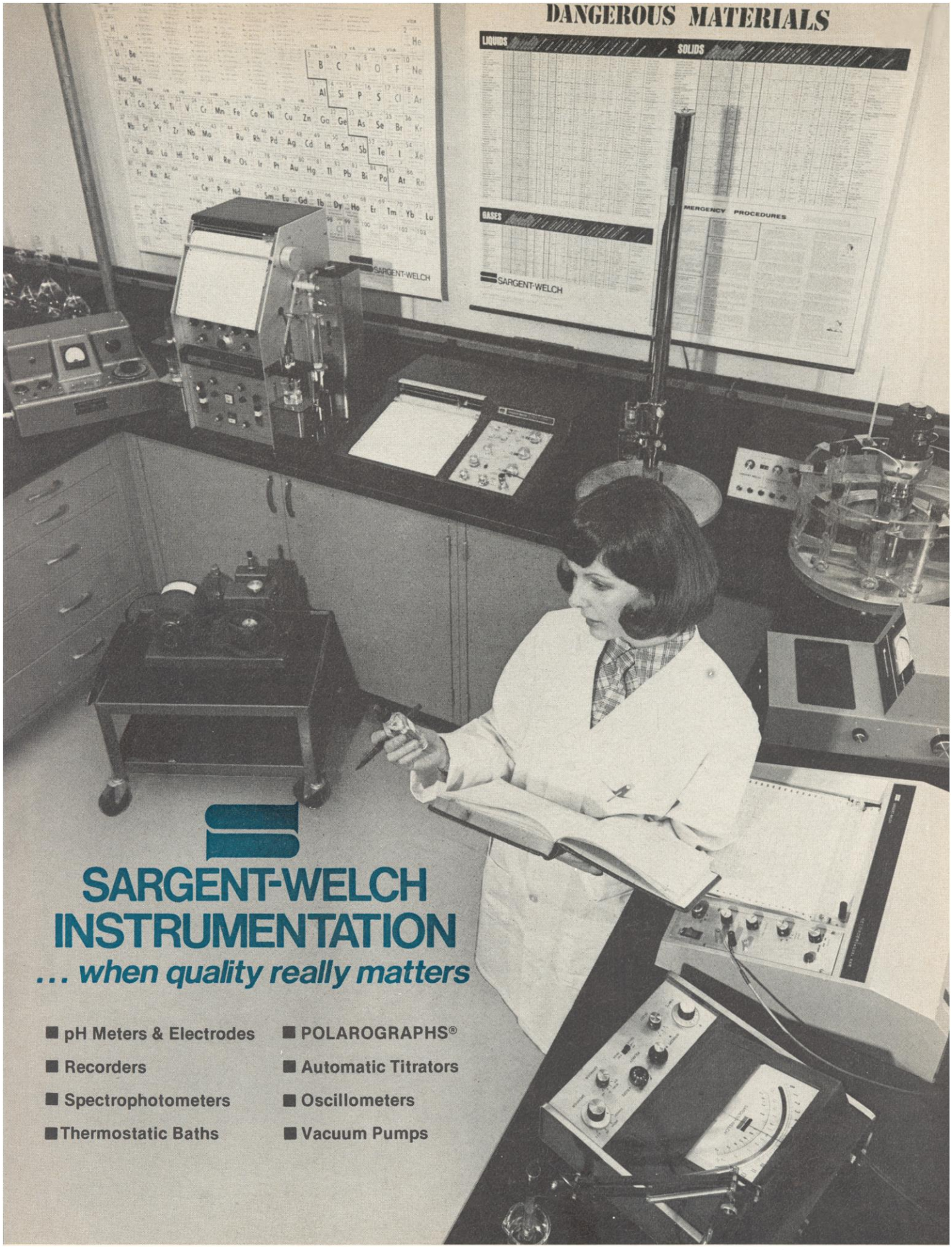

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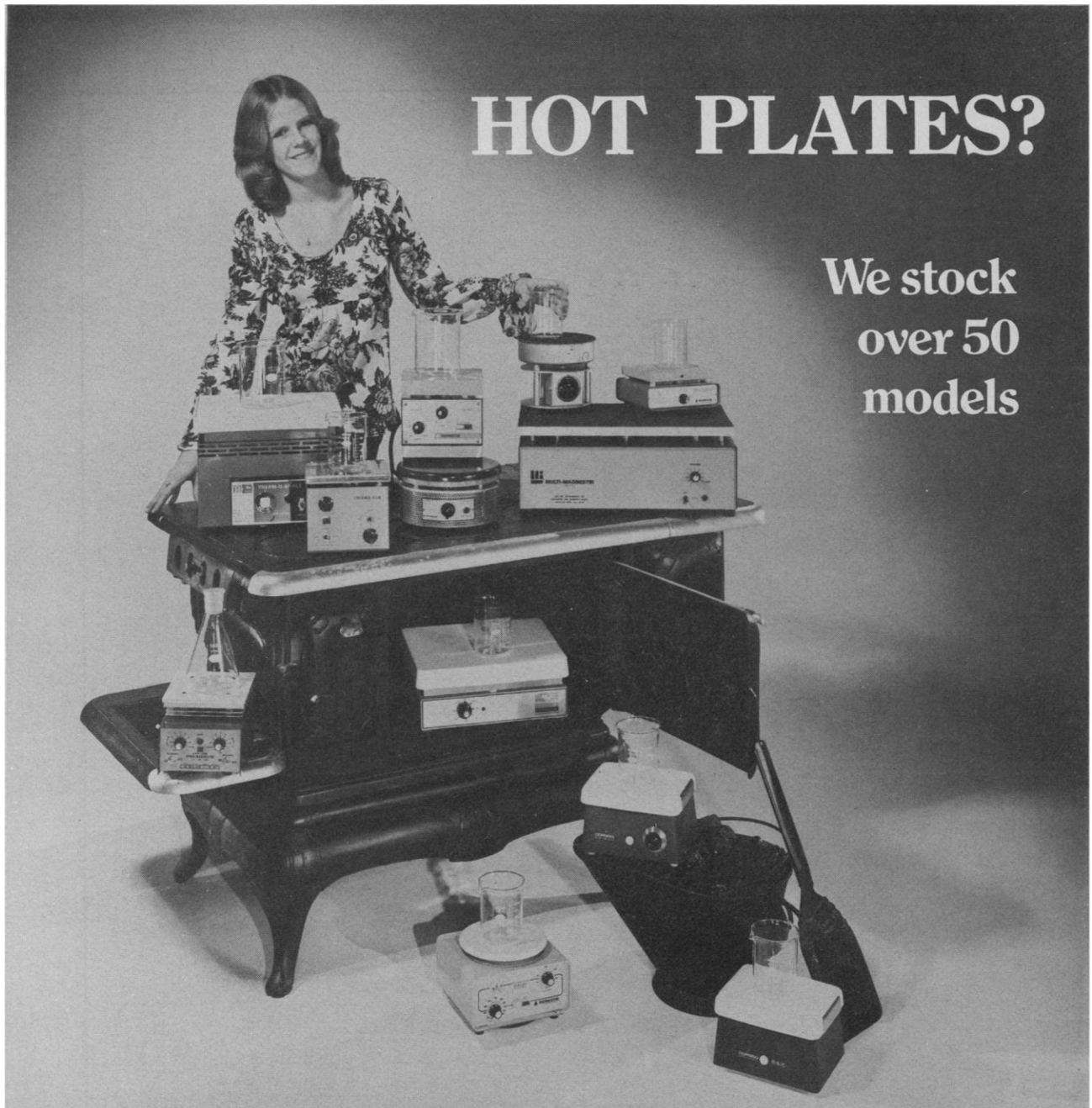

Years ago, the old coal-burning stove did a fair job of heating, but its performance was naturally a far cry from today's modern methods.

In the case of hot plates and combination hot plate/magnetic stirrers, we can offer you a variety of models ranging in price from $16.25 to $530.00 . . . made by such outstanding manufacturers as Chromalox, Corning, Hoskins, Lab-Line, Lindberg, Precision-Scientific and Thermolyne. There are light-duty, heavy-duty, micro, explosion-proof — even remote control types . . . in various shapes and sizes to meet any requirement.

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Eastman Organic Chemicals News

about products for liquid scintillation counting

Your nearby supplier of EASTMAN Organic Chemicals can now provide you with a variety of premixed, convenience, liquid scintillation counting reagents. EASTMAN Ready-To-Use I and II, EASTMAN Concentrate I and II, and EASTMAN Dry Blend I and II join a line of 27 individual reagents for LSC that includes fluors, solvents, tissue solubilizer, and CO_2 absorbers.

In order to provide reagents of consistent high quality, the products are monitored by a rigorous quality control program. The testing includes:

- Actual-use tests under a variety of conditions.
- Measurement of fluorescence quantum yield.
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To order these reagents, contact:

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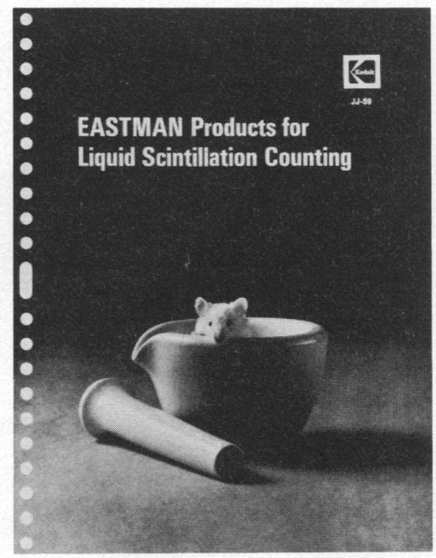

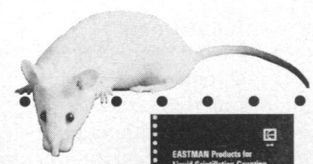

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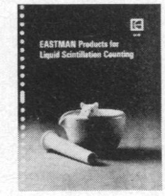

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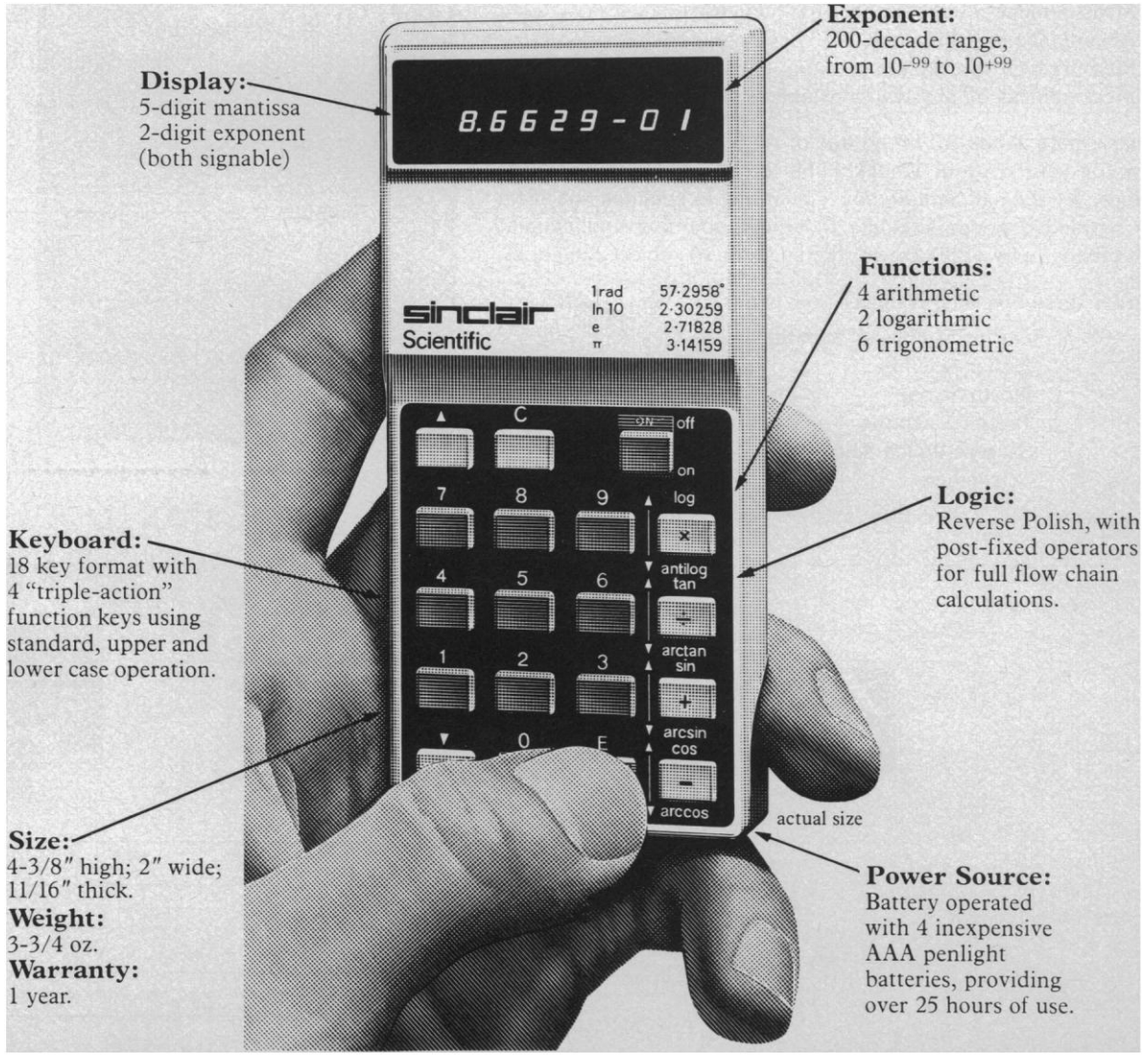

Scientific calculators are fast.

And convenient.

And, until recently, very expensive.

(A good one could cost as much as $300.)

But now there's the Sinclair Scientific.

For an incredible $99.95, this small scientific miracle not only performs logarithmic and trigonometric functions at the push of a button. It displays all calculations with scientific notation.

What's more, the Sinclair Scientific isn't just portable. It's pocketable.

Less than ¾-inch thin. And 3¾-ounces light. It's the world's thinnest, lightest scientific calculator.

Just look at some of its essential functions, and you may never use your slide rule or log tables again:

log and anti-log (base 10)
sin and arcsin
cos and arccos
tan and arctan
automatic squaring
automatic doubling
x^y, including square and other roots
plus the four basic arithmetic functions

Besides performing virtually all scientific, mathematical and financial operations, it can also carry out chain calculations of unlimited length.

What makes a scientific calculator scientific?

There are a number of calculators that call themselves "scientific."

But most, quite frankly, don't measure up.

To be a really valuable tool for engineers, scientists, technicians and students, a calculator must provide *all* of the following:

Log functions.

Plus trig functions.

Plus scientific notation (10^{-99} to 10^{+99}).

Clearly, a scientific calculator without scientific notation severely limits the size of numbers with which you can work easily.

And scientific notation without transcendental functions is little more than window dressing on an arithmetic calculator.

Granted, there are two companies, other than Sinclair, offering excellent units with all the essential ingredients.

But Hewlett-Packard's models start at well over $200.

And Texas Instruments' SR-50, at about $170, uses a mix of logics. Which we believe is less convenient than the reverse Polish logic with post-fixed operators used by Sinclair and Hewlett-Packard.

What it all adds up to is this:

Only Sinclair provides truly scientific capacity at a truly affordable price.

What makes the Sinclair Scientific so inexpensive?

Two important technological breakthroughs.

First, the British-built Sinclair Scientific has a *single* integrated circuit. Engineered by Sinclair. And exclusive to Sinclair.

(Competitive units require more than one chip. Their chips are larger. And also more expensive.)

Second, Sinclair's exclusive keyboard has only four function keys. All of which provide "triple-action" by changing from standard to upper or lower case mode.

Competitive products have more than twice as many keys. Most of them are infrequently used. And non-essential.

For example:

The Sinclair Scientific hasn't a square root key. But squares—and other roots—are obtainable simply by using logarithms.

Finally, extra keys mean extra cost. (Not to mention size and weight.) And fewer keys mean a simpler format to memorize—for increased speed and fewer entry errors.

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Sinclair has been an innovator in calculator miniaturization right from the start. And it's now Europe's largest manufacturer of pocket calculators.

In the last two years Sinclair brought to America the world's thinnest, lightest calculators—the Sinclair Executive and Executive Memory—as well as the Cambridge, a moderately priced 4-function unit.

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All Sinclair pocket calculators, including the Executive ($79.95), Executive Memory ($99.95) and Cambridge ($44.95), are available at better stores everywhere.

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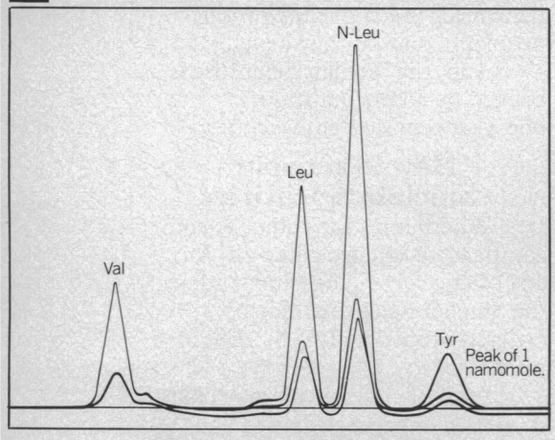
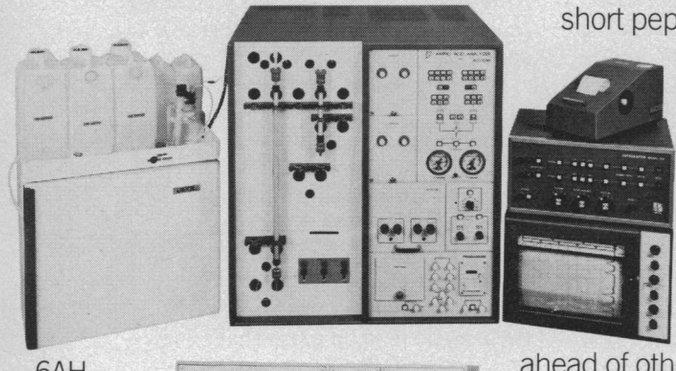


This is an Insulin A-Chain after a 12 step degradation. The instrument that provided the analysis was our 6AH Amino Acid Analyzer. Peaks like this are just part of the performance on the 6AH and our 47K Sequence Analyzer.

Highest sensitivity. The 6AH matches unmatched sensitivity and automatic operation. It's rated at 5 nanomoles/2 mm and 1 nanomole/10 mm. It automatically accommodates 12 samples or 36 with accessories. You can employ either single or dual column methodology for protein hydrolyzate research and for work with physiological fluids. And like the 6AH, the integrator we feature is a product of JEOL design and manufacture. ☐

Our 47K should be part of your work if your work includes short peptide or long protein analysis. The patented design of the overflow reaction cup system makes this research possible. The automatic fractionation of residual peptides and dual fraction collectors make both Edman and Dansyl subtractive methods routine.



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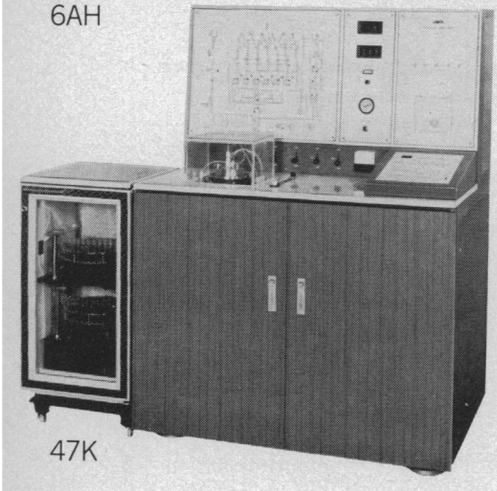

47K

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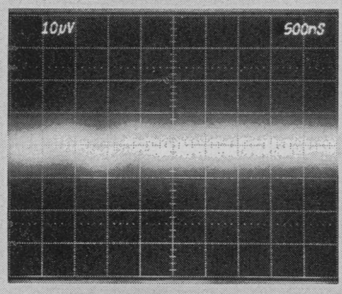
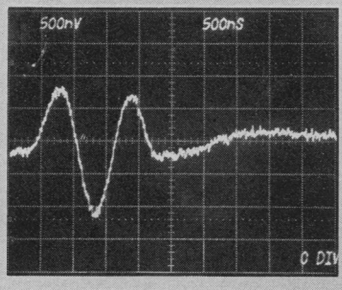


. . . is made useful by signal averaging with the DPO.



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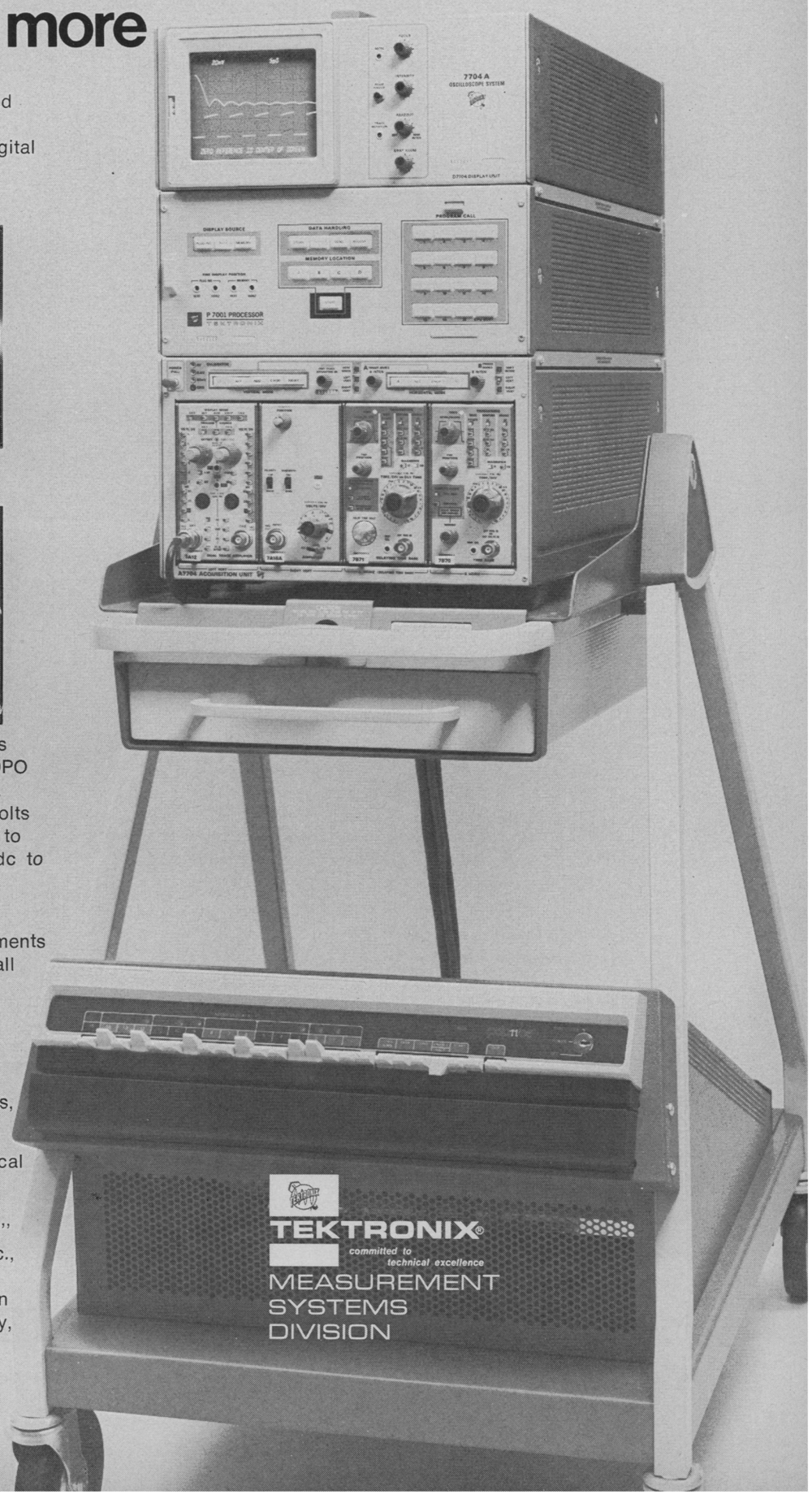

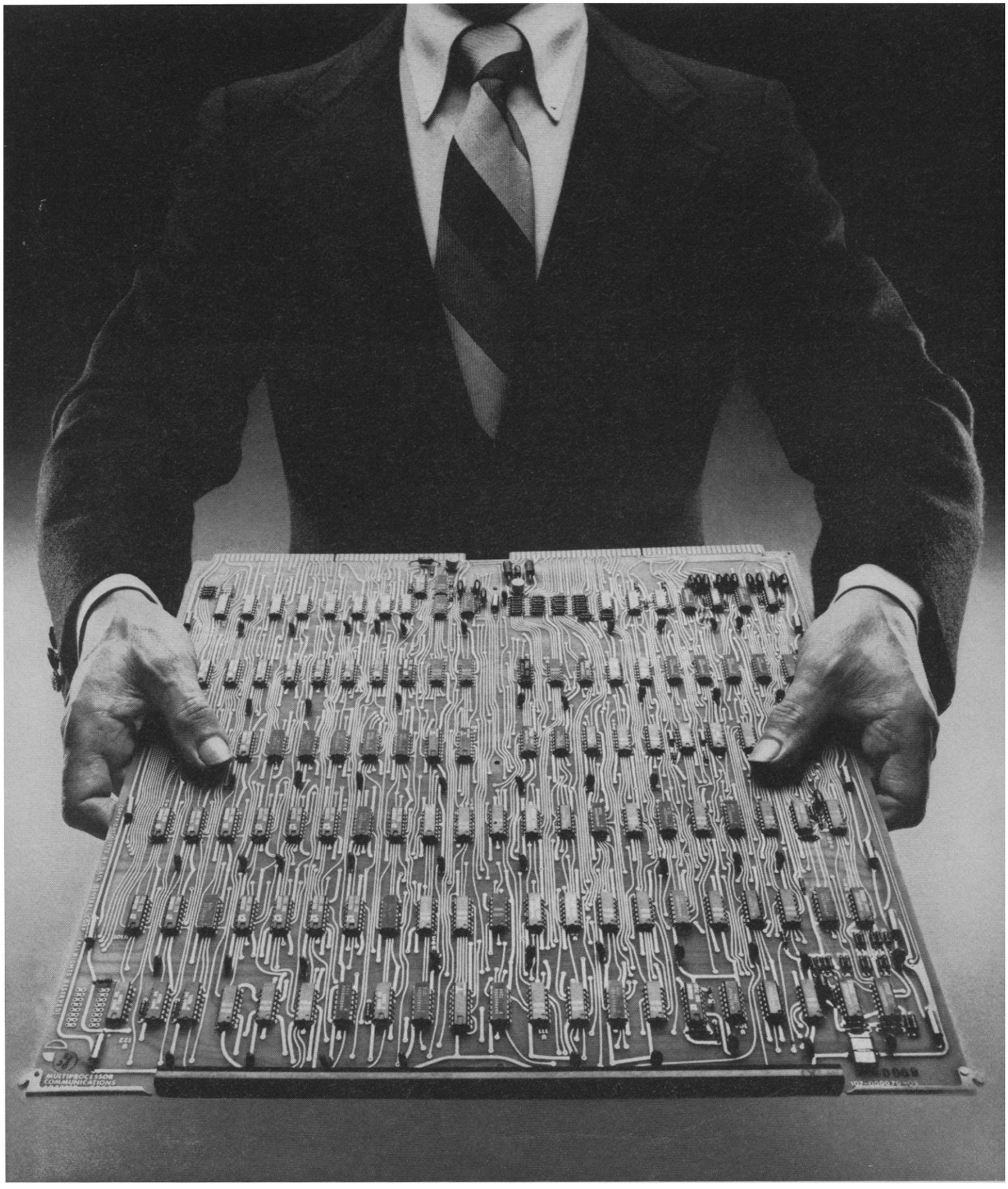

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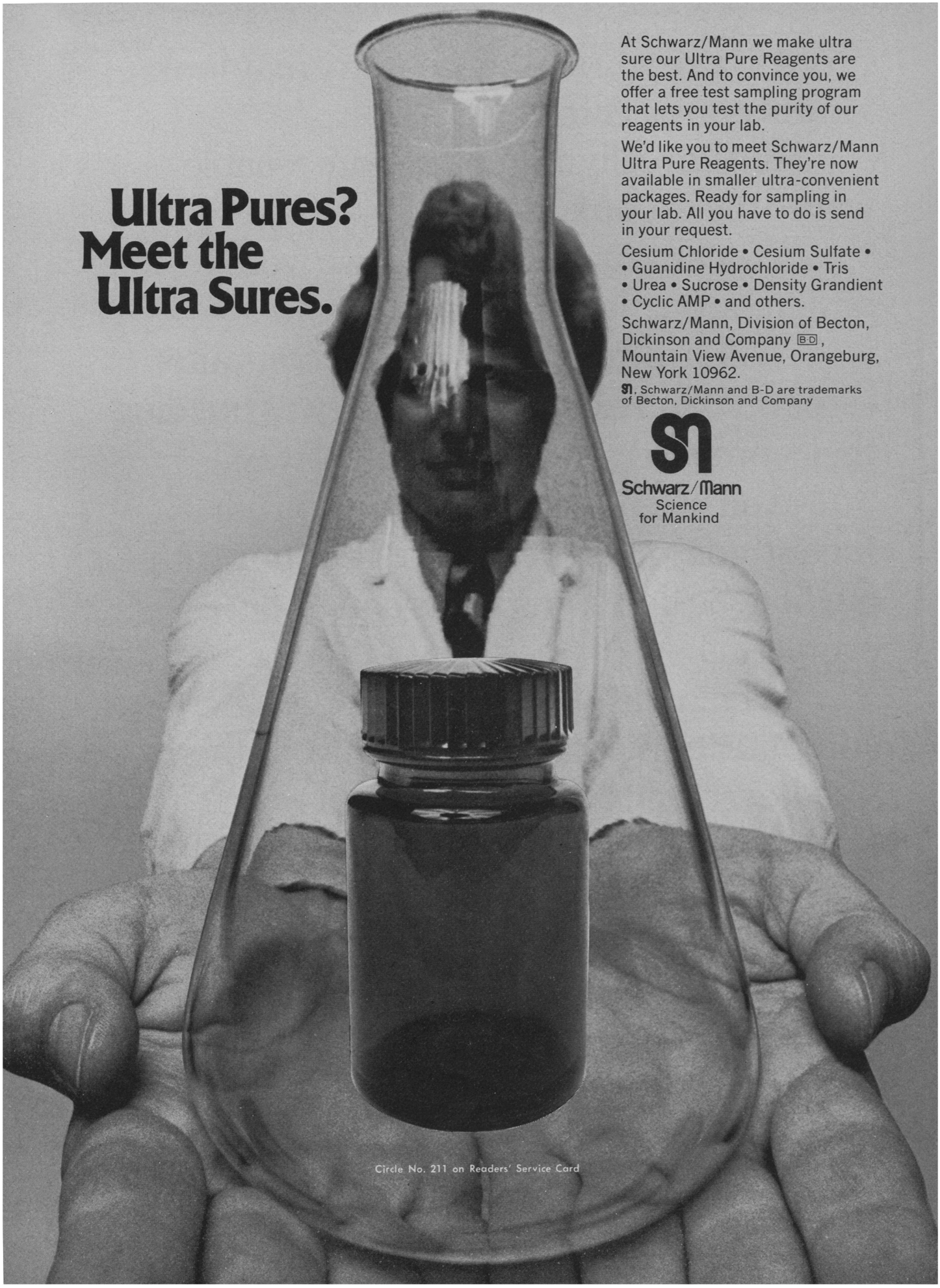
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References

1. R. M. May, *Stability and Complexity in Model Ecosystems* (Princeton Univ. Press, Princeton, N.J., 1973), p. 12. (The 19 percent of figures that are scaleless are diagrams of food webs, and the like, which do not admit of scaled axes: I can lay strong claim to being a scaler.)

Mr. Wonderfull's Surprize

Constance Holden's report "Food and nutrition: Is America due for a national policy?" (News and Comment, 3 May, p. 548) refers to "meetings [between nutritionists and] General Foods officials" about a cereal called Mr. Wonderfull's Surprize. She apparently got her generals confused. General Foods makes no such product, but General Mills does.

KEN FRANKLIN
General Foods Corporation,
250 North Street,
White Plains, New York 10625

Landlubbing Admiral?

In Bruce C. Heezen's review (8 Feb., p. 504) of A. Hallam's book *A Revolution in the Earth Sciences* (*1*) the late Harry H. Hess is referred to as (in 1960) "the then-landlubber Princetonian geologist." Rear Admiral Hess, USNR, was such a low-keyed man that his modesty probably prevented some "high-seas" folk from realizing that, during World War II, he arranged for the preservation of data from recording fathometers on U.S. naval vessels plying the seas for other than oceanographic purposes.

FRANK C. WHITMORE, JR.
20 Woodmoor Drive,
Silver Spring, Maryland 20901

References

1. A. Hallam, *A Revolution in the Earth Sciences* (Clarendon, New York, 1973).

The numerous important accomplishments and renowned abilities of the late Harry Hammond Hess were so solid and impressive that it would be sad to see his substantial record replaced by a fanciful legend. Contrary to what Hallam states in his book, Hess was not a submarine commander. He did command a World War II supply vessel (U.S.S. *Cape Johnson*) and ran a fathometer when the ship's mission took him to the unsounded areas of the western Pacific. To the flat-topped seamounts which abound there,

he gave the name of the Princeton Geology Building (Guyot) (*1*). After the war, when he returned to his teaching post at Princeton, his seagoing days ended. He did, however, retain his reserve commission in the Navy, eventually rising to the rank of rear admiral. His annual reserve duty was often served at the U.S. Naval Hydrographic (later Oceanographic) Office, where he contoured deep-sea soundings that had been compiled. At Princeton Hess developed a vigorous research program on the geology of the lands surrounding the Caribbean, which provided stimulating thesis problems for a talented group of graduate students (*2*). He continued his active personal research in petrology. He also served in a variety of advisory capacities for national and international scientific endeavors.

It does not detract from his impressive record to point out that, contrary to popular belief, Hess played no active part in oceanographic research after World War II, preferring to play the role of critic. To be accurate, the contribution to post–World War II marine geology of Admiral Hess was made at a considerable distance from the sea by a "then landlubber."

BRUCE C. HEEZEN
Lamont-Doherty Geological Observatory, Palisades, New York 10964

References

1. H. H. Hess, *Am. J. Sci.* **224**, 772 (1946).
2. H. H. Hess, Ed., *Geol. Soc. Am. Mem.* **98**, 1 (1966).

Research Chemicals: Supply and Demand

Certain practices are occurring in the production and distribution of fine chemicals and biochemicals that should be of interest to a large number of scientific researchers dependent upon federal research grants. These practices are not limited to the United States; they are in fact a worldwide problem, occurring in Europe, Japan, and many other countries. Some supply houses, having determined that there is a market for a certain compound or enzyme but that they lack the necessary expertise to produce it themselves, are contacting and hiring as "consultants" scientists who supply them with the compound. Sometimes these compounds are produced in a university or research institute laboratory that is funded by federal research grants. One example involved a university professor of chemistry who was also vice president of a chemical supply house. His federally funded research laboratory was literally a factory for his supply house, until he was caught and his wrist lightly slapped. These practices occur infrequently; research scientists as a group are relatively free of corruption, and in the United States, federal research funds are used with a high degree of cost-effectiveness.

What is the answer? The existing system, in which Professor X produces compound Y for supply house Z, is efficient and should be retained. Payment of Professor X "under the table" by supply house Z, however, is unethical and should be eliminated. As a practical solution, I propose that Professor X receive a fair payment (perhaps in the form of an honorarium) and that the balance be returned to Professor X's grantor, or Professor X's research fund. There may be better ways of handling the problem; it is basically a question of changing an unethical practice into an "aboveboard" practice.

R. L. KATZMAN
34 Gluskin, Rehovot, Israel

Telling Time

Recent discoveries indicate that birds and insects navigate by using polarized light, even in cloudy weather when the sun is obscured. I quote from a letter James Clerk Maxwell wrote to his father about a device he made in 1848 (*1*).

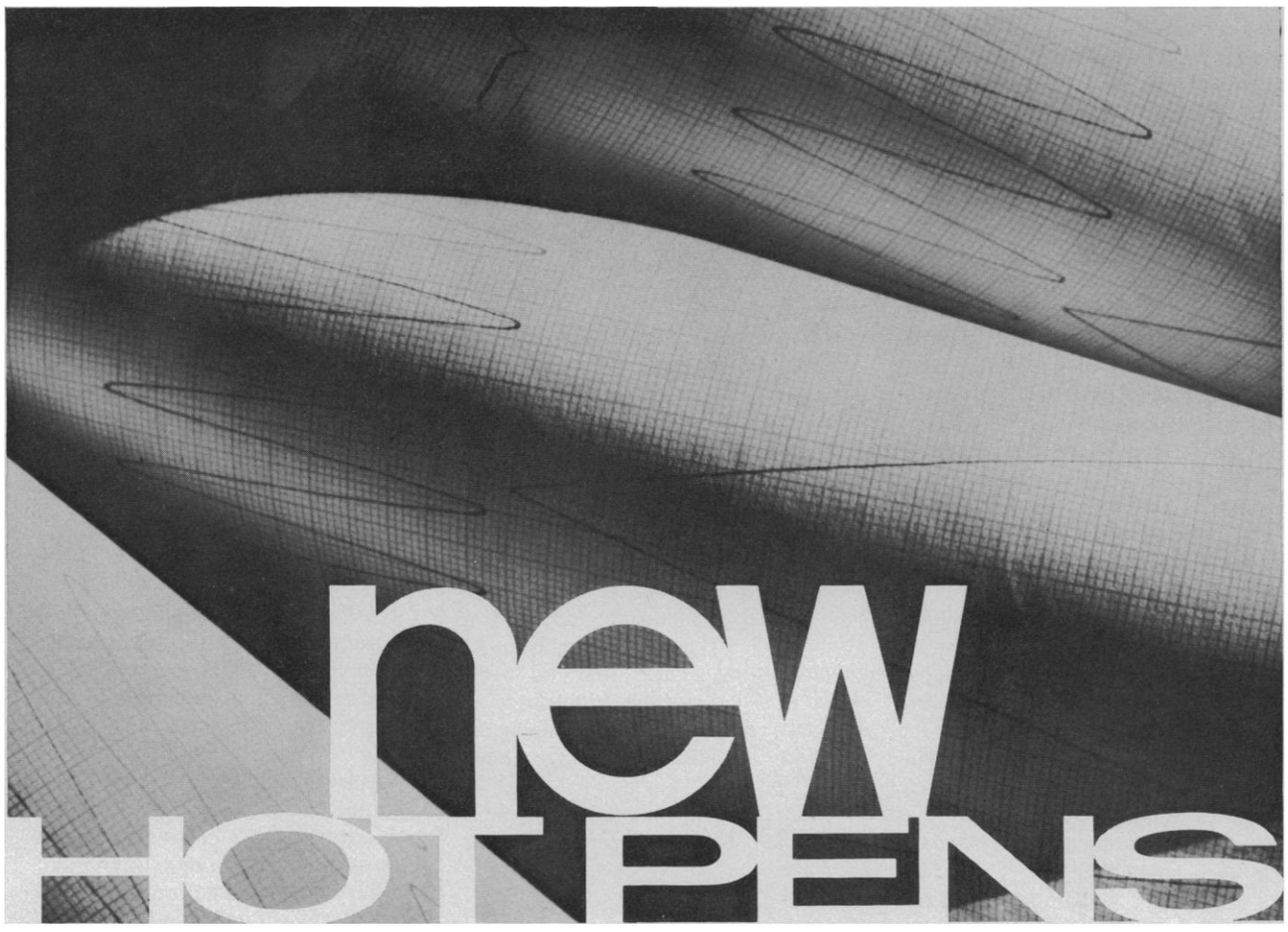
> I have got a lucifer match box fitted up for polarising, thus. The rays suffer two reflections at the polarising angle from glasses A and B. . . . In the lid there is set a plate of mica, and so one observes the blue sky, and turns the box around till a particular colour appears, and then a line on the lid of the box points to the sun wherever he is. Thus one can find out the time of the day without the sun.

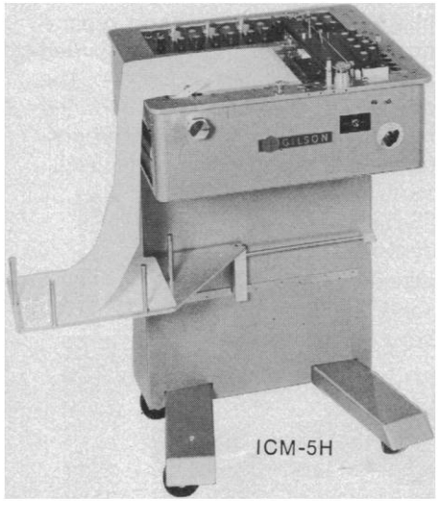
A diagram of the device is included. One is bound to ask whether the eyes of birds and (some) insects have the counterpart of Maxwell's invention in some biological structure.

ARTHUR PORGES
P.O. Box 371, Pacific Grove, California 93950

References

1. L. Campbell and W. Garnett, *Life of James Clerk Maxwell* (Macmillan, London, 1882), p. 122.





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14 June 1974, Volume 184, Number 4142 **SCIENCE**

Will There Be Enough Food?

The ancient prayer, "Give us this day our daily bread," may have a desperate urgency for hundreds of millions of human beings during the next few years. World demand for cereals and plant proteins has been soaring, in part because of population growth in the poor countries and partly because of the use of beef in the rich countries as their per capita incomes rise. World grain reserves have fallen to their lowest level in two decades, equal to only about 27 days supply. At the same time the rise in petroleum prices has created a worldwide shortage of nitrogen fertilizers and has greatly lessened the ability of farmers in the poor countries to pump water for irrigation.

The United States, the leading supplier of food exports for the rest of the world, has brought all its idle cropland into production and with luck will produce a bumper crop this year. But most of our surplus will be sold to the other rich countries at prices the poor ones cannot afford, and food aid shipments are being severely reduced. Mankind may be drawing closer to a precipice where mass starvation occurs whenever drought or plant disease results in less-than-average crop production.

How can we draw back from the precipice? An obvious, difficult, but in the long run absolutely essential, way is through reducing rates of population growth. Supplies can be increased by three lines of action: for the short term, a world food bank; for the longer term, a modernization of agriculture in the poor countries; and finally, a sharp intensification of agricultural and food research.

A world food bank should have several components—stores of wheat and other cereals and of soybeans and other legumes; stores of fertilizers to enable crop production to be quickly expanded; reserves of land which can be put under the plow in emergencies; a bank of information and technology which can be used to increase crop yields; and stores of crop genes to enable seeds of new varieties to be quickly multiplied when the old varieties are stricken by pests or plant disease.

The modernization of agriculture in the poor countries has been shown to be technically feasible by the limited successes of the Green Revolution. But it requires much more than technology. The farmers must be able to buy the fertilizer, irrigation water, high-yielding seeds, plant protection, and knowledge necessary to increase their production; and benefits they receive from selling crops must be enough greater than the cost of inputs to provide incentives for increased production. Transportation, storage facilities, markets, and profitable prices are all essential components of modernization, as are reforms in land tenure systems, greater opportunities for rural employment, and mechanisms for transfer of technology to the farmer.

The modernization of agriculture depends on continuing agricultural research not only to produce new disease-resistant crop varieties but to increase the efficiency of water use, to find ways to combat soil deterioration and erosion, and in the long run to increase the efficiency of photosynthetic conversion of solar energy to food energy, proteins, and other nutrients that are acceptable components of human diets. Equally important are research and development on improved methods of food storage and processing, plant protection against pests and disease, and research which would permit crop diversification and lead to improved diets.

The United States has become the breadbasket of the world, in large part because of successful programs of research and application of research results. American agricultural researchers need to face an even greater future task—to use their methods and their insights to make possible a vast increase in food and fiber production throughout the world. In meeting this challenge they need reinforcement from the entire scientific community.—ROGER REVELLE

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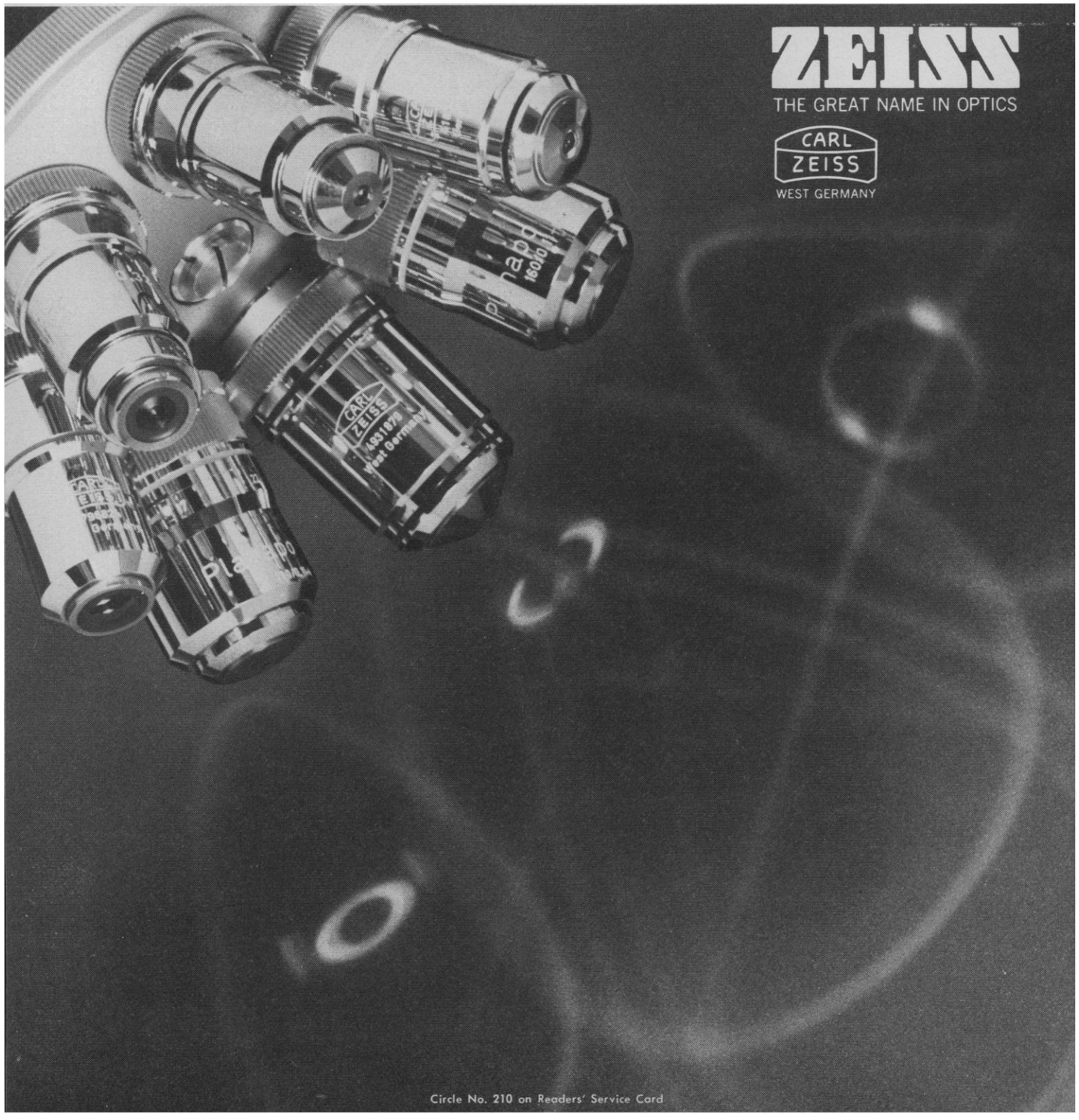

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77°K, although some work is being done at 4°K) by inorganic ions such as NO_3^- was discussed. Effects of solutes on the thermoluminescence observed from irradiated acid ices were also described. There was considerable discussion of evidences for tunneling of both trapped electrons and hydrogen atoms in experiments at low temperatures. The results of recent experiments on polymerization of formaldehyde at 4°K being conducted in the Institute of Chemical Physics (Moscow) were reported.

Discussions of the radiation chemistry of inorganic systems involved studies both in dilute solutions where abnormal oxidation and reduction states of metal ions were examined by pulse radiolysis techniques and in very concentrated solutions where considerable work is being done on effects of solutes on product formation. Studies on organic solutes focused around the oxidation of alcohols and other relatively simple oxygen-containing compounds (extensive work is in progress both in the Institute of Electrochemistry in Moscow and in the Department of Chemistry of the Byelorussian State University in Minsk). Papers were also presented on the radiolysis of aqueous solutions of both aliphatic and aromatic hydrocarbons. The sessions on biologically important systems were directed toward detailed examination of the products found in the radiolysis of solutions of various sugars, which are being studied in the Institute of Organic Chemistry in Moscow, and toward amino acids and proteins which are being studied in many of the Soviet laboratories.

All in all the symposium appeared to be very successful. As is usual for a conference of this type, considerable benefit was derived from the establishment of very fine personal contacts among the participants. The formal discussions of the presentations were somewhat limited due to lack of time but this seemed to be more than made up by extensive informal technical discussions during which the various scientists emphasized their common problems. While there may have been some reticence toward such informal discussion in cases where a language barrier existed, this reticence appeared to have been largely overcome by the assistance of many of the Soviet scientists who were able to act as interpreters.

R. H. SCHULER

Radiation Research Laboratories,
Carnegie-Mellon University,
Pittsburgh, Pennsylvania 15213

Forthcoming Events

July

1–2. National Symp. on **Water Resources Problems Related to Mining**, American Water Resources Assoc. and Colorado School of Mines, Golden. (D. T. Snow, Geology Dept., Colorado School of Mines, Golden 88040)

1–5. World Congr. of **Environmental Medicine and Biology**, Paris, France. (R. Abbou, Secretariat General et Scientifique, 115, rue de la Pompe, 75116 Paris)

1–5. British Council for **Rehabilitation of the Disabled**, 5th intern. seminar and exhibition, London, England. (I. R. Henderson, REHAB, Tavistock House (South), Tavistock Sq., London, WC1H 9LB)

3–5. European **Chemoreception Research** Organization, 1st congr., Paris-Orsay, France. (ECRO, Collège de France, 11 Place Marcelin Berthelot, 75231 Paris Cedex 05, France)

7–9. **Gamma Sigma Delta**, Brookings, S.D. (K. R. Keller, Agricultural Experiment Sta., 104 Patterson Hall, North Carolina State Univ., Raleigh 27607)

7–10. **Teratology** Soc., 14th, Vancouver, B.C., Canada. (J. R. Miller, Dept. of Medical Genetics, Univ. of British Columbia, Vancouver)

7–11. **Health Physics** Soc., 19th annual, Houston, Texas. (W. H. Parr, Physical Agents Branch/NIOSH, 1014 Broadway, Cincinnati, Ohio 45202)

7–12. **Neuropsychopharmacology**, 9th intern. congr., Paris, France. (J. R. Boissier, 2 rue d'Alesia, F75014 Paris)

7–13. American **Library** Assoc., New York, N.Y. (D. H. Clift, ALA, 50 E. Huron St., Chicago, Ill. 60611)

7–13. American College of **Chest Physicians**, London, England. (A. Soffer, ACCP, 112 E. Chestnut St., Chicago, Ill. 60611)

8–10. Society for **Economic Botany**, East Lansing, Mich. (H. G. Wilkes, Biology Dept., College II, Univ. of Massachusetts, Boston 02125)

8–11. **Circumpolar Health**, 3rd intern. symp., Yellowknife, N.W.T., Canada. (O. Schaefer, Charles Camsell Hospital, Edmonton, T5M 3A4, Alberta, Canada)

8–12. International Conf. on **Electron Lifetimes in Metals**, Natl. Science Foundation and U.S. Atomic Energy Commission, Eugene, Ore. (D. H. Lowndes, Dept. of Physics, Univ. of Oregon, Eugene 97403)

9–12. Conference on **Inter-Relation of Structure, Properties and Applications of Polymers**, Inst. of Physics, Nottingham, England. (Mtgs. Officer, IP, 47 Belgrave Sq., London, SW1X 80X, England)

14–19. Institute of Electrical and Electronics Engineers, **Power Engineering** Soc., summer mtg. and energy resources conf., Anaheim, Calif. (S. H. Gold, IEEE Energy Resources Conf., 345 E. 47 St., New York 10017)

14–19. **Illuminating Engineering** Soc., New Orleans, La. (P. C. Ringgold, IES, 345 E. 47 St., New York 10017)

14–20. **Radiation Research** Soc., 22nd annual, Seattle, Wash. (R. J. Burk, Jr., RRS, 4211 39th St., NW, Washington, D.C. 20016)

15–16. Advances in **Fertility Regulation through Basic Research**, 3rd annual, New York, N.Y. (C. A. Gallaway, Population Council, Rockefeller Univ., New York 10021)

15–18. Conference on **Nuclear and Space Radiation Effects**, Institute of Electrical and Electronics Engineers, Fort Collins, Colo. (E. A. Burke, AFCRL LOR/ Stop 30, L. G. Hanscom Field, Bedford, Mass. 01730)

15–19. **Dynamic Studies with Radioisotopes in Clinical Medicine and Research** Symp., Intern. Atomic Energy Agency, Knoxville, Tenn. (R. A. Dudley, Medical Applications Section, IAEA, Kärntner Ring 11-13, P.O. Box 590, A-1011 Vienna, Austria)

15–19. National Soc. of **Professional Engineers**, Atlantic City, N.J. (P. H. Robbins, NSPE, 2029 K St., NW, Washington, D.C. 20006)

15–20. American Soc. of **Pharmacognosy** with Acad. of **Pharmaceutical Sciences** (Pharmacognosy and Natural Products Section), 14th, Jekyll Island, Ga. (J. D. Leary, Dept. of Chemistry, Massachusetts College of Pharmacy, 179 Longwood Ave., Boston 02115)

21–26. American Soc. for **Horticultural Science**, Guelph, Ont., Canada. (C. Blackwell, ASHS, P.O. Box 109, 914 Main St., St. Joseph, Mich. 49085)

21–26. Conference on **Process Design, Operation, and Control for Safety and Reliability**, Engineering Foundation, Henniker, N.H. (EF, United Engineering Center, 345 E. 47 St., New York 10017)

21–26. **Improving Indoor Air Quality** Conf., Engineering Foundation, Rindge, N.H. (EF, United Engineering Center, 345 E. 47 St., New York 10017)

22–25. **Cancer of the Skin and Mouth-Advances in Diagnosis and Treatment**, Stanford, Calif. (P. H. Jacobs, Dept. of Dermatology, Stanford Univ. Medical Center, Stanford 94305)

22–25. American **Veterinary Medical** Assoc., Denver, Colo. (D. A. Price, AVMA, 600 S. Michigan Ave., Chicago, Ill. 60605)

22–26. American Soc. for **Photobiology**, 2nd annual, Vancouver, B.C., Canada. (R. J. Burk, Jr., ASP, 4211 39th St., NW, Washington, D.C. 20016)

22–26. **Working Place, Home and Leisure Safety** Conf., Scientific Affairs Div., North Atlantic Treaty Organization, Bad Grund, Germany. (M. Hagenkötter, Bundesanstalt für Arbeitsschutz und Anfallforschung, 46 Dortmund Marten, Postfach 25, Germany)

22–26. Symposium on the **Sterility Principle for Insect Control**, Food and Agriculture Organization of the United Nations and the Intern. Atomic Energy Agency, Vienna, Austria. (J. H. Kane, Office of Information Services, U.S. Atomic Energy Commission, Washington, D.C. 20545)

22–27. Interallied Confederation of **Medical Reserve Officers**, 28th annual, Oslo, Norway. (J. H. Kidder, 4545 Connecticut Ave., NW, Washington, D.C. 20008)

23–31. International Congr. on **Acoustics**, 8th, London, England. (Administrative-Secretary, ICA, 47 Belgrave Sq., London SW1X 8QX)

24–27. **Hormones, Homeostasis and the Brain**, 5th intern. congr., Intern. Soc. for Psychoneuroendocrinology, Utrecht, Netherlands. (D. de Wied, Rudolf Magnus Inst. for Pharmacology, Medical Faculty, Univ. of Utrecht, Vondellaan 6, Utrecht)

25–27. **Calorimetry** Conf., 29th annual, Knoxville, Tenn. (H. Watts, Research & Development Dept., Dow Chemical of Canada, Ltd., P.O. Box 1012, Sarnia, Ont., N7T 7K7, Canada)

25–27. American **Electroencephalographic** Soc., Seattle, Wash. (M. H. Henry, AES, 36391 Maple Grove Rd., Willoughby Hills, Ohio 44094)

26–2. **Applied Psychology**, 18th intern. congr., Montreal, P.Q., Canada. (G. Desautels, 195 Bloomfield, Outremont-Montreal)

28–31. American Soc. of **Animal Science**, Ithaca, N.Y. (T. J. Marlowe, Dept. of Animal Science, Virginia Polytechnic Inst., Blacksburg 24061)

28–31. National **Urban League** Conf., San Francisco, Calif. (NUL, Inc., Conf. Div., 55 E. 52 St., New York 10022)

28–1. National **Medical** Assoc., New Orleans, La. (R. D. Watkins, NMA, 2109 E St., NW, Washington, D.C. 20037)

28–2. International Assoc. of **Applied Psychology**, 18th congr., Montreal, P.Q., Canada. (G. DesAutels, IAAP, C.P. 242, Station Youville, Montreal)

28–2. International Assoc. for **Child Psychiatry and Allied Professions**, 8th congr., Philadelphia, Pa. (A. Solnit, IACPAP, P.O. Box 1974, Philadelphia 19105)

28–4. **Productivity Improvement in the Service Sector of the National Economy**, 3rd conf., Engineering Foundation, Natl. Commission on Productivity, Commerce Dept.'s Office of Telecommunications, and Natl. Bureau of Standards, Rindge, N.H. (EF, 345 E. 47 St., New York 10017)

29–2. Conference on **Dynamics of Molecular Collisions**, Santa Cruz, Calif. (J. L. Kinsey, Room 6-229, Massachusetts Inst. of Technology, Cambridge 02139)

30–1. American **Quaternary** Assoc., Madison, Wis. (W. M. Wendland, AMQUA, Center for Climatic Research, 1225 W. Dayton St., Madison 53706)

31–3. **Wildlife Disease** Assoc., Asilomar, Calif. (B. W. Hudson, Chief, Immunobiology Unit, Center for Disease Control, Ecological Investigations Program, Fort Collins Labs., P.O. Box 2087, Fort Collins, Colo. 80521)

August

1–4. International Symp. on **Microwave Acoustics**, Inst. of Physics, Lancaster, England. (J. K. Wigmore, Dept. of Physics, Univ. of Lancaster, Lancaster, LA1 4YB)

3–8. American **Pharmaceutical** Assoc., 121st mtg., Chicago, Ill. (W. S. Apple, APA, 2215 Constitution Ave., NW, Washington, D.C. 20037)

3–9. American Soc. of **Hospital Pharmacists**, Chicago, Ill. (J. A. Oddis, ASHP, 4630 Montgomery Ave., Bethesda, Md. 20014)

4–9. American Soc. of **Parasitologists**, Kansas City, Mo. (D. V. Moore, Univ. of Texas Health Science Center, 5325 Harry Hines Blvd., Dallas 75235)