SCIENCE 19 September 1969
Vol. 165, No. 3899
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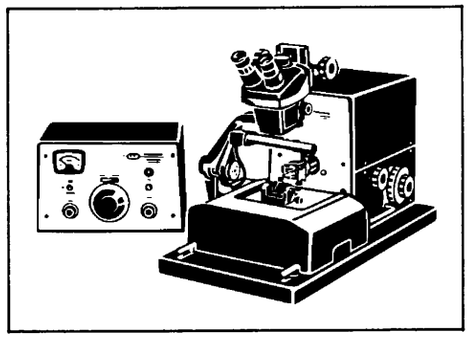

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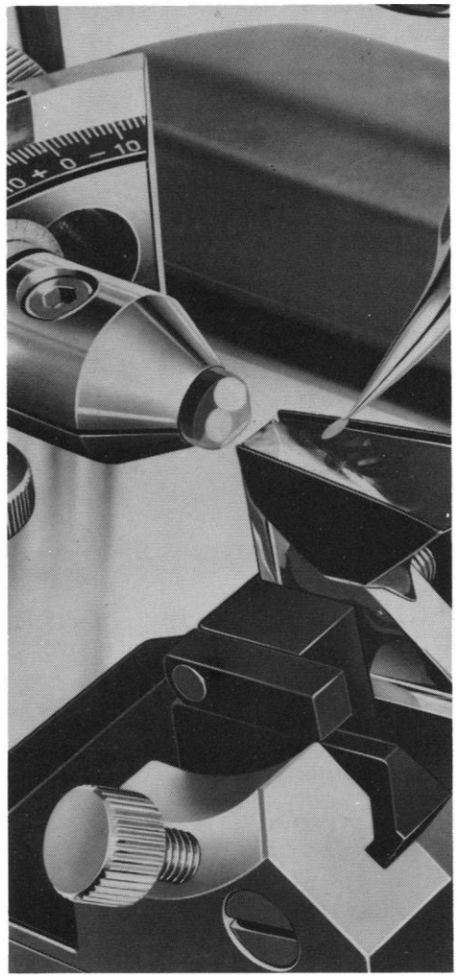

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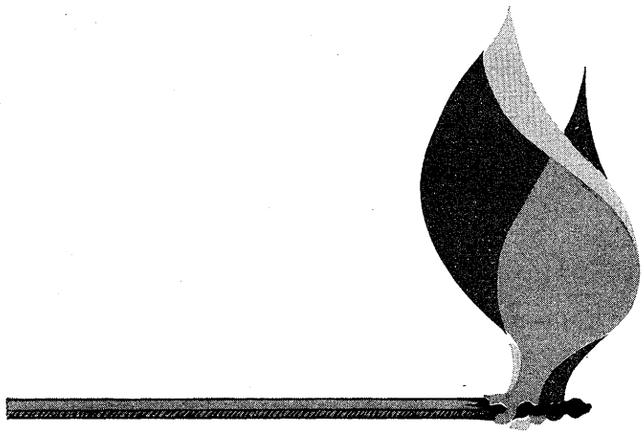

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19 September 1969
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**COVER**

Petrographic thin section, plane polarized light, of a lunar sample returned from the Apollo 11 mission. The major minerals are calcium-rich plagioclase (light-colored), clinopyroxene (gray, fractured), and ilmenite (black). This general mineralogy is typical of the crystalline rocks collected at Tranquillity Base (× 65). See page 1211. [NASA]

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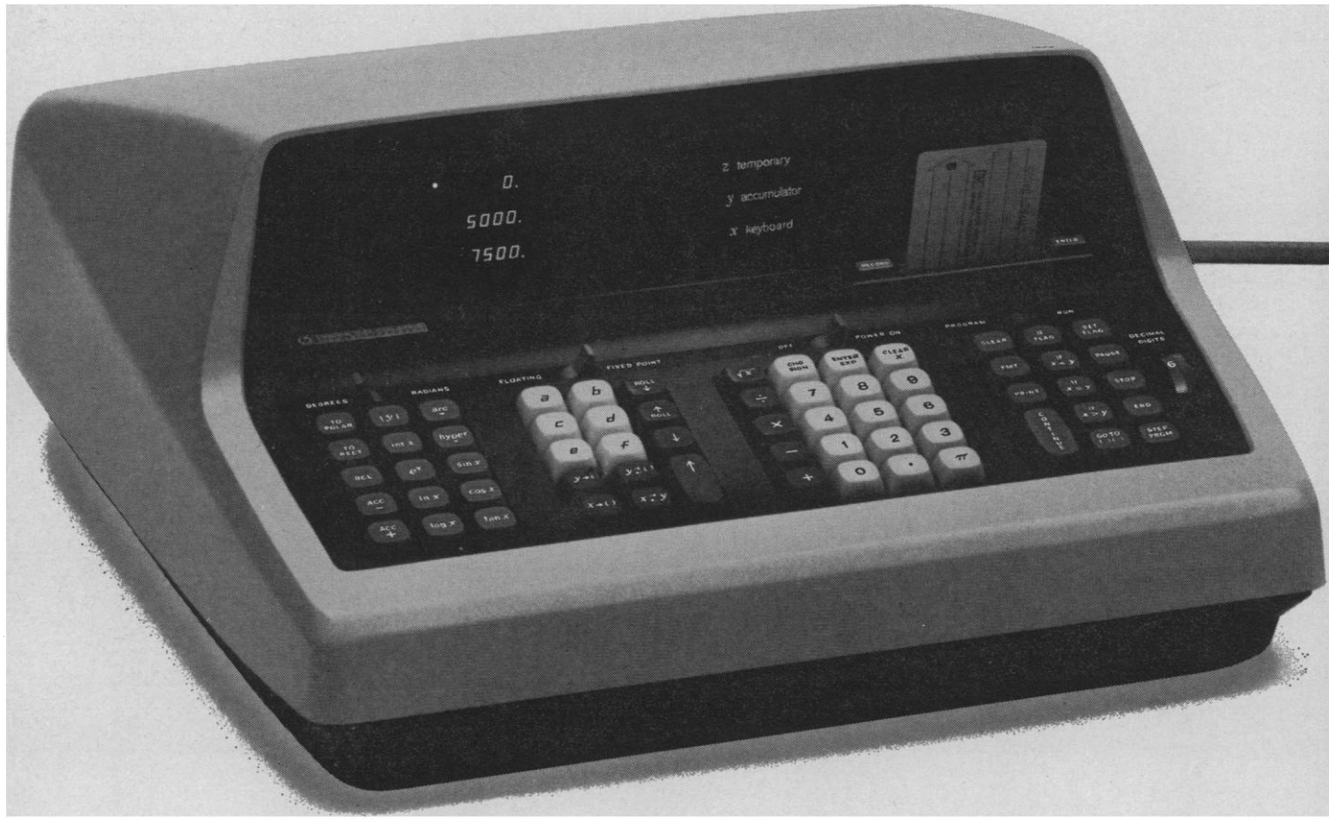


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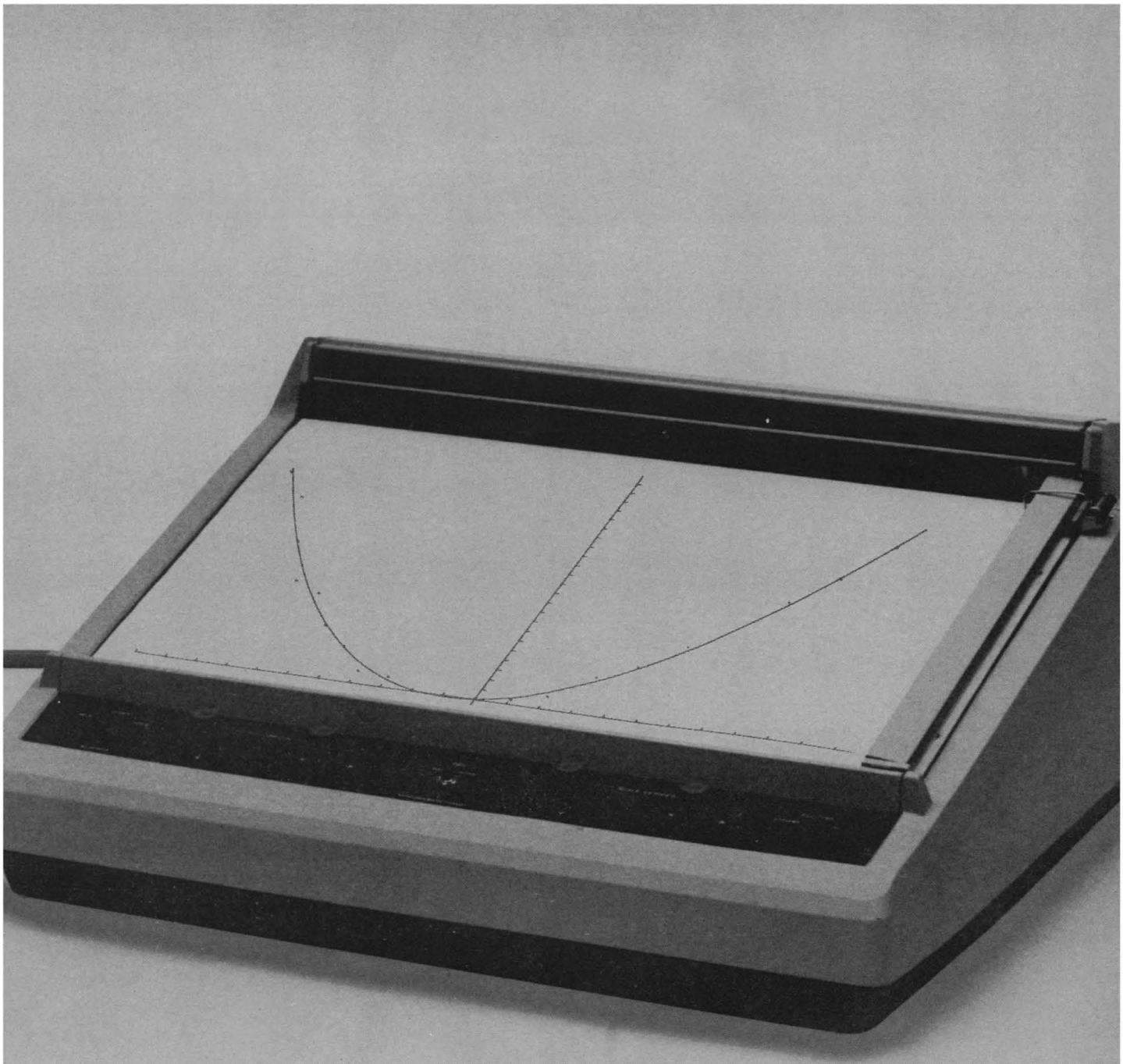

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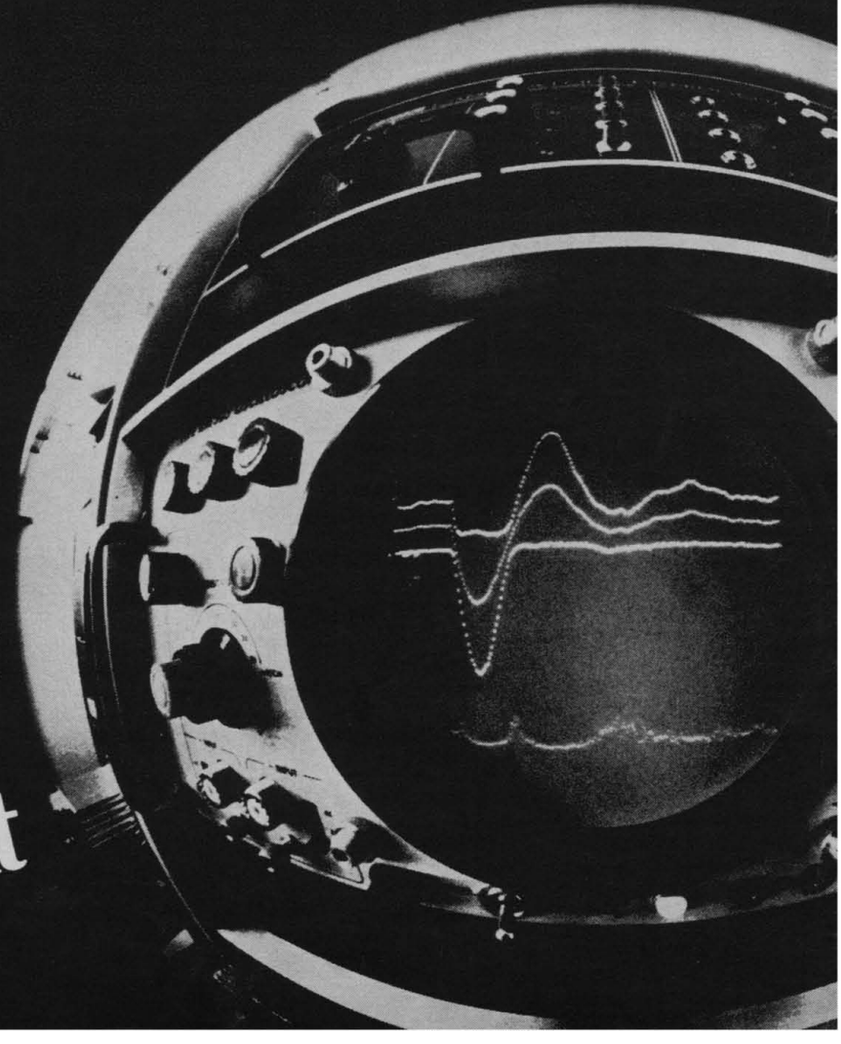

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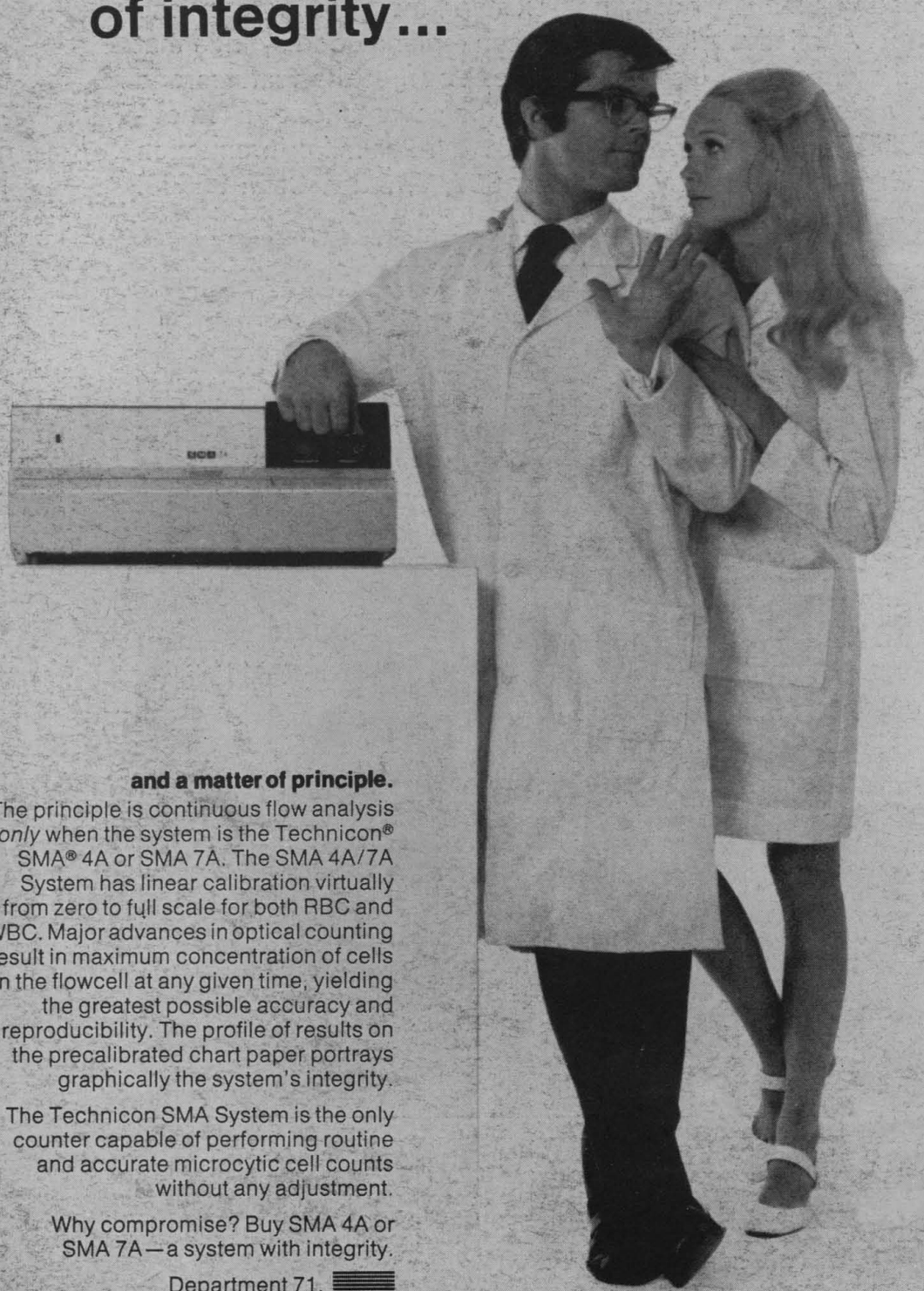

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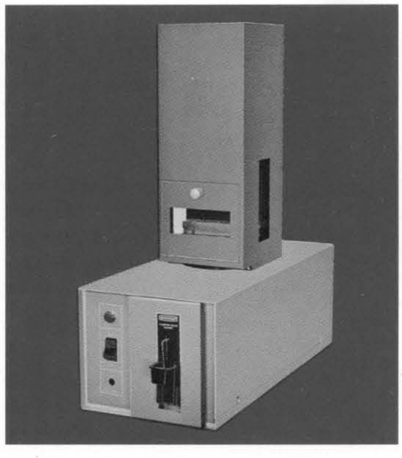

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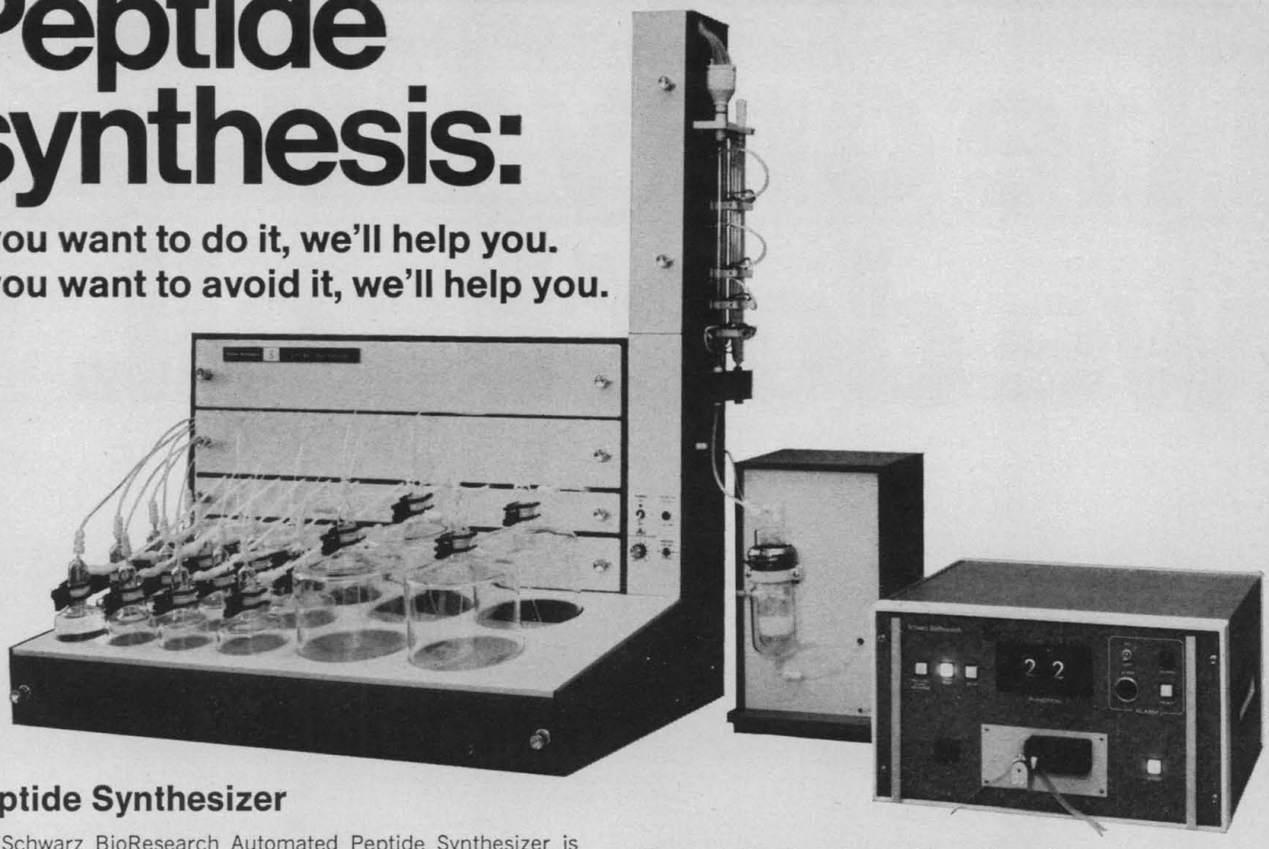

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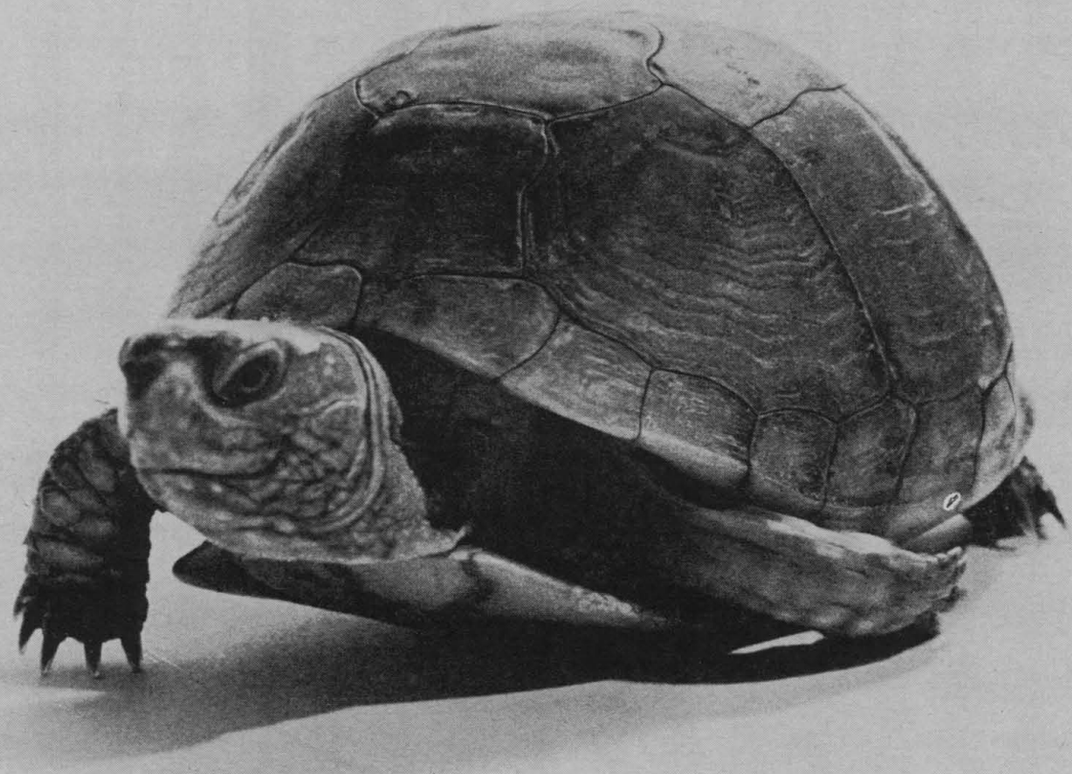

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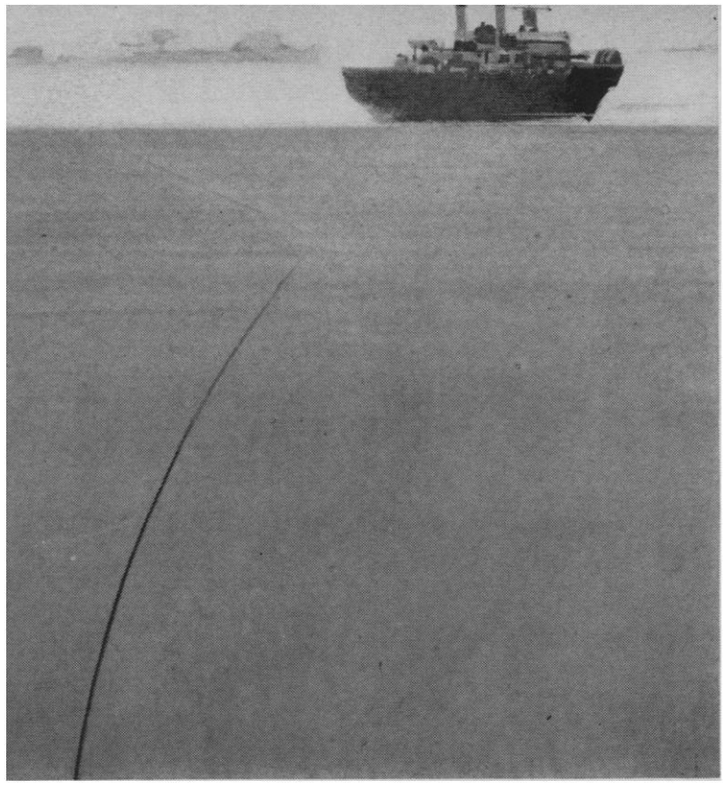


# Twenty years under the sea.

**IT'S NOT EASY** to put a telephone cable under the sea, and it's not easy to raise it later if it needs repair. So the Bell System builds it to work reliably as long as possible.

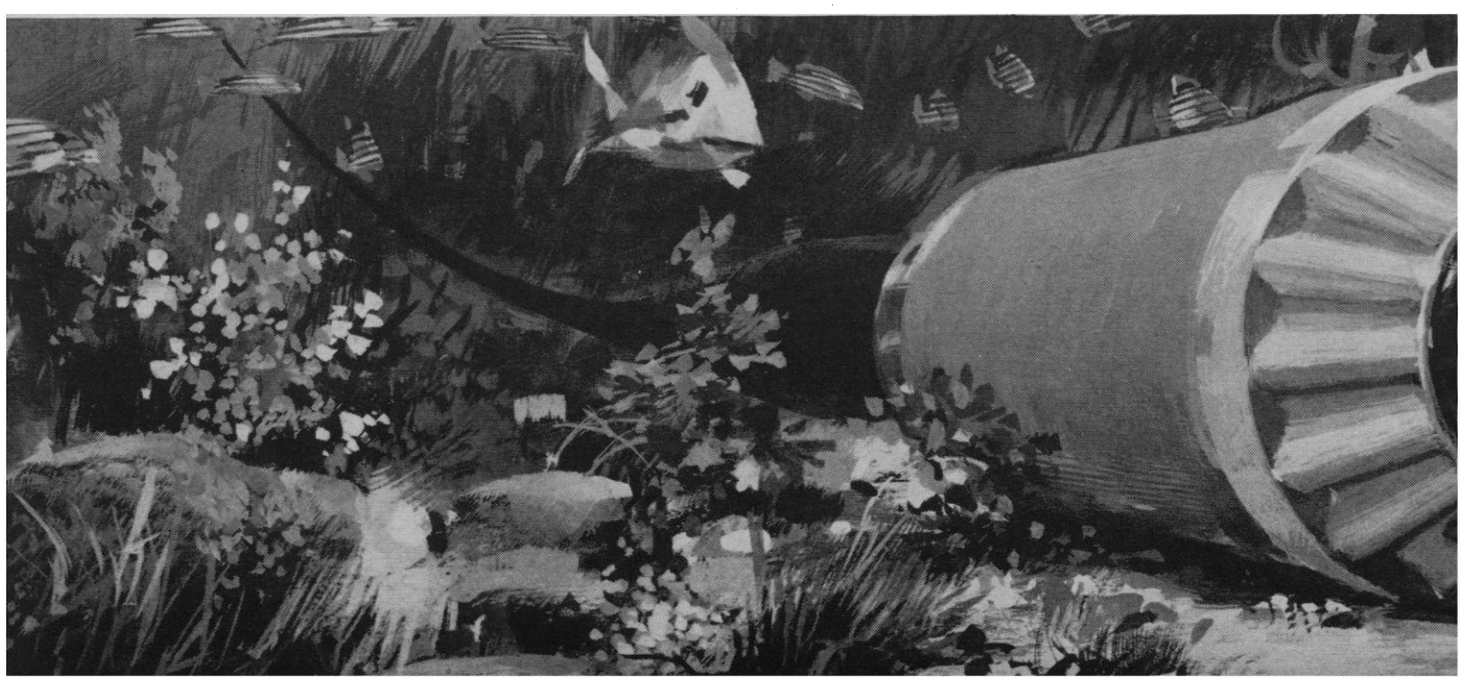
Placing such a cable is expensive, too, so it's designed to carry as many communications circuits as possible.

These two goals—reliability and economy—are not easily attained. Until 1956, in fact, it was not at all certain that a transoceanic telephone cable system could be built. It was not known, for example, if electronic amplifiers could be constructed with enough reliability to insure virtually trouble-free service for the ocean cables, or if they could handle enough traffic to make the cable system economically feasible. But these problems were overcome and the first such system was put into service that year across the North Atlantic. The system, designed by Bell Telephone Laboratories, was installed under direction of the Long Lines department of AT&T and contained deep-sea electronic amplifiers manufactured by Western Electric.

**Continuous improvements** have since been made. The 1956 system, for example, handled up to 48 telephone calls at a time. The latest system will handle at least 720 calls simultaneously.

The design and manufacturing problem is briefly this: any undersea cable system of ocean-spanning length must meet certain minimum reliability standards. For example, the system must have reasonable expectation of a 20-year lifetime without service-interrupting failures due to electronics, design, materials or manufacturing-related factors. Then, within those boundaries, the system must carry as much traffic as possible, as economically as possible.

Another important factor—the accidental cutting of cables by fishing trawlers—cannot be controlled by engineering design. But even here headway has been made

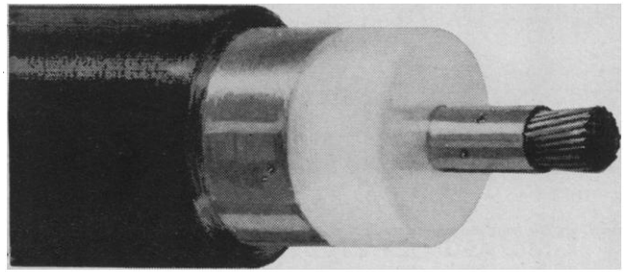


in recent years by developing techniques for plowing cables under the sea bottom on the continental shelves.

Another significant development that shaped our plans for new, improved undersea systems was the invention of the transistor by Bell Telephone Laboratories scientists. They quickly recognized the great potential for long service life of transistors and other solid-state components.

**At the same time,** however, it was recognized that any new, high-capacity system would require a much larger number of transistors and diodes than earlier systems. The larger number might counterbalance the decreased failure rate of each individual component—unless, as calculated, we could vastly improve the technology.

The standard sought was a failure rate of five per billion device hours—or, stated in other terms, an average of only one failure in 23 years for each 1000 components put on test. Such reliability standards were far more exacting than any used before.



All the work on transistors and diodes was carried out under meticulous engineering supervision. Complete records of every transistor and diode were kept.

Bell Labs and Western Electric engineers at Reading, Pa., jointly constructed an installation to accelerate the "aging" of components. The testing equipment designed for that installation is by far the most sensitive ever used for large-scale testing of semiconductor components.

The components are aged for six months or more. The testing is performed automatically under programs carefully worked out for each family of semiconductors, and the results are read into a computer. The computer compares test results against performance standards and indicates which components should be used.

Bell System care in designing, manufacturing, aging, and screening has resulted in components so stable electrically, that special high-precision test equipment had to be designed to evaluate them.

**The design and creation** of an undersea cable system reliable and efficient enough to meet modern technological demands is a major Bell System achievement. It is because of the unique working relationship between Western Electric, Bell Labs and other units of the Bell System that such achievements are possible.

BELL SYSTEM

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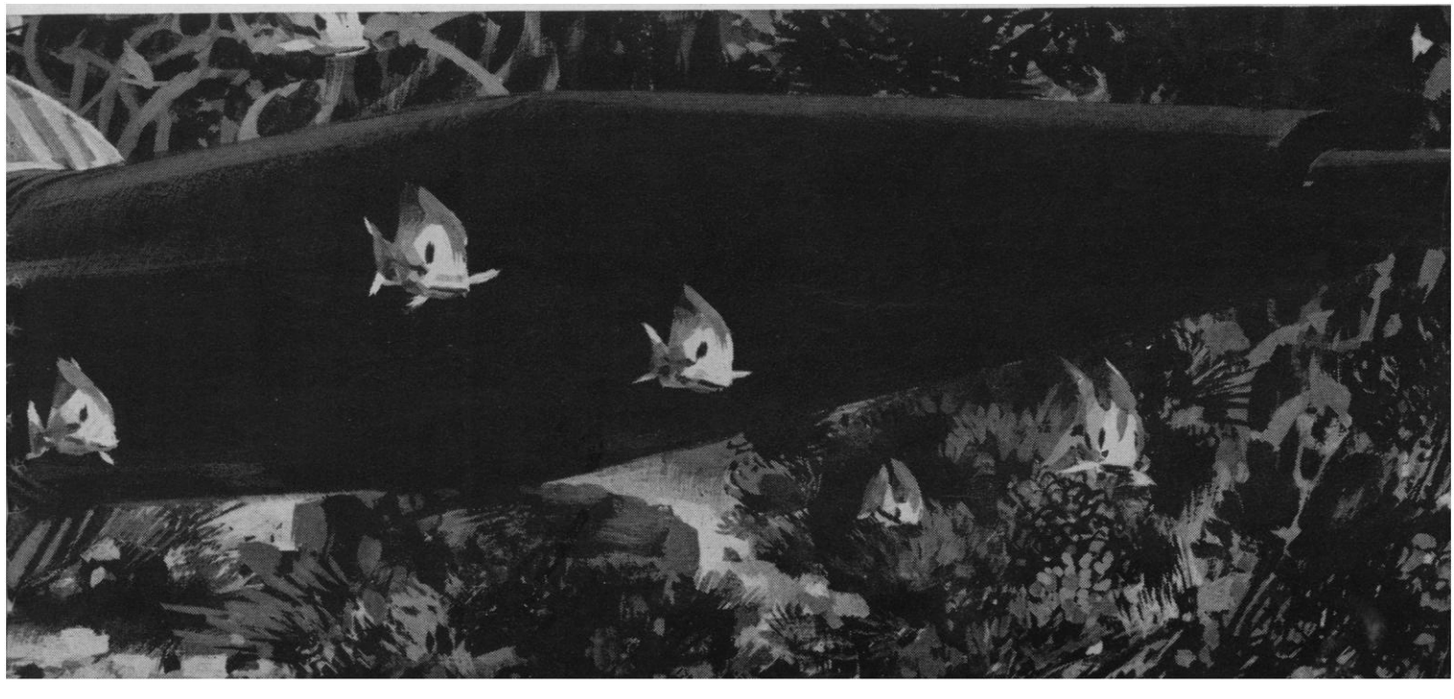

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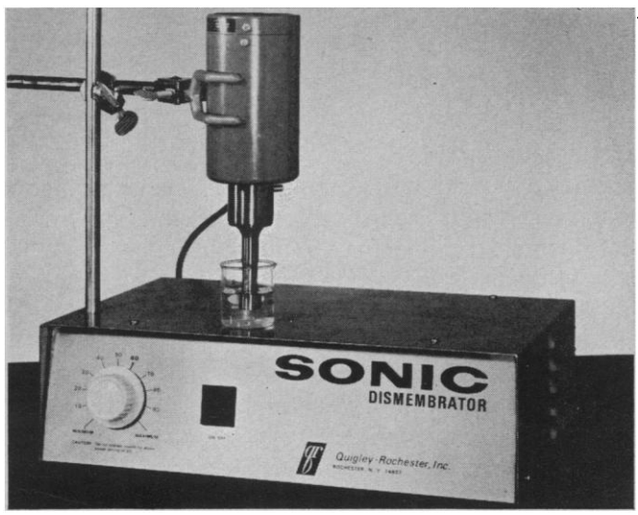


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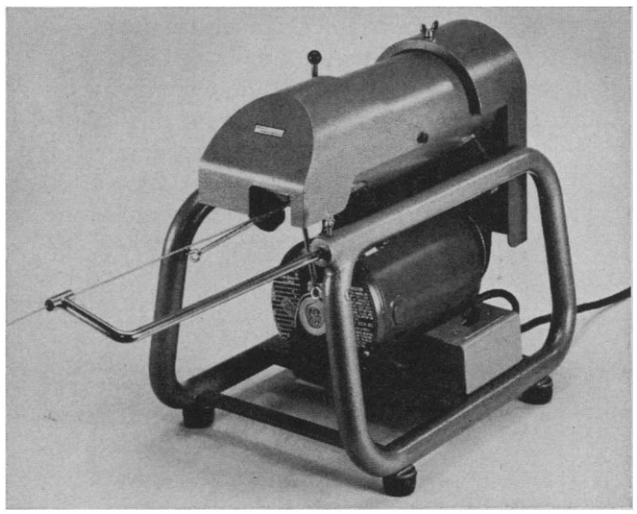
The Sonic Dismembrator is marketed exclusively through leading scientific supply dealers by Quigley-Rochester, Inc., 250 N. Goodman Street, Rochester, New York 14607. Send for literature. Q/R . . . the knowledgeable people in the field of cell disruption.



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- 99% disruption of all cells in 2-4 minutes at 4° C.
- Up to 10 grams of cells can be processed at once
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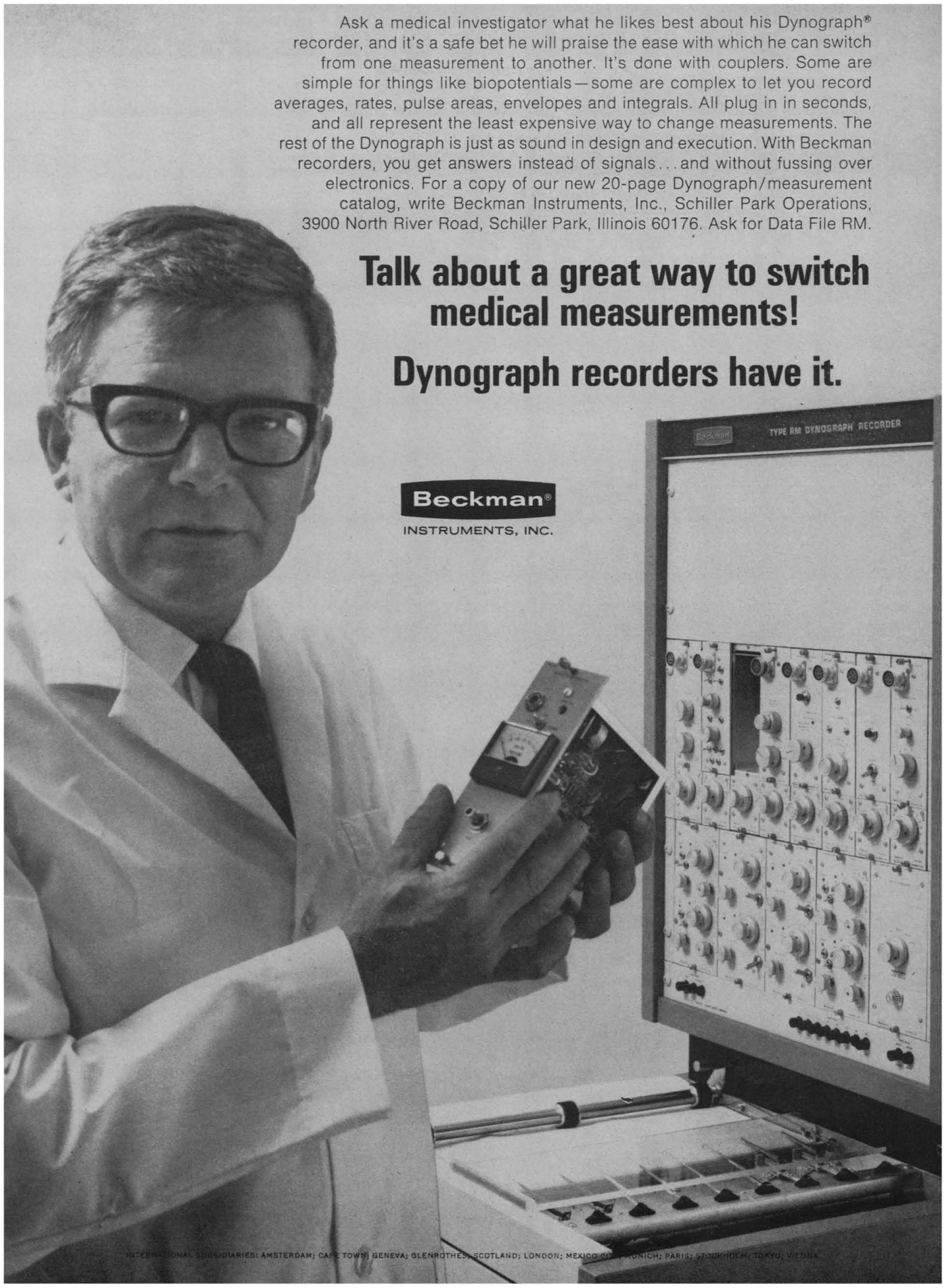
Ask a medical investigator what he likes best about his Dynograph® recorder, and it's a safe bet he will praise the ease with which he can switch from one measurement to another. It's done with couplers. Some are simple for things like biopotentials—some are complex to let you record averages, rates, pulse areas, envelopes and integrals. All plug in in seconds, and all represent the least expensive way to change measurements. The rest of the Dynograph is just as sound in design and execution. With Beckman recorders, you get answers instead of signals... and without fussing over electronics. For a copy of our new 20-page Dynograph/measurement catalog, write Beckman Instruments, Inc., Schiller Park Operations, 3900 North River Road, Schiller Park, Illinois 60176. Ask for Data File RM.
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# What makes one constant temperature circulator better than another?

## For one thing, the Lauda Duplex Pump.


All constant temperature circulators heat. Some, like the Lauda K-2/RD shown here, also cool. But this Lauda model can do even more. Its duplex pump enables it to circulate liquid to and from an external open bath, no matter whether the bath is positioned higher, lower or level with the circulator. Liquid will always return to the K-2/RD because its duplex pump provides simultaneous pressure and suction. You won't find this feature on many constant temperature circulators.

Another nice thing about this Lauda is its automatic liquid level control. It prevents accidental emptying of the bath by balancing pressure and suction, thereby keeping liquid levels constant in all parts of the system. These features add up to a better, more versatile circulator.

Besides the K-2/RD, which circulates liquids at temperatures from −10°C to 150°C, duplex pumps and the automatic liquid level control are also available in our N and WB series models. Some of these heat up to 330°C, or cool down to −130°C. Of course, solid state relays, excess load protection, drainage and flow control valves and stainless steel construction of all immersed components are standard on all Lauda Circulators.

Which Lauda is best for you? Get our free catalog to help you decide. Write: Lauda Circulators, Division of Brinkmann Instruments Cantiague Rd., Westbury, N.Y. 11590. In Canada, write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Boulevard, Rexdale (Toronto) Ont.

**LAUDA Circulators**

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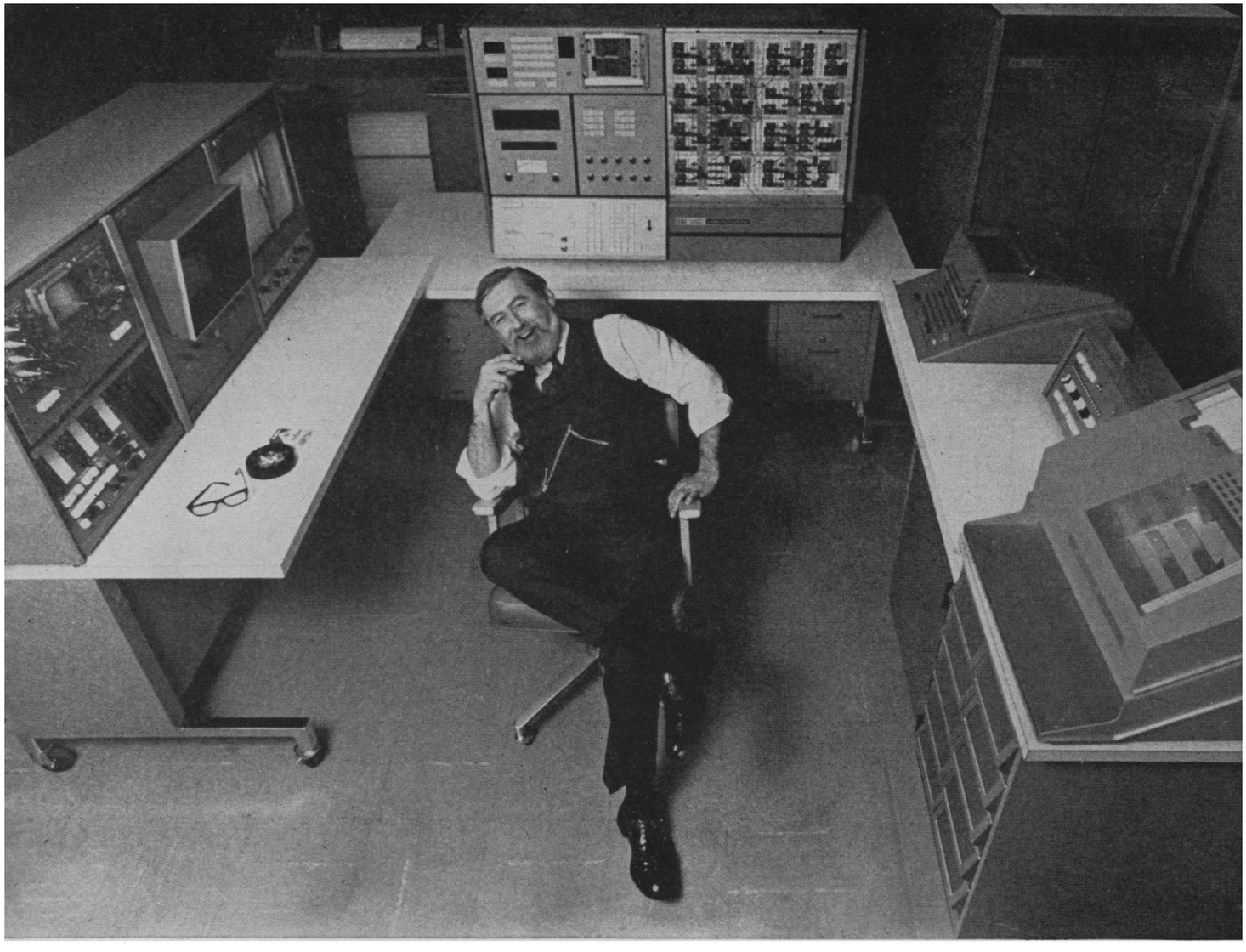

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But especially because the 590 is a fully-integrated hybrid system. Born out of the field-proven success of the only other standard hybrids in the world—the EAI 690 and 8900.

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With the new Beckman Kintrac VII Spectrophotometer System, most analyses can be automated and specific studies, such as reaction kinetics, performed with new ease. Whatever the problem, Kintrac VII can reduce the tedious, time-consuming mechanics to a minimum.

Six samples and a reference are accommodated simultaneously with controls independent, precalibrated and direct reading for each of the seven channels. Data is conveniently presented on a recorder chart so you needn't plot it manually. Optional readout accessories such as a digital panel meter or teletype with tape punch can tailor the system to your specific needs.

All samples are mixed continuously throughout the entire measuring cycle with a magnetic stirrer. The Beckman thermocirculator assures sample temperature regulation to ±0.1°C. Reagents may be added without disturbing the sample cuvettes.

The linear absorbance range is 0-3A with zero suppression to 2.9A. Variable scale expansion permits display of any 0.1A full scale over the entire range. To match your needs, systems are available with dual wavelength programming, automatic $I_0$ correction and true multi-point recording.

Kintrac VII is another example of how Beckman won its leadership in spectrophotometry. For full information write for Data File 109, Scientific Instruments Division, Beckman Instruments, Inc., 2500 Harbor Boulevard, Fullerton, California 92634.

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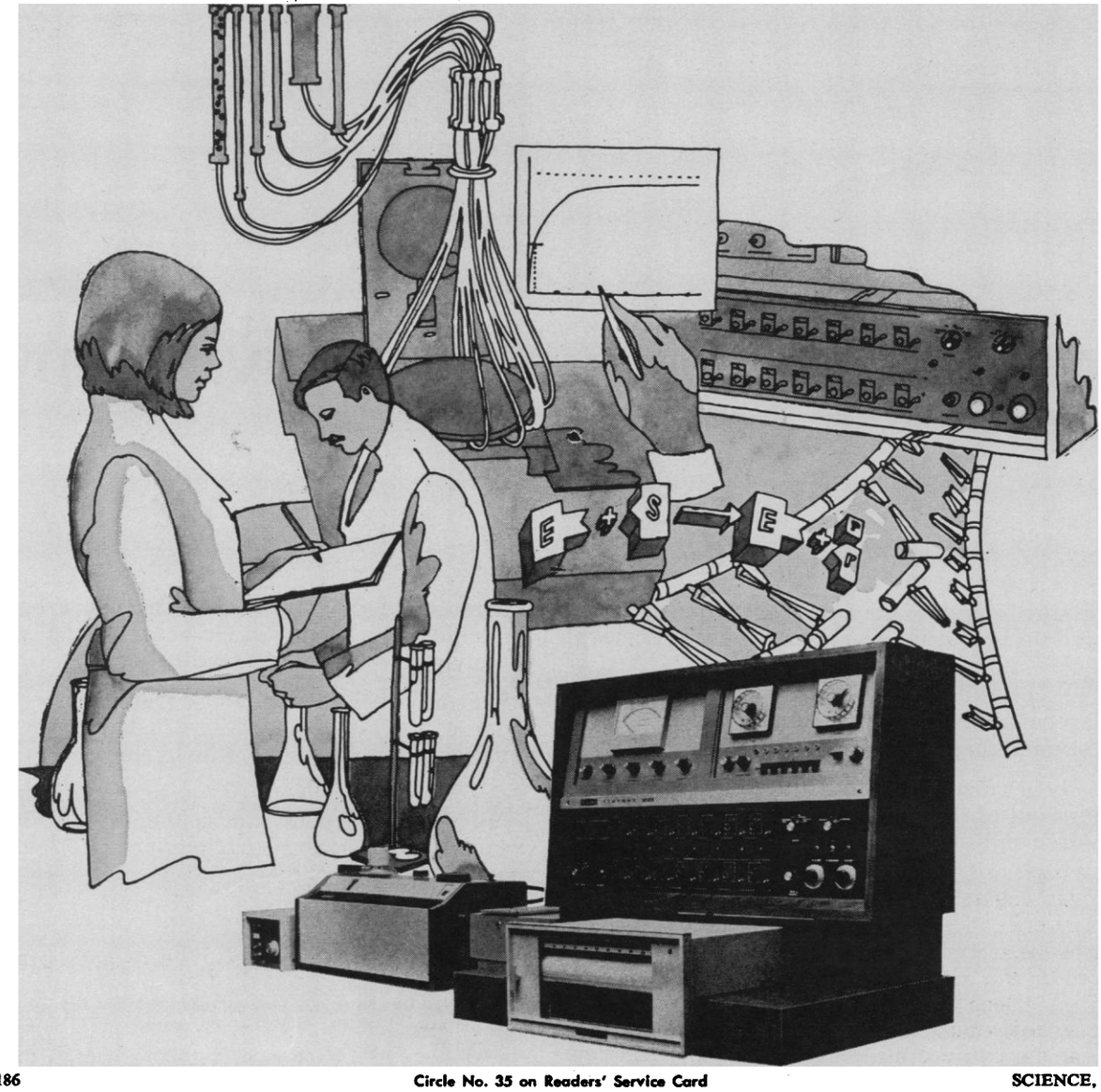
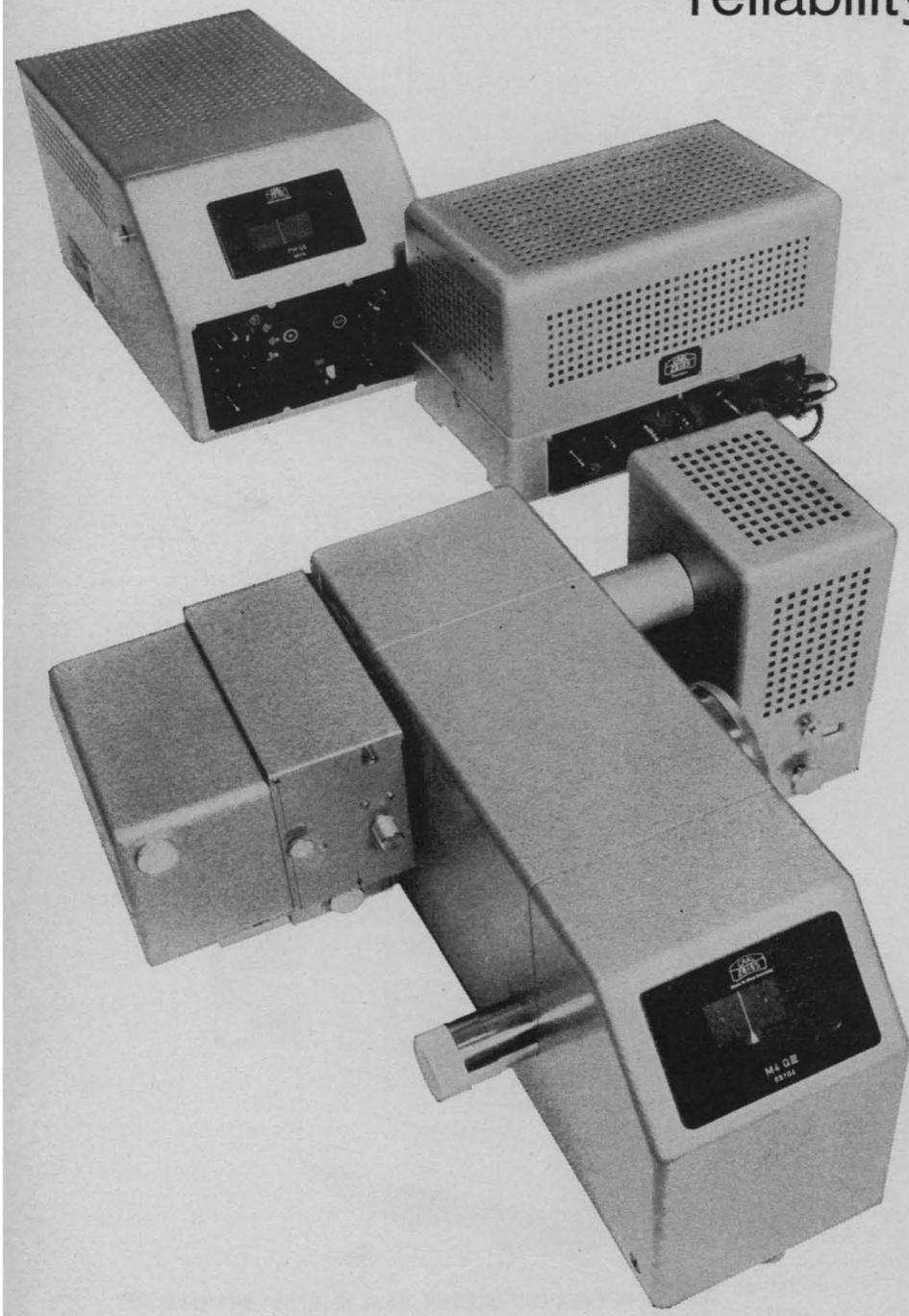
# Kintrac VII™: the new way to say automated spectrophotometry



# Why is it hard to convince users of the ZEISS PMQ II Spectrophotometer to buy a service contract?

## Because they are sold on the PMQ II's reliability.



One major university has had eight Zeiss PMQ IIs for from 5 to 8 years with never a breakdown in any of them. So they questioned the need for a service contract. Our answer, of course, is that the service contract is really worthwhile to keep the instrument at top-performance level. But even so, it's quite a testimony to the PMQ II.

We would like to point to the seven big factors that contribute to its reliability:

(1) The monochromator is absolutely backlash-free. Couple this with the no-parallax readout, and you have accuracy and reliability in wavelength and slit setting far beyond any other instrument.

(2) The craftsmanship of the light source is unmatched. What's more, it's so made that replacing a lamp (either tungsten or deuterium) is easy, aligning it is positive, and, once aligned, it stays put.

(3) For utmost stability, the instrument is constructed of strong castings and heavy gauge sheet metal.

(4) The chemical-resistant enamel finish is baked onto the surface for permanence.

(5) The electronics system, with its built-in check-out, is so reliable our most experienced technical rep has never seen an unstable detector.

(6) The built-in wavelength calibration is the soul of simplicity to use.

(7) The versatility of the instrument is such that, with the proper modules, it can be used for TLC, Kinetics, and Atomic Absorption.

For the full story on the reliable, accurate, and versatile PMQ II (and on a fine nationwide service policy), write Carl Zeiss, Inc., 444 5th Ave., New York, New York 10018.

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Seismic disturbances? Heavy traffic? Air conditioning equipment? No matter what the cause of vibration, we can make your piece of earth stand still. Single instruments or entire buildings can be effectively isolated from shock and vibration with the patented, proven Serva-Levl® system.

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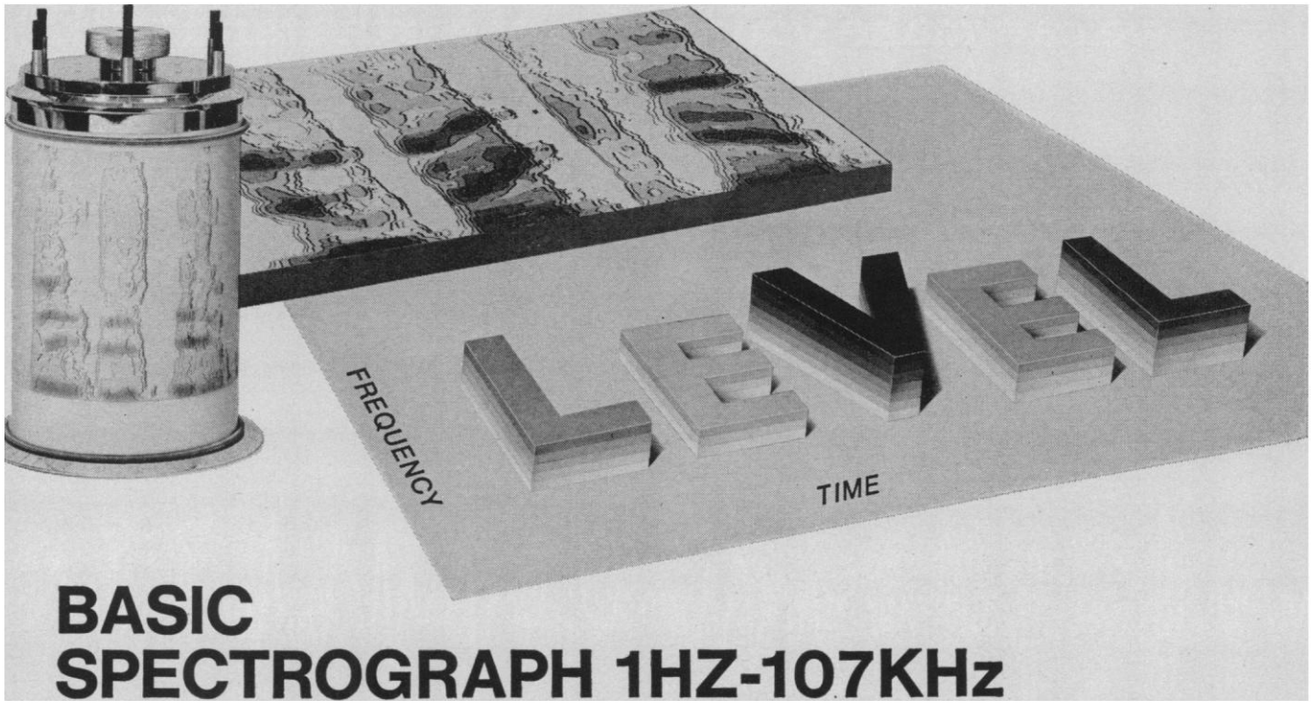
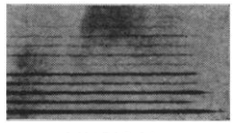
# KAY Sound Spectrographs do for sound or electrical signals what a spectroscope can do for complex light. They can sample a signal and print out a graph showing all component frequencies, their relative levels and their duration.




**BASIC SPECTROGRAPH 1HZ-107KHz**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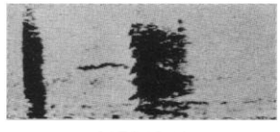
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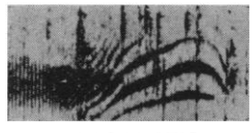
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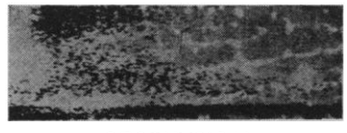
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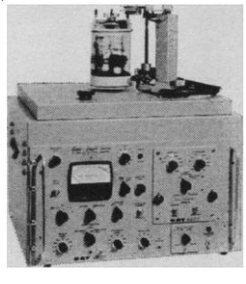

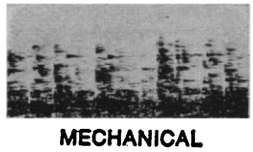
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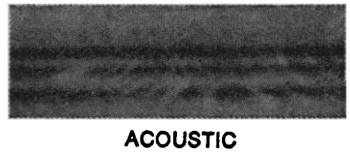
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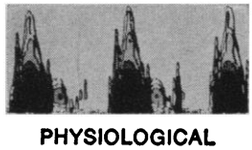
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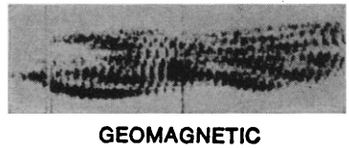
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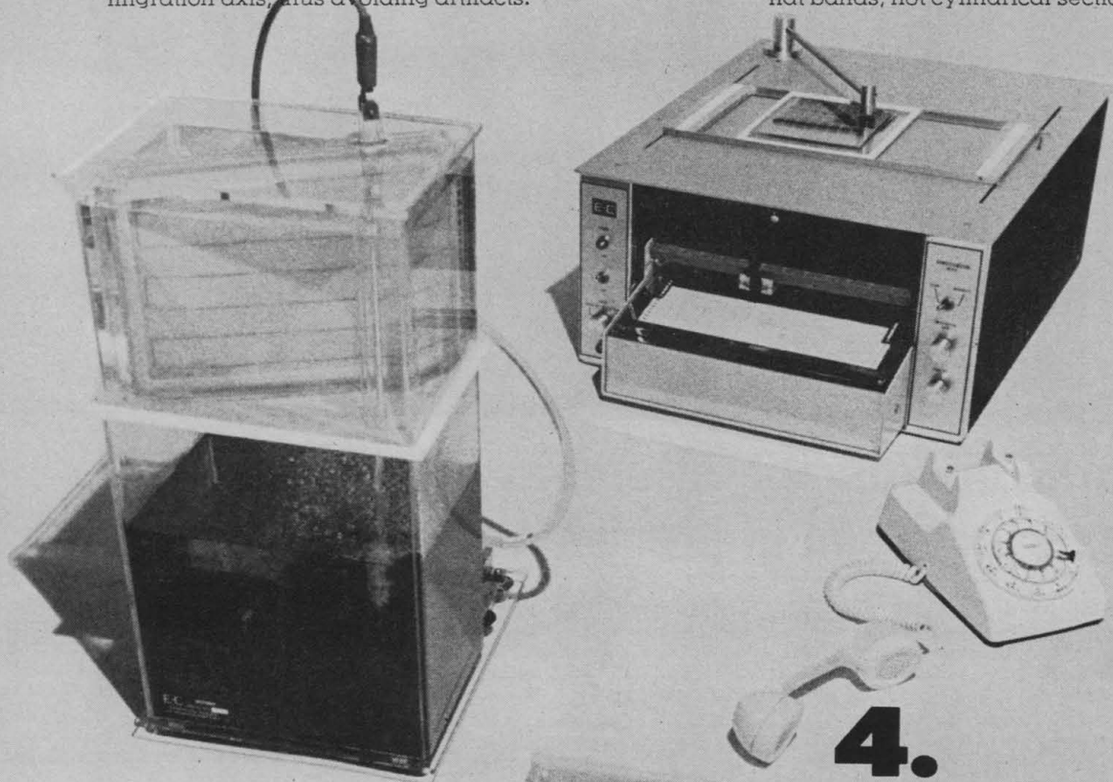
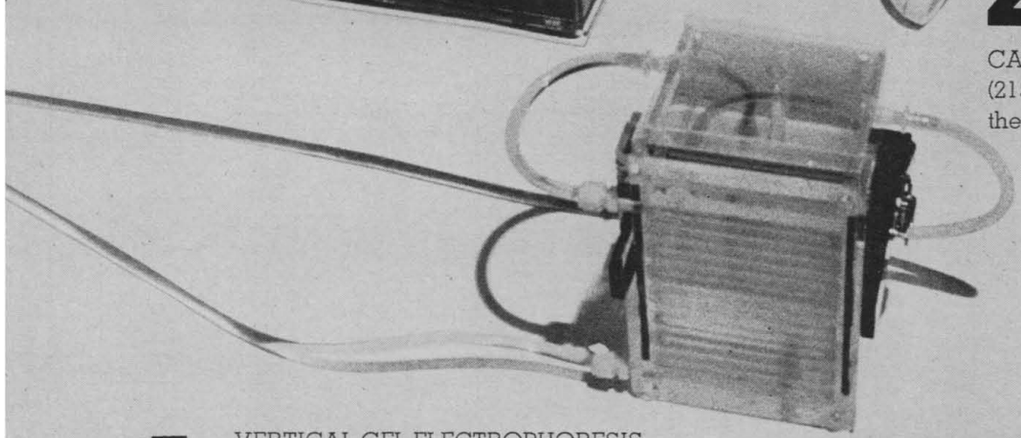


**4.** CALL TECHNICAL SERVICE COLLECT (215) 382-9100 for further details. Or send the coupon.



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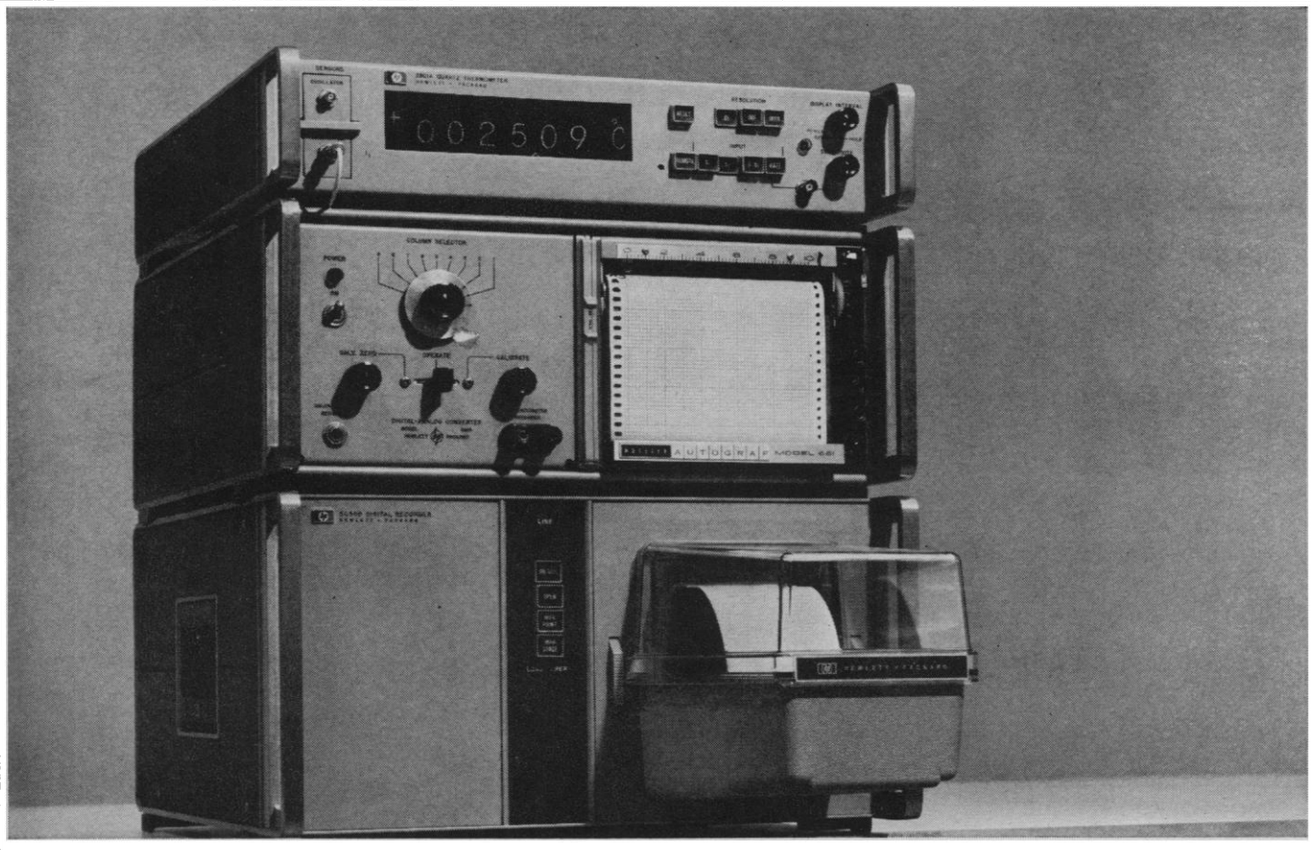


# Digital instrument automates data acquisition in precision thermometry

The HP Model 2801A Quartz Thermometer is a convenient digital instrument whose resolution (0.0001°C) and accuracy (up to 0.004°C) make it an ideal laboratory standard for precision thermometry. In addition, its extremely versatile data output capability can eliminate the tedious chores of data gathering and reduction usually associated with such work . . . and greatly reduce its cost.

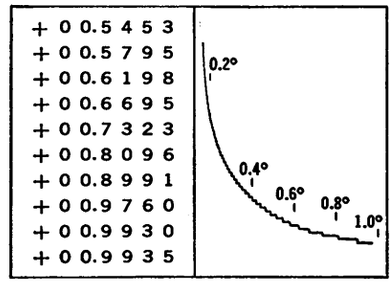
**Digital Display.** Start with the 2801A's basic capability: it measures either of two temperatures or the difference between them and displays the measurement in °C or °F directly, to a resolution of 0.0001° . . . automatically repeating the display at regularly spaced time intervals that are repeatable within 3 milliseconds. Through its standard Rate input, the 2801A can also measure any second variable that can be converted to frequency and display it within ±0.1 Hz, within a range of 2 Hz to 300 kHz.

**Digital Output.** All 2801A's have a standard digital output in BCD code, to drive digital recorders, tape punch, magnetic tape recorders or computers. When used with the HP 5050B Digital Recorder, the 2801A measurement is automatically printed out in six digits with coded identification, if desired, of polarity, resolution and mode ($T_1$, $T_2$, $T_1$-$T_2$ or Rate). In the example shown here, 2801A measurements of temperature rise were automatically printed at precisely spaced 10-second intervals, thus greatly facilitating record-keeping and subsequent integration of data.

**Analog Output.** 2801A measurements can also be recorded graphically on an HP Strip Chart Recorder, through a D to A converter. The converter permits high-resolution analog recording (as high as 0.001°C full scale with the 100 sec. option for the 2801A) or, if desired, low-resolution based on any three successive digits of 2801A output. In the example at right, for instance, the same temperature rise data printed by the 5050B to a resolution of 0.0001°C was also recorded by an HP Strip Chart Recorder, with full scale sensitivity set for 1.00°C; the resultant analog record gives a clear indication of temperature rise trend and allows the scientist to detect visually the end of the rise as it approaches equilibrium.

For full information, call the nearest HP sales office or write for Data Sheet 2801 and Application Note 78-3. Basic price for the 2801A is $3250; for the 5050B with 10 data columns, $2400; and for the 680 Strip Chart Recorder with D/A option, $1325.

Hewlett-Packard, Route 41, Avondale, Pennsylvania 19311. In Europe: 1217 Meyrin-Geneva, Switzerland.




Digital (left) and analog record of 2801A temperature rise measurement

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ANALYTICAL INSTRUMENTS

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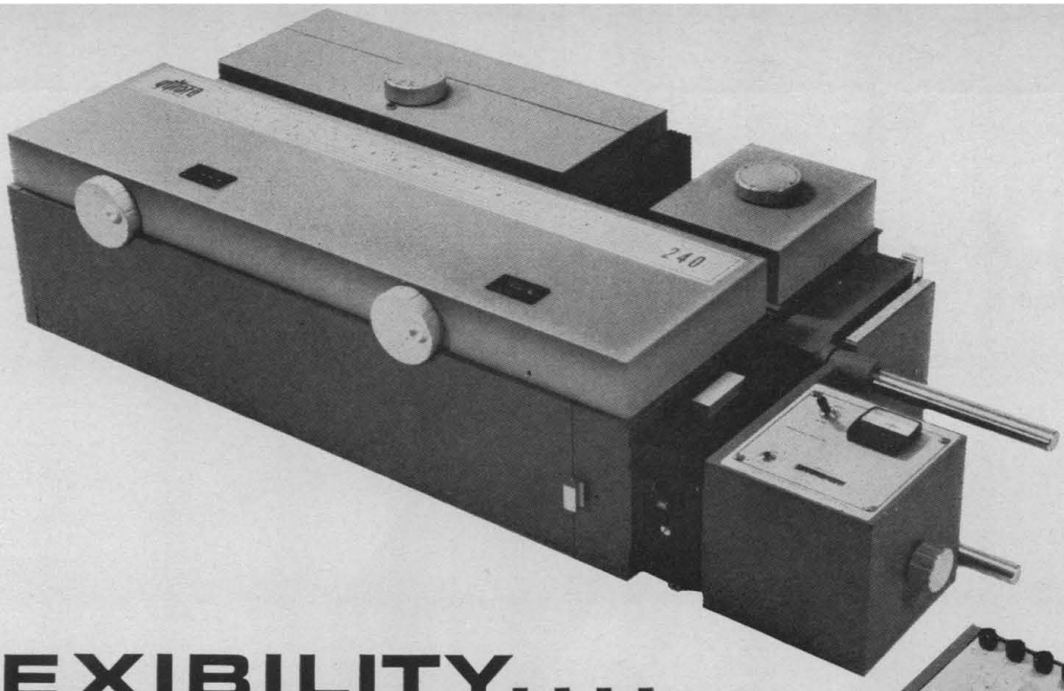


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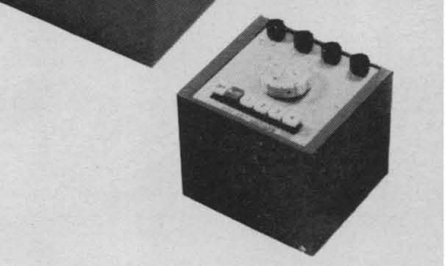
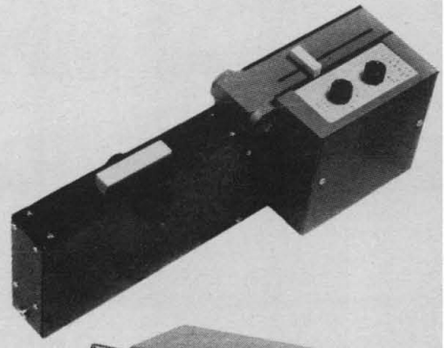
Multiple sample handling, gel scanning, wavelength scanning and flow through monitoring are but a few capabilities provided by the building block design of Gilford spectrophotometric instruments.

Whether you are interested in a manual or an automatic spectrophotometer, with either single or multiple sample handling systems, call your Gilford representative and let him show you how the Gilford building block concept guarantees the flexibility to meet your growing needs.

Write for your copy of *Gilford Bibliography No. 4* relating to enzyme kinetics and other applications of Gilford Spectrophotometers, or phone 216/774-1041.





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# From counting vial to finished form— a liquid scintillation system that begins where others stop.

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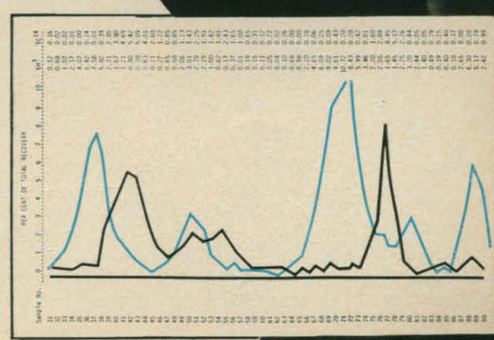
One control selects any of seven standard printout formats. What's more, SL-40 systems accept special programs to fit your specific needs.

"User Oriented" is the best way to describe the SL-40. It features • three separate channels of pulse height analysis plus two additional channels for external standardization • instant channel setup with pre-calibrated channel settings for single and dual label samples • controlled temperature operation • 200 sample capacity • push button sample handling . . . and more.

For more information plus sample graph printouts, contact your Intertechnique representative or Intertechnique Instruments, Inc., Randolph Industrial Park, Dover, New Jersey 07801. Telephone: (201) 361-5550.



Assay showing percent recovery of $H^3$ and $C^{14}$ printed out and plotted . . . *on line*

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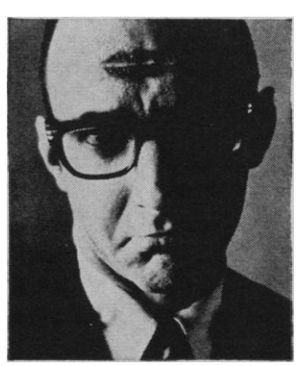

S/P doesn't woo you, win you, then kiss you goodbye when something goes wrong. We service every one of the scientific instruments we sell. If you have an equipment or instrument breakdown, a phone consultation with an S/P Specialist usually will set things right. But if it doesn't, S/P has local repair service, too. The quality products we represent are reliable. Still it's nice to know that if anything does go wrong, we'll do right by you. S/P . . . the single source for laboratory equipment, supplies, scientific instruments. Scientific Products, a division of American Hospital Supply Corporation, 1210 Leon Place, Evanston, Illinois 60201. Look for the nearest S/P office in the Yellow Pages in major cities.

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# Need any other good reasons to try new EM aluminum-backed TLC sheets?

**In terms of cost, versatility and convenience, these new aluminum-backed silica gel, aluminum oxide, cellulose and polyamide-layered TLC sheets are nothing short of revolutionary.**

Not only do they cost less than any other pre-coated system, but they are completely adaptable to your own particular needs. You can bend them into any shape you wish, cut them to any size you require, even punch them for easy filing. To develop, just stand them in a tank (they require no special support and will not collapse). These sheets also have a thick, abrasion-resistant layer that will not flake, permitting stacking and compact packaging.

Need more good reasons? Consider these: You can use EM aluminum-backed TLC sheets with almost all popular solvents (except aqueous solutions). They may even be sprayed with aggressive reagents, such as sulfuric acid.

Cost-wise, our popular 20 x 20 cm sheets coated with a 250 μ layer of silica gel are less than 60 cents each in quantity.

Doesn't this sound like the kind of TLC sheet you've always hoped for? If it does, we'd be happy to send you a free sample (and our catalog).

Just write: EM–Reagents Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590.

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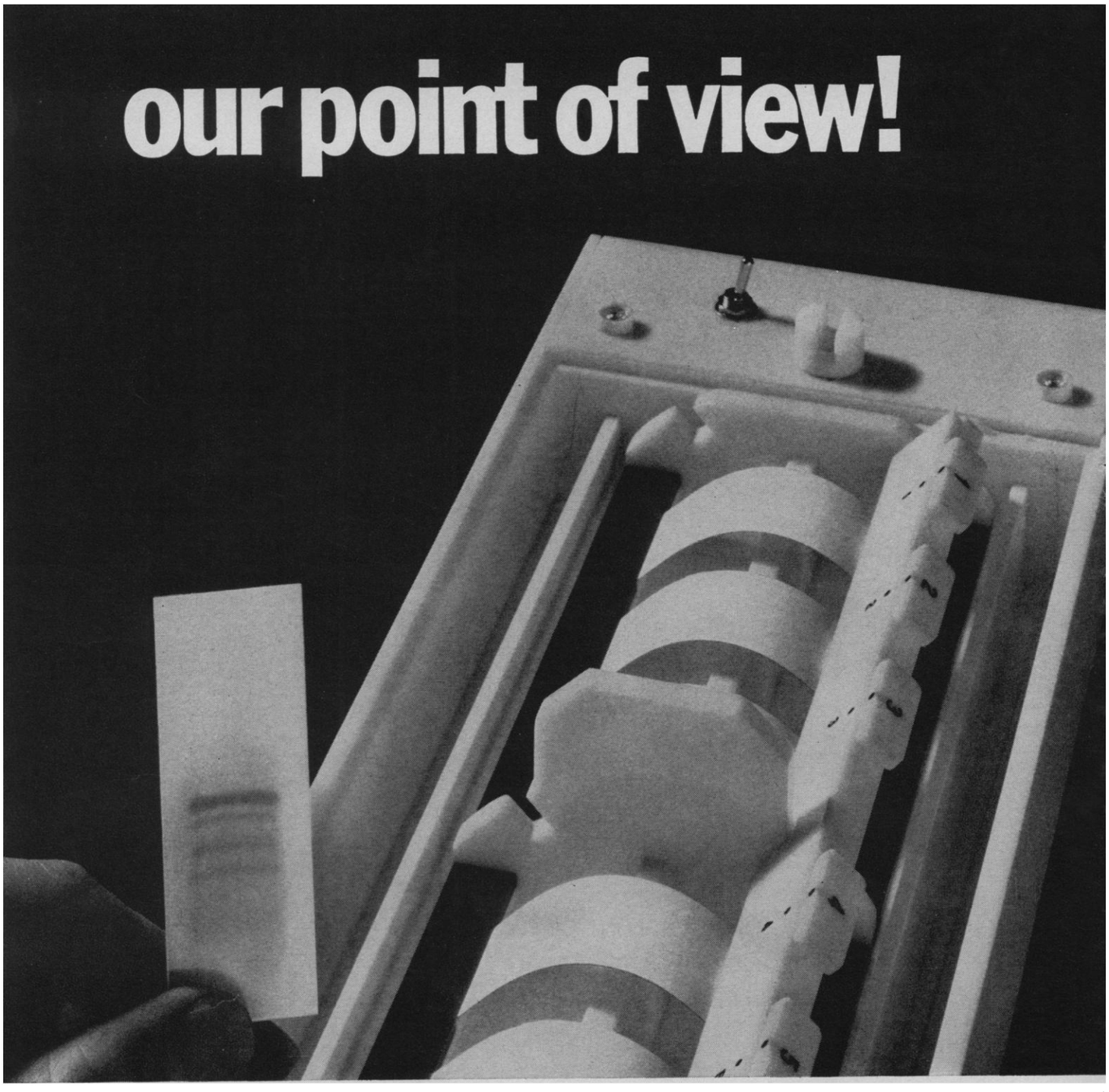
# our point of view!



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*'o more variable applications.* Built-in guide rovides in-chamber application. Sample posi- on, quantity and alignment always the same.

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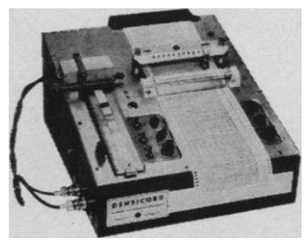

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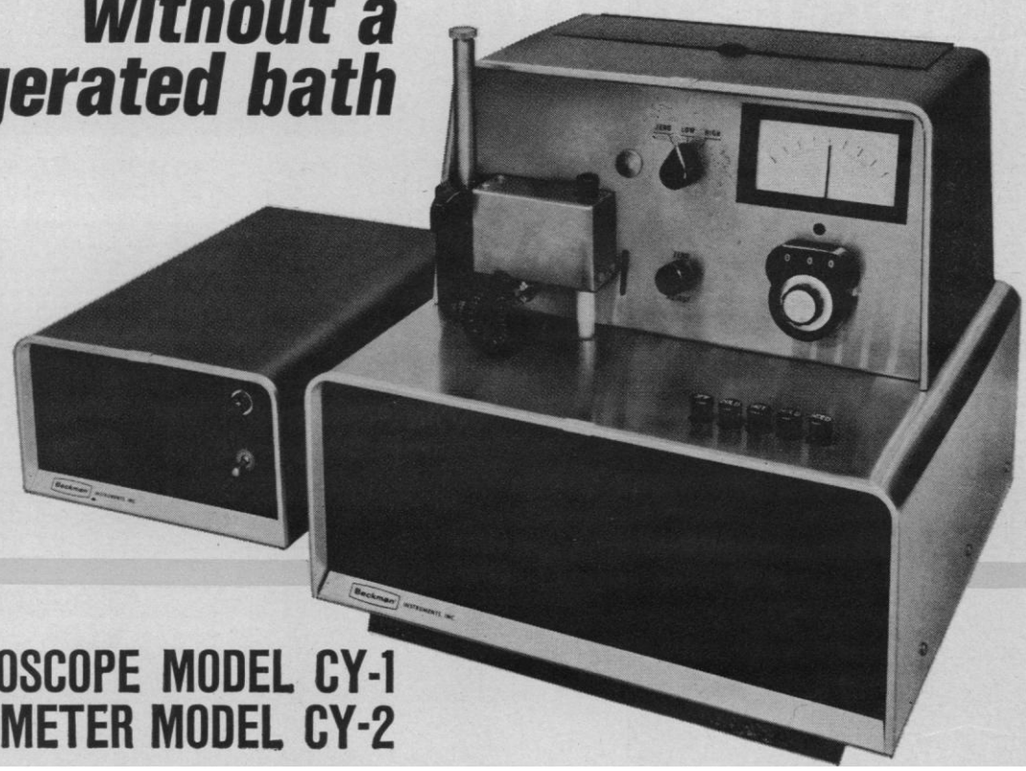

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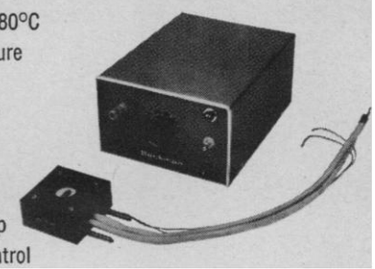

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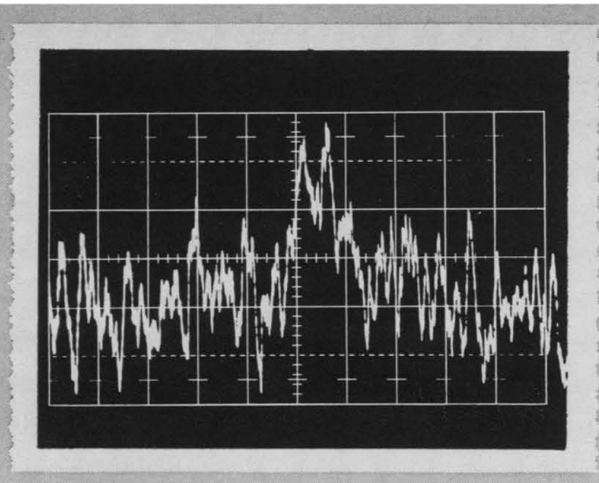

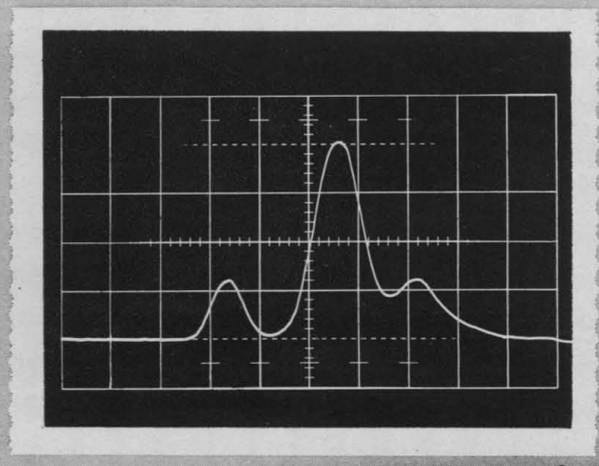

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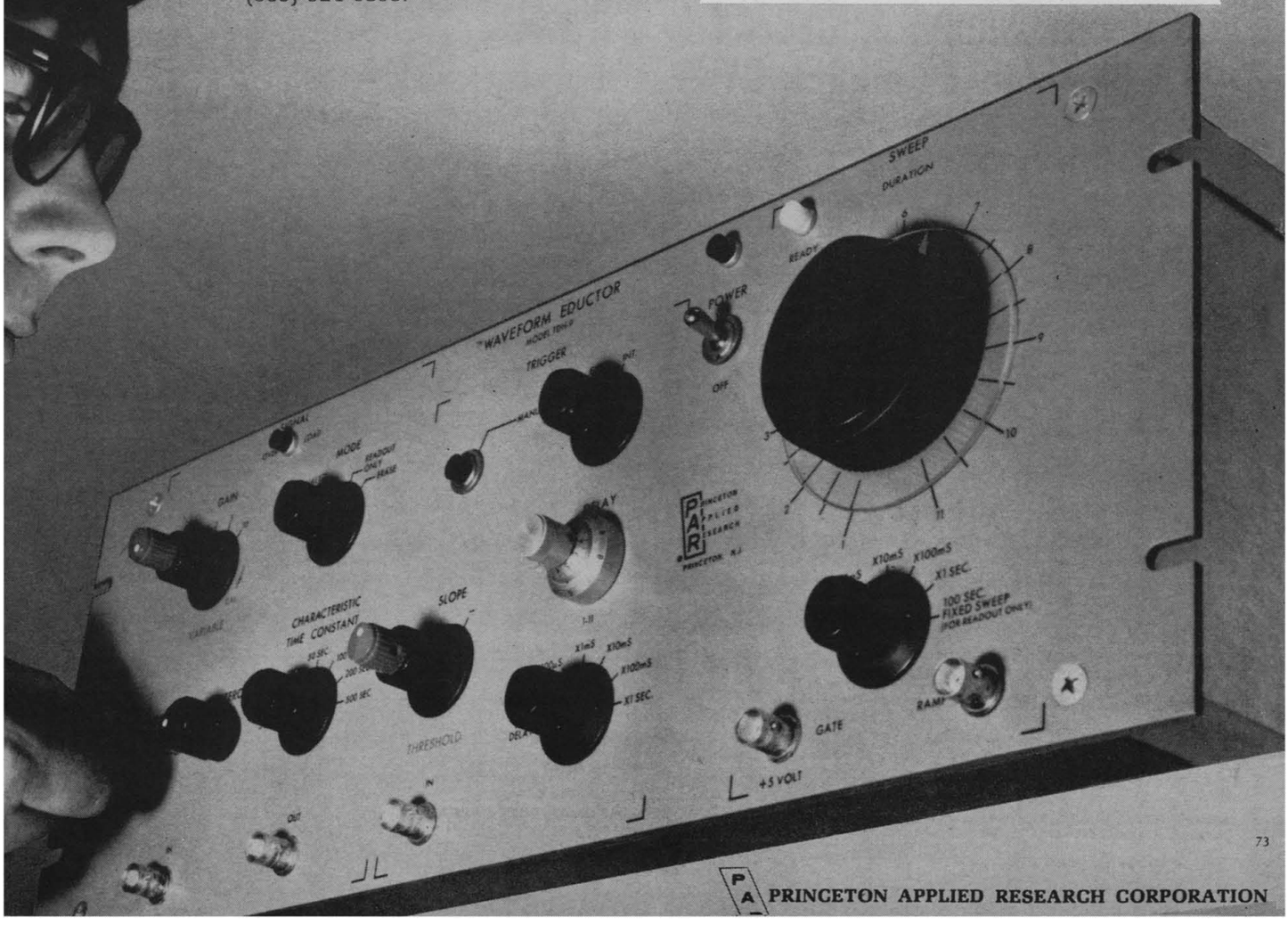




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This estimate does not imply that the women need federal services, but merely that they need contraception.

Harkavy and his colleagues are right that family planning for the poor is not a means of population control. It is not even a "first step" to that goal. But until now this has not been clear; the government has been sold a risky program as part of a population-control package. This program invites charges of genocide, dissemination of dangerous drugs, and subversion of moral standards—ironically, it now appears, for the purpose of "health" and a dubious welfare goal. The insensitivity to such risks, as well as the paradoxical confusion of goals, is exemplified by Senator Gruening's support of the statement that (*6*) ". . . whatever might be the long-range adverse effects of the pill . . . women prefer to take their chances. They would risk any possible ill effect rather than become pregnant."

JUDITH BLAKE

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*Berkeley 94720*

**References and Notes**

1. The principal documents under discussion are: O. Harkavy, F. S. Jaffe, and S. M. Wishik, *Implementing DHEW Policy on Family Planning and Population* (1967, mimeographed; available from the Ford Foundation, New York); *Report of the President's Committee on Population and Family Planning: The Transition from Concern to Action* (Government Printing Office, Washington, D.C., 1968); and *Hearings on S. 1676, U.S. Senate Subcommittee on Foreign Aid Expenditures* (17 volumes of testimony concerning "the population crisis").
2. Statement by President Johnson at the 20th anniversary of the United Nations at San Francisco, 25 June 1965, and swearing-in ceremony of John W. Gardner as Secretary of Health, Education, and Welfare, 18 Aug. 1965 [*Congr. Rec.* **113**, 6494 (14 Mar. 1967)]. The complete text of the 1968 Republican platform appears in *Congr. Quart.*, 9 Aug. 1968; the reference to population is on p. 213. "Family planning: A basic human right," speech of Senator Joseph P. Tydings, *Congr. Rec.* **115**, S. 4848 (8 May 1969).
3. N. B. Ryder and C. F. Westoff, "Relationships Among Intended, Expected, Desired, and Ideal Family Size: United States, 1965." An occasional paper published by the Center for Population Research, National Institute of Child Health and Human Development, March 1969, no pagination.
4. Tabulation from basic data cards of the 1960 study.
5. From the interview schedule used in the 1965 National Fertility Study. Kindly supplied to me by Charles F. Westoff of Princeton University.
6. *Hearings on S. 1676, U.S. Senate Subcommittee on Foreign Aid Expenditures, 90th Congress, 1st session* (2 Nov. 1967), p. 62.

## Public Health Service Grants

During a period of tight money, smaller contributions to nonprofit organizations, and decreased congressional appropriations for research, it would appear natural for an investigator to ask: "Do I stand a better chance of getting my research grant application approved by the Public Health Service or some federal funding body if I submit a moderate or small budget?"

As part of a study of the priority system for reviewing PHS grants, it was decided to determine if there was any relationship between the amount of support requested by the applicant and the priority assigned by the review group. A group of executive secretaries of PHS study sections which are the scientific review bodies were asked to select samples of relatively large requests (4 or more years at an average of more than $40,000 a year), medium requests (2 or 3 years at about $25,000 a year), and small requests (2 or, if necessary, 3 years at less than $20,000 a year). It is obvious that with inflation $40,000 a year is no longer a large amount. However, the comparisons would still apply. Each voting member of a section assigns to each request a priority of 1 to 5 on the basis of scientific merit; 1 being the highest and 5 the lowest possible priority for each approved application. The individual ratings are then totaled, divided by the number of members voting, and multiplied by 100 to get the 3-digit priority.

Table 1 shows that 22 of the 33 disapproved applications were in the small and medium groups, whereas 45 of the 80 approvals were in the large and medium size. The large group had the best average priority. It is apparent that the size of the request has practically no

Table 1. Relationship of project size to approval rate.

| Project size | Total | Disapprovals | | Approvals | | |
|---|---|---|---|---|---|---|
| | | Number | Percent | Number | Percent | Average priority |
| Large | 36 | 11 | 31 | 25 | 69 | 224 |
| Medium | 27 | 7 | 26 | 20 | 74 | 260 |
| Small | 50 | 15 | 30 | 35 | 70 | 256 |

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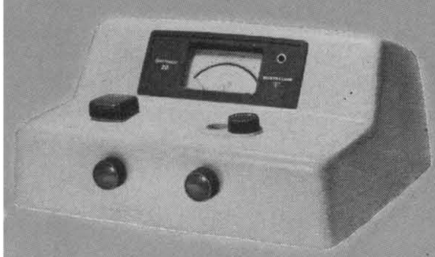

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effect on the approval rate. Since the applications selected for this study did not constitute a probability sample, it is not clear to what extent this statement can be applied to the entire group of research grant applications which are submitted to the Public Health Service each year.

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## The Fit and the Unfit

The facts contained in "Draft caused drop in graduate science enrollments" (11 July, p. 162) may have been correct, but the tone was disturbing in its implications. The draft was held responsible for the removal of "able-bodied males" from graduate programs, "leaving only females, the aged, and a few physically unfit males." Thus, men who do not come up to draft board standards are labeled physically unfit. For what? And the aged: who are they? We, who are over 26 years?

The author's bias in his reference to female students as "only female" reappeared when he attributed to "a chemistry department" the lament that although it had been a coeducational department, the "entire incoming class for 1969 will consist of females only." That last "only" is only redundant. Until the facts show that aged and infirm adults comprise the bulk of graduate students, please report the situation with more accuracy and restraint.

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## ACE Study of Campus Unrest

Judith Coburn's thoughtful article on criticisms of the American Council on Education study of campus unrest (11 July, p. 160) contains several minor inaccuracies and omissions.

1) It is incorrect to say that "the entire study was about disruption." The study focuses on campus unrest, and more specifically on protests, rather than on disruption alone. It therefore includes a variety of social and political activities like demonstrations, petitions, marches, teach-ins, strikes, and protest

meetings that are in no way disruptive.

2) In discussing the Students for a Democratic Society opposition to the study, Coburn considerably understates its vehemence. The *New Left Notes* article she cites refers to the directors of the Bureau of Social Science Research as " 'liberal' pigs," to ACE and BSSR researchers as "surveyor-pigs," and to research institutes as "pig institutes." It states that the BSSR "primarily does counter-insurgency research contract work for the U.S. Government." It sees the ACE research as a part of "counter-insurgency programs which are used to finger and destroy individuals and whole communities." And so on.

3) In quoting National Student Association President Bob Powell's criticism of the ACE study, Coburn fails to note the inaccuracy of his assertion that the study deals exclusively with individual behavior. In fact, the study is equally concerned with institutional characteristics that are related to campus unrest.

4) Coburn does not mention one background fact important in judging the potential misuses of the ACE study. There have *already* been dozens of empirical studies of student activists and protesters. Any college administrator with the diligence to have read these studies already knows how to "screen out" the applicants who are most likely to engage in protest. As a start, I would recommend that he admit only dumb, unimaginative, conventional, and extremely devout applicants from conservative and politically apathetic families. . . . It does not take the ACE study to enable an unscrupulous or frightened college administrator to begin screening out "protest-prone" students.

5) Coburn says that I agree that the advisory board guidelines "will only absolve Advisory Committee members of guilt" with regard to the possible misuse of findings. If I had believed this, I would not have drafted the guidelines and pressed for their adoption. She is of course correct in noting that no one can *guarantee* that research findings will not be used for destructive or unethical ends. All anyone can do (and what he *must* do, I believe) is to commit himself to work for the ethical use of a study's findings, and to oppose unethical uses. At least that much has now been done. . . .

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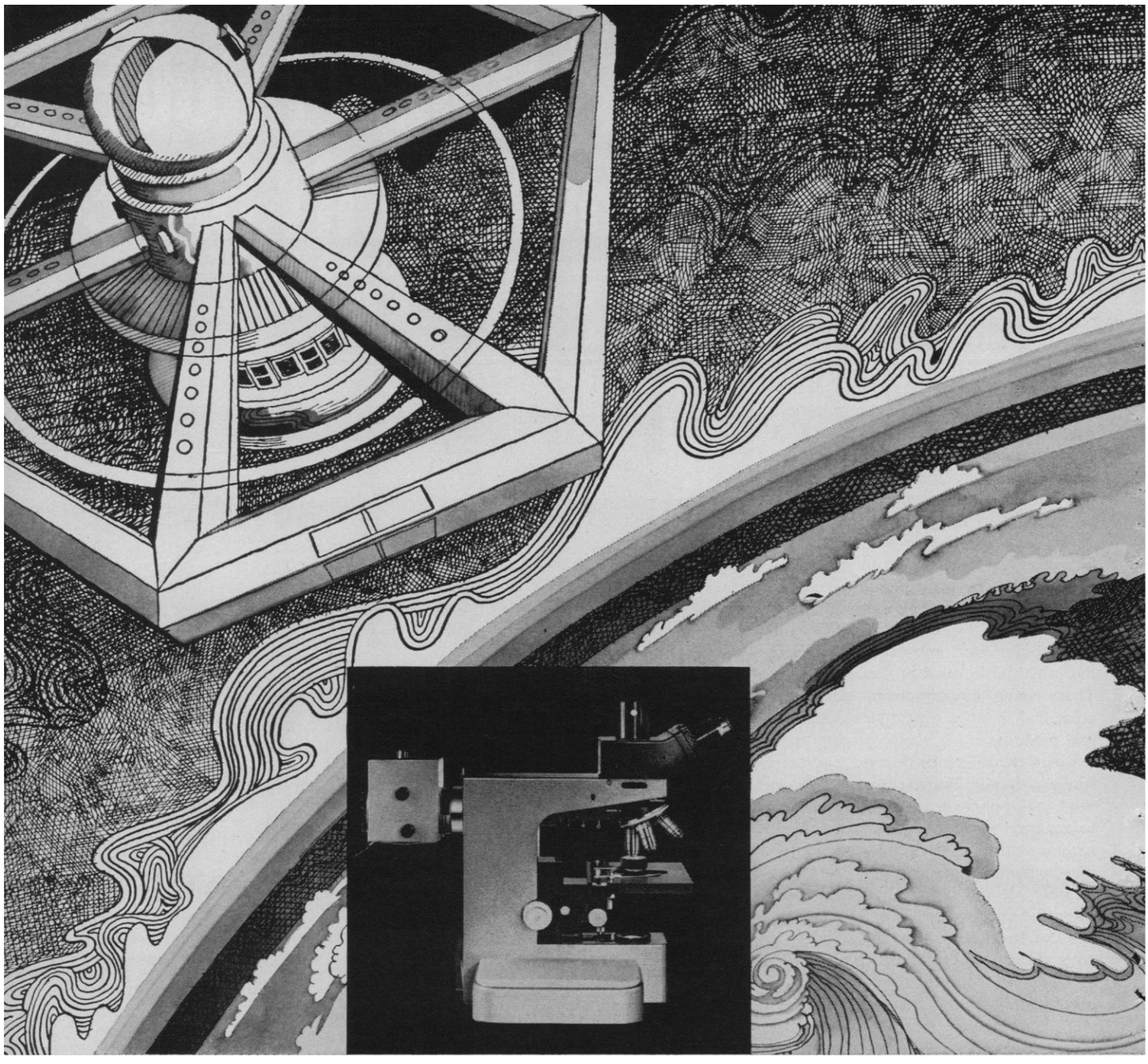

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19 September 1969, Volume 165, Number 3899 **SCIENCE**



## Foundation or Public Charity

The tax reform bill passed by the House of Representatives (H.R. 13270) includes provisions of far-ranging significance for organizations that are tax exempt under Section 501(c)(3), the section of the Internal Revenue Code that pertains to schools, colleges, foundations, scientific and scholarly societies, and similar organizations. In a peculiar and unsatisfactory effort to define foundations by a process of exclusion, all Section 501(c)(3) organizations are divided into two classes. One class includes four strictly defined types of organizations that are collectively considered "public charities." All others are called foundations. Because the Act increases incentives to contribute to schools, colleges, churches, and charities, and punishes foundations—those that operate for the public benefit as well as those whose abuses the Congress has properly wanted to curb (*Science*, 4 July and 15 August)—it becomes of great importance to an organization whether it be classed as a "foundation" or as a "public charity." Except for the demeaning label, the latter category will be much more desirable for many organizations.

Most scientific associations, such as the AAAS, should qualify as public charities, but there is uncertainty on the point, and some of the major scientific and professional membership societies are likely to be treated as private foundations. Also apparently classed as foundations are institutions, such as the Institute for Advanced Study, that are educational in fact but that do not have regularly announced classes and curricula.

The penalties for being classified as a foundation would be severe: a tax of 7.5 percent on investment income; major new restrictions on activities; and eligibility to receive grants from foundations only if the foundation making the grant exercises much stricter surveillance than is required for grants to universities or other "public charities" and makes "full and detailed reports" to the Secretary of the Treasury.

If the House provisions become law, they will reduce the usable income, reduce the ability to secure grants and gifts, and reduce the freedom and flexibility of a group of institutions that are distinguished for their research and for their leadership in advanced education: Woods Hole, the Institute for Advanced Study, the Carnegie Institution, the Brookings Institution, the Wistar Institute, the Institute for Advanced Study in the Behavioral Sciences, and others.

The provisions may not become law. The Secretary of the Treasury has already told the Senate Committee that the House bill "goes too far in taxing foundations," and that a tax to raise revenue from the foundations cannot be justified if their tax-exempt status is justified. He proposed, instead, a 2-percent "supervisory tax" which would be used to support an audit program by the Internal Revenue Service. The terminology here is important; a "user fee," as the House once called it, may be justified, where a "tax" is not, and would be less subject to the danger of later escalation. Other changes should be made. Some of the House-version restrictions on grant-making foundations are too sweeping, and the definition of a foundation needs to be clarified.

After the Senate has acted, a compromise between the House and Senate bills will be worked out. A better compromise can be expected if the senators, especially the members of the Senate Committee on Finance, are informed about the damage the House version would do to foundations and to the research institutes and institutes for advanced study that are likely to be treated as foundations under the House definition. Now is the time to give them that information.—DAEL WOLFLE

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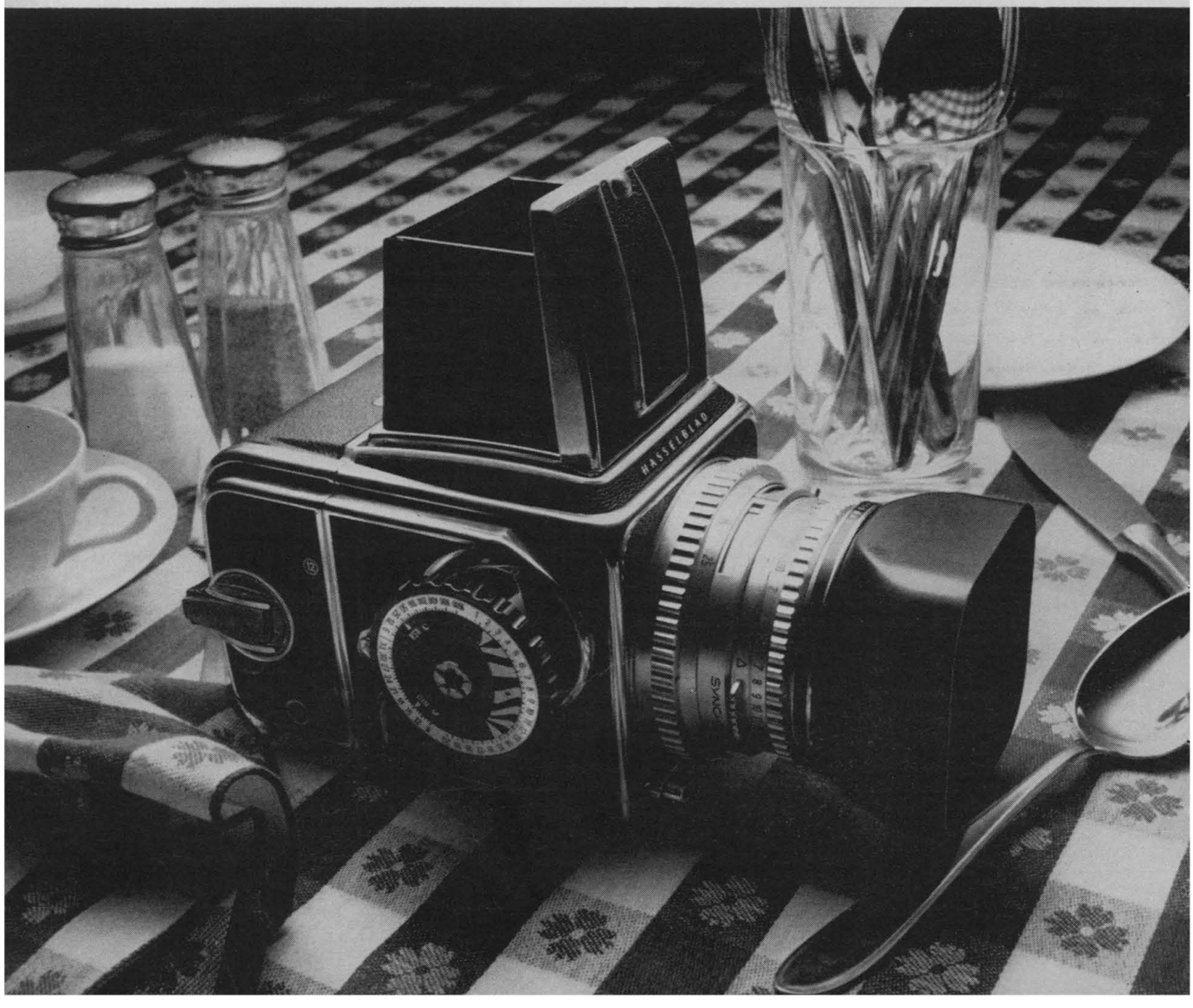

2) The tissue of origin should be one in which contaminating viruses have not been demonstrated. The difference in this respect between monkey and human tissue is noteworthy. The disappearance of demonstrable viruses from serially propagated monkey cells does not necessarily preclude the persistence of at least portions of the contaminating viral genome. Tissue of fetal origin is probably preferable to postnatal tissue because the former has a lower risk of exposure to extraneous viruses.

There are several new techniques for better detection of latent agents. Immunofluorescence tests with homospecific serum and fluorescent immunoglobulin to given species can reliably be used to detect viral coat protein in cell substrates.

Electron microscopy is proving useful for detecting viruses in cells and should be used routinely. More experience is needed before the data can be interpreted fully, but appearance of any virus-like particles calls for further studies or exclusion of the cell population. To investigate a new cell substrate for the presence of incomplete viruses, the technique of cell fusion with normal and transformed cells can be used to detect the defective or activated viral genome.

3) Since potential tumorigenicity of new cell substrates is a problem, attempts should be made to obtain a more sensitive procedure to test for this property. It has been shown that treating mice with antiserum to lymphocytes has allowed unplanted HeLa cells to establish rapidly growing tumors. Greater experience with other malignant and transformed cells in mice and other animals treated with immunosuppressive agents as well as drugs is needed and may lead to the development of a useful screening test for cell substrates. Attention should be given to the number of cells required for the production of tumors, both by known transformants and candidate diploid strains. With the latter, relatively large inocula should be used.

4) An important feature of the acceptability of a candidate diploid cell strain for human viral vaccine production is the maintenance of a "normal" diploid karyotype, as opposed to the abnormal or pseudodiploid karyotype which appears in transformed or neoplastic cell lines of indefinite subculture potential. Many cultures of the candidate substrate must be examined in order to assess the range of "normal" random variation in the occurrence of chromosome aberrations in serial culture. The range of variation may be compared with that of leukocytes of the same species. By defining these limits, cell strains may then be judged for compatibility with a range of abnormal karyotypes seen in peripheral leukocyte cultures from normal control subjects of the same species.

5) It is self-evident that the usefulness of a given cell strain depends both on the spectrum of viruses which may be propagated and their yield. Human diploid cell strains present significant advantages over primary cells with respect to many of the points considered above. The following vaccines have been prepared in human diploid cells, and some have already been used on an extensive scale.

*Poliomyelitis (oral).* The Immunological Institute in Zagreb, Yugoslavia, has had extensive experience with this vaccine including over 1 million vaccinations and some follow-up studies. The vaccine has been licensed for general use in Yugoslavia. Workers in the Soviet Union have also prepared and tested on a large scale polio vaccine prepared in human diploid cells.

*Measles (live, attenuated).* It has been shown, again by the Immunological Institute in Zagreb, and by the Institute for Viral Vaccine Production in Moscow, that measles virus grows well in human diploid cells. The vaccine so produced has been licensed in Yugoslavia and the U.S.S.R. for parenteral use on the basis of its low reaction rate and high protective capacity against the disease. Approximately 500,000 people in the U.S.S.R. have been inoculated with vaccine produced in human diploid cells.

*Adenoviruses.* Human diploid cell strains are at present the only cells in which adenovirus vaccines may be prepared without the possible introduction of helper viruses or genomes that might hybridize with adenoviruses. In these cells high virus titers and attenuation can be achieved. In the United States 350,000 subjects have been given enteric-coated capsules containing adeno 4 vaccine prepared by Wyeth Laboratories (Radnor, Pa.), with no untoward effects reported.

*Rubella.* Although rubella virus grows in many different cell cultures, only virus grown in human diploid cells has yet been regularly effective on both parenteral and nonparenteral administration (as reported by workers at the Wistar Institute, Philadelphia).

*Smallpox.* Vaccinia virus grows well in human diploid cells, and a vaccine free from contaminating agents has been prepared in these cells. Early studies by the Institute of Immunology in Zagreb have shown a satisfactory clinical response.

*Respiratory syncytial virus (RSV).* Although only experimental work has been reported with RSV vaccine, the growth of this virus to high titer in human diploid cells suggests the feasibility of the use of this tissue in vaccine production.

*Rhinoviruses.* Many rhinovirus strains grow only in human diploid cells and a number of laboratories are working on the preparation of killed- and live-virus vaccines produced in these substrates.

*Rabies.* There is an urgent need for a highly antigenic rabies vaccine produced on a cell substrate free of nerve cells. One such vaccine prepared in WI-38 cells is now being tested.

*Tick-borne encephalitis.* Tick-borne encephalitis virus grown to high titer in human diploid cells has been used for the production of an inactivated vaccine and found to be antigenic in experimental animals (Institute for Virus Preparation, Moscow).

This rapidly accumulating evidence of safety, together with the theoretical advantages of vaccines developed in human diploid cell cultures, indicates that this cell system is often to be preferred as a substrate for viral vaccines.

The conclusion of this conference is similar to that of a previous one on the same subject held in Bethesda, Maryland, in November 1967 (*National Cancer Institute Monograph No. 29*, Cell Cultures for Virus Vaccine Production, p. 583).

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## Forthcoming Events

### October

*8–10.* American Council on **Education**, 52nd annual, Washington, D.C. (F. Skinner, ACE, 1785 Massachusetts Ave., NW, Washington, D.C. 20036)

*8–11.* National Assoc. of **Biology Teachers**, Philadelphia, Pa. (J. R. Lightner, NABT, 1420 N St., NW, Washington, D.C. 20005)

*12–16.* American Soc. of **Plastic and Reconstructive Surgeons**, St. Louis, Mo. (P. Randall, The Society, 18 Laughlin Lane, Philadelphia, Pa. 19118)

*13–14.* **Psychological Aspects of Perception**, New York, N.Y. (E. Harms, 158 E. 95 St., New York 10028)

*13–16.* Association of Official **Analytical Chemists**, Washington, D.C. (L.G. Ensminger, Box 540, Benjamin Franklin Station, Washington, D.C. 20044)

*13–17.* American Assoc. for **Laboratory Animal Science**, 20th annual, Dallas, Tex. (J. J. Garvey, The Association, Box 10, Joliet, Ill. 60434)

*13–17.* Symposium on **Radiation Safety Problems in the Design and Operation of "Hot" Facilities**, Saclay, France. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

*14–16.* **Remote Sensing of Environment** Symp., Ann Arbor, Mich. (Univ. of Michigan, Extension Service, Conf. Dept., 412 Maynard St., Ann Arbor 48103)

*14–17.* Society for **Experimental Stress Analysis**, Houston, Tex. (B. E. Rossi, SESA, 21 Bridge Sq., Westport, Conn. 06880)

*14–22.* Pan-Pacific **Surgical** Assoc., 11th congr., Honolulu, Hawaii. (H. DeVault, Room 236, Alexander Young Bldg., Honolulu 96813)

*16–17.* Association of **Earth Science Editors**, 3rd annual conf., Houston, Tex. (W. D. Rose, Kentucky Geological Survey, Univ. of Kentucky, Lexington 40506)

*16–17.* National Conf. on **Fluid Power**, Chicago, Ill. (W. R. Smith, NCFP, 3300 S. Federal St., Chicago 60616)

*16–17.* **Rapid Excavation,** 2nd symp., Sacramento, Calif. (H. L. Hartman, Dean of Engineering, Sacramento State College, Sacramento 95819)

*17–19.* Society for **Social Responsibility in Science**, New Haven, Conn. (H. Bloom, SSRS, 221 Rock Hill Rd., Bala-Cynwyd, Pa. 19004)

*18–23.* American Acad. of **Pediatrics**, Chicago, Ill. (G. E. Hughes, Secretary for Education Affairs, 1801 Hinman Ave., Evanston, Ill. 60204)

*19–22.* American **Mining** Congr., San Francisco, Calif. (R. W. Van Evera, Ring Bldg., Washington, D.C. 20036)

*19–25.* American College of **Gastroenterology**, 34th annual, Houston, Tex. (D. Weiss, Executive Director, ACG, 33 W. 60 St., New York 10023)

*20–21.* **Polymer-Modified Hydraulic Cements** Symp., Philadelphia, Pa. (H. B. Wagner, Dept. of Chemistry, Drexel Inst. of Technology, Philadelphia 19104)

*20–22.* **George H. Hudson Symp.,** 5th annual, Plattsburgh, N.Y. (G. F. Kokoszka, Dept. of Chemistry, State Univ. College, Plattsburgh 12901)

*20–22.* American Assoc. of **Stratigraphic Palynologists**, University Park, Pa. (A. Traverse, Dept. of Geology and Geophysics, Pennsylvania State Univ., University Park 16802)

*21–24.* **Optical** Soc. of America, 54th annual, Chicago, Ill. (M. E. Warga, The Society, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

*21–25.* Association of **Engineering Geologists**, 12th annual, San Francisco, Calif. (P. Vardy, AEG, P.O. Box 985, San Francisco 94101)

*23–25.* American **Astronautical** Soc., Las Cruces, N.M. (J. Penwarden, New Mexico State Univ., Las Cruces)

*24–26.* **Orton** Soc., 20th annual, New York, N.Y. (V. A. Graff, The Society, 15 Claremont Ave., New York 10027)

*25–29.* American Soc. of **Anesthesiologists**, San Francisco, Calif. (W. S. Marinko, 515 Busse Highway, Park Ridge, Ill. 60608)

*25–31.* American Assoc. of **Medical Record Librarians**, New York, N.Y. (M. Waterstraat, The Association, 211 E. Chicago Ave., Chicago, Ill. 60611)

*26–30.* Society for **Industrial and Applied Mathematics**, Anaheim, Calif. (R. K. Windsor, 33 S. 17 St., Philadelphia, Pa. 19103)

*27–29.* Interscience Conf. on **Antimicrobial Agents and Chemotherapy**, 9th, Washington, D.C. (R. W. Sarber, American Soc. for Microbiology, 1913 Eye St., NW, Washington, D.C. 20006)

*25–26.* International Soc. for **Homotoxicology** and **Antihomotoxicological Therapy** Symp., Baden-Baden, Germany. (F. Doerper, Bertholdstr. 7, 757 Baden-Baden)

*27–30.* National **Powerplant** Mtg., Cleveland, Ohio. (W. I. Marble, 2 Pennsylvania Plaza, New York 10001)

*27–30.* National **Safety** Congr. and Exposition, Chicago, Ill. (H. W. Champlin, The Congress, 425 N. Michigan Ave., Chicago 60611)

*29–31.* Symposium on **Pharmacology of Selected Drugs Used in Dermatology: Principles of Action and Uses**, New York, N.Y. (P. Merwin, New York Univ. Medical Center, 550 First Ave., New York 10016)

*30–3.* Association of American **Medical Colleges**, Cincinnati, Ohio. (D. E. Mattson, Div. of Educational Measurement and Research, AAMC, 2530 Ridge Ave., Evanston, Ill. 60201)

*31–2.* American Soc. of **Criminology**, Columbus, Ohio. (R. M. Susman, ASC, 800 Fourth St., SW, S-610, Washington, D.C. 20024)

**November**

*2–5.* **Atherosclerosis**, 2nd intern. symp., Chicago, Ill. (L. N. Katz, Chicago Heart Assoc., 22 W. Madison St., Chicago 60602)

*2–7.* Society of **Cosmetic Chemists**, Harriman, N.Y. (A. R. Korte, 521 W. 57 St., New York 10019)

*3–4.* Institute of **Navigation**, San Diego, Calif. (R. E. Freeman, Inst. of Navigation, Suite 912, 711 14th St., NW, Washington, D.C. 20005)

*3–4.* **Veterinarians**, 45th annual conf., Columbia, Mo. (F. McCulloch, School of Veterinary Medicine, Univ. of Missouri, Columbia 65201)

*3–5.* **Engineering Science in Biomedicine**, 7th annual, St. Louis, Mo. (E. Y. Rodin, Dept. of Applied Mathematics and Computer Science, Box 1176, Washington Univ., St. Louis 63130)

*3–6.* National Bureau of Standards, 3rd **Materials Research** Symp., Gaithersburg, Md. (R. R. Stromberg, A-307, Polymers Bldg., NBS, Washington, D.C. 20234)

*3–7.* American Soc. of **Parasitologists**, Washington, D.C. (D. V. Moore, Dept. of Microbiology, Univ. of Texas, Southwestern Medical School, Dallas 75235)

*4–5.* **Chemical Marketing Research** Assoc., Toronto, Canada. (P. E. Levesque, FMC Corp., 633 Third Ave., New York 10017)

*4–6.* Society of **Plastics Engineers**, Dallas, Tex. (C. C. Campbell, SPE, 656 W. Putnam Ave., Greenwich, Conn. 06830)

*4–7.* **Acoustical** Soc. of America, San Diego, Calif. (B. H. Goodfriend, 335 E. 45 St., New York 10017)

*5–7.* Pittsburgh **Diffraction** Conf., 27th, Pittsburgh, Pa. (J. H. Scott, U.S. Steel Research Center, Monroeville, Pa. 15146)

*5–8.* American **Chemical** Soc., southeastern regional mtg., Richmond, Va. (H. R. R. Wakeham, Philip Morris Inc., Box 3D, Richmond 23206)

*5–8.* Federation of Socs. for **Paint Technology**, Chicago, Ill. (R. W. Matlack, 121 S. Broad St., Philadelphia, Pa. 19107)

*6–7.* National Symp. on **Industrial Robots**, Chicago, Ill. (D. W. Hanify, IIT Research Inst., 10 W. 35 St., Chicago 60616)

*6–8.* American Soc. of **Cytology**, 17th annual scientific mtg., Chicago, Ill. (W. R. Lang, 7112 Lincoln Dr., Philadelphia, Pa. 19119)

*6–8.* American **Physical** Soc., Gainesville, Fla. (W. Seagondollar, Dept. of Physics, North Carolina State Univ., Raleigh 27607)

*10–12.* **Geological** Soc. of America, Atlantic City, N.J. (R. C. Becker, P.O. Box 1719, Boulder, Colo. 80302)

*10–12.* **Operations Research** Soc. of America, 36th natl., Miami, Fla. (M. E. Thomas, Dept. of Industrial and Systems Engineering, Univ. of Florida, Gainesville 32601)

*10–12.* **Paleontological** Soc., Atlantic City, N.J. (R. L. Langenheim, Jr., Dept. of Geology, Univ. of Illinois, Urbana 61801)

*10–14.* American College of **Preventive Medicine**, Philadelphia, Pa. (E. A. Piszczek, 6410 N. Leona Ave., Chicago, Ill. 60646)

*10–14.* American **Public Health** Assoc., 97th annual, Philadelphia, Pa. (B. F. Mattison, APHA, 1740 Broadway, New York 10019)

*10–14.* Technical Conf. on **Tin**, 2nd, Bangkok, Thailand. (W. Fox, Intern. Tin Council, Haymarket House, 28 Haymarket, London, S.W.1., England)

*11–13.* **Neurosurgical** Soc., 28th annual, Kyoto, Japan. (H. Handa, Dept. of Neurosurgery, Kyoto Univ., Kyoto)

*11–14.* **Neutrons in Radiobiology** Symp., Oak Ridge, Tenn. (J. A. Auxier, Oak Ridge National Lab., P.O. Box X, Oak Ridge 37830)

*16–19.* Association of **Military Surgeons** of the U.S., Washington, D.C. (Brig. Gen. F. E. Wilson, USAR, Execu-

tive Director, 1500 Massachusetts Ave., NW, Washington, D.C. 20005)

*16–20.* American Assoc. of **Blood Banks**, Houston, Tex. (L. J. James, AABB, 30 N. Michigan Ave., Chicago, Ill. 60602)

*16–20.* **Gulf and Caribbean Fisheries** Inst., 22nd annual, Miami Beach, Fla. (Executive Secretary, Gulf and Caribbean Fisheries Inst., 10 Rickenbacker Causeway, Miami 33149)

*16–20.* American Soc. of **Mechanical Engineers**, Los Angeles, Calif. (O. B. Schier, II, United Engineering Center, 345 E. 47 St., New York 10017)

*17–19.* National **Fire Protection** Assoc., Denver, Colo. (D. Richardson, The Association, 60 Batterymarch St., Boston, Mass. 02110)

*17–21.* **Electronic Industries** Assoc., Laser Subdivision, Paris, France. (J. Davis, EIA Subdivision, 2001 Eye St., NW, Washington, D.C. 20006)

*17–21.* World **Mental Health** Assembly, Washington, D.C. (P. V. Lemkau, Assembly Chairman, 615 N. Wolfe St., Baltimore, Md. 21205)

*18–19.* International Federation of **Surgical Colleges**, Buenos Aires, Argentina. (R. S. Johnson-Gilbert, Secretary, c/o Royal College of Surgeons of England, Lincolns Inn Fields, London, W.C.2, England)

*18–21.* **Magnetism and Magnetic Materials**, 15th conf., Philadelphia, Pa. (J. Blades, Franklin Inst., Research Labs., Philadelphia 19103)

*19–21.* Eastern **Analytical** Symp., New York, N.Y. (R. J. Knauer, Advanced Materials Div., Armco Steel Corp., P.O. Box 1697, Baltimore, Md. 21203)

*20–21.* Association for the Study of **Animal Behaviour**, London, England. (J. Cullen, Psychology Dept., The University, Stirling, England)

*20–23.* American **Anthropological** Assoc., New Orleans, La. (C. C. Reining, Suite 112, 3700 Massachusetts Ave., NW, Washington, D.C. 20016)

*20–24.* **Audio Engineering** Soc., 37th conv., New York, N.Y. (J. D. Colvin, Room 428, 60 E. 42 St., New York 10017)

*21–22.* **Clinical** Conf., 13th annual, Houston, Tex. (J. Brandenberger, M. D. Anderson Hospital & Tumor Inst., Univ. of Texas, Houston 77025)

*30–3.* American Acad. for **Cerebral Palsy**, Las Vegas, Nev. (G. Solomons, University Hospitals, Iowa City, Iowa 52240)

*30–4.* American **Nuclear** Soc., San Francisco, Calif. (O. J. Du Temple, ANS, 244 E. Ogden Ave., Hinsdale, Ill. 60521)

**December**

*1–4.* **Entomological** Soc. of America, Chicago, Ill. (R. H. Nelson, 4603 Calvert Rd., College Park, Md. 20740)

*2–5.* **Reticuloendothelial** Soc., 6th natl., San Francisco, Calif. (E. Dobson, Donner Lab., Univ. of California, Berkeley 94720)

*3–5.* International **Wire and Cable** Symp., Atlantic City, N.J. (J. Spergel, U.S. Army Electronics Command, Amsel-K1-EE, Fort Monmouth, N.J. 07703)

*3–6.* American Assoc. of **Physicists in Medicine**, Chicago, Ill. (J. G. Kereiakes, Radioisotope Lab., Cincinnati General Hospital, Cincinnati, Ohio 45229)

*5–6.* **Oklahoma Acad. of Science**, Edmond. (J. T. Self, 730 South Oval, Univ. of Oklahoma, Norman 73069)

*5–6.* **Interferon** Symp., New York, N.Y. (I. Saulpaugh, New York Heart Assoc., 2 E. 64 St., New York 10021)

*5–6.* American **Rheumatism** Assoc., Tucson, Ariz. (M. M. Walsh, ARA, 1212 Avenue of the Americas, New York 10036)

*5–7.* American Acad. of **Oral Medicine**, New York, N.Y. (B. Tuchman, 200 Central Park South, New York 10019)

*5–7.* American Acad. of **Psychoanalysis**, New York, N.Y. (M. Carroll, AAP, 125 E. 65 St., New York 10021)

*6–11.* Galaxy Conf. on **Adult Education**, Washington, D.C. (E. Sydnor, 900 Silver Spring Ave., Silver Spring, Md. 20910)

*7–9.* American Soc. of **Hematology**, Cleveland, Ohio. (F. H. Gardner, Presbyterian–Univ. of Pennsylvania Medical Center, Philadelphia 19104)

*7–12.* American Soc. for **Testing and Materials**, Cincinnati, Ohio. (T. A. Marshall, Jr., ASTM, 1916 Race St., Philadelphia, Pa. 19103)

*8–10.* **Applications of Simulation**, 3rd conf., Los Angeles, Calif. (P. J. Kiviat, RAND Corp., 1700 Main St., Santa Monica, Calif. 90406)

*8–10.* **Circuit Theory**, intern. symp., San Francisco, Calif. (B. J. Leon, School of Electrical Engineering, Cornell Univ., Ithaca, N.Y. 14850)

*8–10.* National **Electronics** Conf. and Exhibition, 25th, Chicago, Ill. (R. J. Napolitan, NEC, Oakbrook Executive Plaza #2, 1211 W. 22 St., Oak Brook, Ill. 60521)

*8–10.* Southern **Surgical** Assoc., Hot Springs, Va. (D. C. Sabiston, Jr., Duke Univ. Medical Center, Durham, N.C. 27706)

*8–11.* Oak Ridge Associated Universities Symp. in **Medicine**, 12th, Oak Ridge, Tenn. (R. M. Kniseley, Medical Div., Oak Ridge Associated Universities, Oak Ridge 37830)

*11–12.* Conference on **Holography and the Computer**, Houston, Tex. (J. A. Jordan, Jr., IBM, Houston Scientific Center, 6900 Fannin St., Houston 77025)

*12–14.* American **Psychoanalytic** Assoc., New York, N.Y. (H. Fischer, 1 E. 57 St., New York 10022)

*14–18.* American Assoc. of **Hospital Pharmacists**, Washington, D.C. (J. A. Oddis, AAHP, 4630 Montgomery Ave., Bethesda, Md. 20014)

*15–18.* American **Geophysical** Union, San Francisco, Calif. (W. E. Smith, AGU, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

*17–19.* Symposium on **Infections and Immunosuppression in Sub-Human Primates**, Rijswijk, Netherlands. (H. Balner, Radiobiological Institute TNO, Lange Kleiweg 151, Rijswijk Z.H., Netherlands)

*18–20.* International Symp. on **Computer and Information Science** (COINS-69), Miami Beach, Fla. (J. T. Lou, Univ. of Florida, Gainesville 32601)

## BOOKS RECEIVED

(*Continued from page 1249*)

North American Forestry. Andrew Denny Rodgers III. Hafner, New York, 1968. x + 624 pp. $11. Reprint of the 1951 edition.

**Bibliography of Salvage Archeology in the United States.** Jerome E. Petsche. Smithsonian Institution River Basin Surveys, Lincoln, Nebr., 1968. iv + 162 pp. Paper. Publications in Salvage Archeology, No. 10.

**Big Bend Historic Sites.** G. Hubert Smith. Smithsonian Institution River Basin Surveys, Lincoln, Nebr., 1968. iv + 114 pp., illus. Paper. Publications in Salvage Archeology, No. 9.

**Bighorn Canyon Archeology.** Wilfred M. Husted. Smithsonian Institution River Basin Surveys, Lincoln, Nebr., 1969. vi + 138 pp., illus. Paper. Publications in Salvage Archeology, No. 12.

**Brain, Mind and Computers.** Stanley L. Jaki. Herder and Herder, New York, 1969. 268 pp. $7.50.

**The Caves of North-West Clare, Ireland.** University of Bristol Spelaeological Society. E. K. Tratman, Ed. David and Charles, Newton Abbot, England, 1969. 256 pp., illus. Until 31 December 1969, 105 s; thereafter, 120 s.

**Ceremonial Exchange as a Mechanism in Tribal Integration among the Mayos of Northwest Mexico.** Lynne Scoggins Crumrine. University of Arizona Press, Tucson, 1969. xii + 52 pp., illus. Paper, $4. Anthropological Papers of the University of Arizona, No. 14.

**The Challenge of Climate.** Man and His Environment. Robert Silverberg. Meredith, New York, 1969. viii + 326 pp. $5.95.

**Challenge to the Court.** Social Scientists and the Defense of Segregation, 1954–1966. I. A. Newby. Louisiana State University Press, Baton Rouge, 1969. xiv + 384 pp. $8.50. Revised edition, with commentaries by A. James Gregor, Frank C. J. McGurk, R. T. Osborne, Wesley Critz George, Carleton Putnam, Nathaniel Weyl, and Ernest van den Haag.

**The CHEM Study Story.** Richard J. Merrill and David W. Ridgway. Contributions by J. Arthur Campbell, Saul L. Geffner, Edward L. Haenisch, and George C. Pimentel. Freeman, San Francisco, 1969. xiv + 162 pp., illus. $2.50.

**Communications in the World of the Future.** Hal Hellman. Evans, New York, 1969 (distributed in association with Lippincott, Philadelphia). vi + 202 pp., illus. $4.95.

**Constitution of Binary Alloys, Second Supplement.** Francis A. Shunk. McGraw-Hill, New York, 1969. xlii + 726 pp., illus. $37.50. McGraw-Hill Series in Materials Science and Engineering.

**Correlation Theory of Statistically Optimal Systems.** N. I. Andreyev. Translated from the Russian edition (Moscow, 1965) by Scripta Technica. Wendell H. Fleming. Transl. Ed. Saunders, Philadelphia, 1969. xii + 372 pp., illus. $14.50. Saunders Mathematics Books.

**Culture Change and Shifting Populations in Central Northern Mexico.** William B. Griffen. University of Arizona Press, Tucson, 1969. xii + 196 pp., illus. Paper, $6.

Anthropological Papers of the University of Arizona, No. 13.

**Cybernetics**. John F. Young. Iliffe, London; Elsevier, New York, 1969. xii + 142 pp., illus. $6. Behavioural Sciences Series.

**Defects and Radiation Damage in Metals**. M. W. Thompson. Cambridge University Press, New York, 1969. x + 384 pp. + plates. $18.50. Cambridge Monographs on Physics.

**The Design of Design**. Gordon L. Glegg. Cambridge University Press, New York, 1969. viii + 96 pp., illus. $4.95. Cambridge Engineering Series.

**The Development of Chemical Principles**. Cooper H. Langford and Ralph A. Beebe. Addison-Wesley, Reading, Mass., 1969. xvi + 384 pp., illus. $7.95. Addison-Wesley Series in Chemistry.

**Dielectrophoretic and Electrophoretic Deposition**. Herbert A. Pohl and William F. Pickard, Eds. Electrodeposition Division, Electrochemical Society, New York, 1969. viii + 136 pp., illus. Paper, $9.

**The Divine Animal**. An Exploration of Human Personality. Roger W. Wescott. Funk and Wagnalls, New York, 1969. xii + 340 pp. $6.95.

**Drugs Affecting Lipid Metabolism**. Proceedings of an international symposium, Milan, Italy, 1968. William L. Holmes, Lars A. Carlson, and Rodolfo Paoletti, Eds. Plenum, New York, 1969. xii + 684 pp., illus. $27.50. Advances in Experimental Medicine and Biology, vol. 4.

**Earth Science Symposium on Hudson Bay**. Ottawa, 1968. Peter J. Hood, G. D. Hobson, A. W. Norris, and B. R. Pelletier, Eds. Department of Energy, Mines and Resources, Geological Survey of Canada, Ottawa, 1969. vi + 386 pp., illus. Paper, $5. GSC Paper 68-53.

**Education and Poverty**. Thomas I. Ribich. Brookings Institution, Washington, D.C., 1969. xii + 164 pp. $5. Studies in Social Economics.

**Electrical Services in Buildings**. Peter Jay and John Hemsley. Elsevier, New York, 1968. x + 182 pp., illus. $5.50. Elsevier Architectural Science Series.

**Electrochemistry for Technologists**. G. R. Palin. Pergamon, New York, 1969. viii + 228 pp., illus. Cloth, $5.50; paper, $4. Commonwealth and International Library: Electrical Engineering Division.

**Five Language Dictionary of Surface Coatings, Plating, Products Finishing, Corrosion, Plastics and Rubber**. English/American, Czech, Russian, German, French. Robert W. Santholzer, assisted by Clara Santholzer. Pergamon, New York, 1969. vi + 582 pp. $20.

**Fluid Mechanics for Engineers**. P. S. Barna. Plenum, New York; Butterworths, London, ed. 3, 1969. xiv + 410 pp., illus. $11.50.

**Fundamentals of Statistics**. H. Mulholland and C. R. Jones. Plenum, New York; Butterworths, London, 1968. x + 294 pp., illus. $5.95.

**Handbook of Neurochemistry**. Vol. 1, Chemical Architecture of the Nervous System. Abel Lajtha, Ed. Plenum, New York, 1969. xxiv + 488 pp., illus. $35.

**Hydrogen Embrittlement of Nonferrous Metals**. B. A. Kolachev. Translated from the Russian edition (Moscow, 1966) by Ch. Nisenbaum. D. Slutzkin, Transl. Ed. Israel Program for Scientific Translations,

⟶ Circle No. 17 on Readers' Service Card

Jerusalem; Davey, Hartford, Conn., 1968. viii + 208 pp., illus. $11.

**Ideas of Life and Matter.** Studies in the History of General Physiology 600 B.C.–1900 A.D. Thomas S. Hall. University of Chicago Press, Chicago, 1969. Vol. 1, From Pre-Socratic Times to the Enlightenment (xii + 420 pp.); vol. 2, From the Enlightenment to the End of the Nineteenth Century (viii + 400 pp.). $20.

**Ifugao Law.** R. F. Barton. University of California Press, Berkeley, 1969. xxiv + 120 pp. + 6 plates. $5. Reprint, with a new foreword by Fred Eggan, of University of California Publications in American Archaeology and Ethnology, vol. 15, No. 1, 1919.

**The Logic of Social Inquiry.** Scott Greer. Aldine, Chicago, 1969. xii + 232 pp., illus. $5.95.

**Manpower for Mental Health.** Based on a symposium, Warrenton, Va., 1967. Franklyn N. Arnhoff, Eli A. Rubinstein, and Joseph C. Speisman, Eds. Aldine, Chicago, 1969. xii + 204 pp. $6.95. Modern Applications of Psychology.

**Mass Motions in Solar Flares and Related Phenomena.** Proceedings of the 9th Nobel Symposium, Anacapri, Capri, Italy, 1968. Yngve Ohman, Ed. Interscience (Wiley), New York; Almqvist and Wiksell, Stockholm, 1968. 246 pp., illus. $22.

**Matrix-Computer Methods in Engineering.** Louis A. Pipes and Shahen A. Hovanessian. Wiley, New York, 1969. xii + 340 pp., illus. $12.95.

**Mechanics.** Ray Skinner. Blaisdell, Waltham, Mass., 1969. xx + 748 pp., illus. $14.50. Pure and Applied Sciences.

**Molecular Biology.** A Structural Approach. C. U. M. Smith. M.I.T. Press, Cambridge, Mass., 1969. 404 pp., illus. $12.50.

**Mysteries of Easter Island.** Francis Mazière. Norton, New York, 1969. 224 pp. + plates. $6.95.

**The New World of the Oceans.** Men and Oceanography. Daniel Behrman. Little, Brown, Boston, 1969. xii + 436 pp., illus. $8.95.

**Noise and Man.** William Burns. Lippincott, Philadelphia, 1969. x + 338 pp., illus. $11.

**The North American Species of Pholiota.** Alexander H. Smith and L. R. Hesler. Hafner, New York, 1968. vi + 402 pp. + plates. $22.50.

**On Death and Dying.** Elisabeth Kübler-Ross. Macmillan, New York; Collier-Macmillan, London, 1969. xii + 260 pp. $6.95.

**Organic Structure Determination.** Daniel J. Pasto and Carl R. Johnson. xiv + 514 pp., illus. $11.95. Prentice-Hall International Series in Chemistry.

**Papago Indians at Work.** Jack O. Waddell. University of Arizona Press, Tucson, 1969. xii + 160 pp., illus. Paper, $5. Anthropological Papers of the University of Arizona, No. 12.

**The Performance of Electrical Machines.** A. R. Daniels. McGraw-Hill, 1968. x + 296 pp., illus. Paper, $6.95.

**Personality.** Dynamics, Development, and Assessment. Irving L. Janis, George F. Mahl, Jerome Kagan, and Robert R. Holt. Irving L. Janis, Ed. Harcourt, Brace and World, New York, 1969. xxxii + 864 pp., illus. $9.95.

**Perspectives in Phytochemistry**. Proceedings of the Phytochemical Society Symposium, Cambridge, 1968. J. B. Harborne and T. Swain, Eds. Academic Press, New York, 1969. xii + 236 pp., illus. $9.

**Photosynthesis**. Isaac Asimov. Basic Books, New York, 1969. x + 198 pp., illus. $5.95. Science and Discovery Series.

**Physical and Information Models in Geography**. Richard J. Chorley and Peter Haggett, Eds. Methuen, London, 1969 (U.S. distributor, Barnes and Noble, New York). Approximately 400 pp., illus. Paper, $3. University Paperbacks. Reprint of parts 1, 2, and 5 of *Models in Geography*, 1967.

**Physicochemical Principles of Semiconductor Doping**. V. M. Glazov and V. S. Zemskov. Translated from the Russian edition (Moscow, 1967) by Ch. Nisenbaum and B. Benny. D. Slutzkin, Transl. Ed. Israel Program for Scientific Translations, Jerusalem; Davey, Hartford, Conn., 1968. xii + 380 pp., illus. $16.

**Physics of Solids in Intense Magnetic Fields**. First Chania Conference, Chania, Crete, 1967. E. D. Haidemenakis, Ed. Plenum, New York, 1969. xx + 484 pp., illus. $27.50.

**The Physiological Bases of Motivation**. Jack E. Hokanson. Wiley, New York, 1969. x + 182 pp., illus. Cloth, $8.95; paper, $4.95.

**Proceedings of the Conference on Changes in the Biota of Lakes Erie and Ontario**. Buffalo, N.Y., 1968. Robert A. Sweeney, Ed. Buffalo Society of Natural Sciences, Buffalo, 1969. viii + 88 pp., illus. Paper, $2. Bulletin of the Buffalo Society of Natural Sciences, vol. 25, No. 1.

**The Psychopharmacology of the Normal Human**. A study group, San Juan, Puerto Rico, 1966. Wayne O. Evans and Nathan S. Kline, Eds. Thomas, Springfield, Ill., 1969. xii + 252 pp., illus. $11.50.

**Radiation Injury**. Effects, Principles, and Perspectives. Arthur C. Upton. University of Chicago Press, Chicago, 1969. x + 126 pp., illus. $6.50.

**The R & D Game**. Technical Men, Technical Managers, and Research Productivity. David Allison, Ed. M.I.T. Press, Cambridge, Mass., 1969. viii + 328 pp., illus. $12.50.

**The Relation of Theory to Practice in Psychotherapy**. Leonard D. Eron and Robert Callahan, Eds. Aldine, Chicago, 1969. x + 176 pp. $5.95.

**Return to Responsibility**. An Analysis of Social Problems and a Proposal for Action. Frank Goble. Thomas Jefferson Research Center, Pasadena, 1969. ii + 46 pp., illus. Paper, $1.50.

**Seashore Life of Southern California**. An Introduction to the Animal Life of California Beaches South of Santa Barbara. Sam Hinton. University of California Press, Berkeley, 1969. 184 pp. + plates. Paper, $2.25. California Natural History Guides, No. 26.

**The Second Genesis**. The Coming Control of Life. Albert Rosenfeld. Prentice-Hall, Englewood Cliffs, N.J., 1969. viii + 328 pp. $6.95.

**Sources of High-Intensity Ultrasound**. Vol. 2. L. D. Rozenberg, Ed. Translated from the Russian edition (Moscow, 1967) by James S. Wood. Plenum, New York,