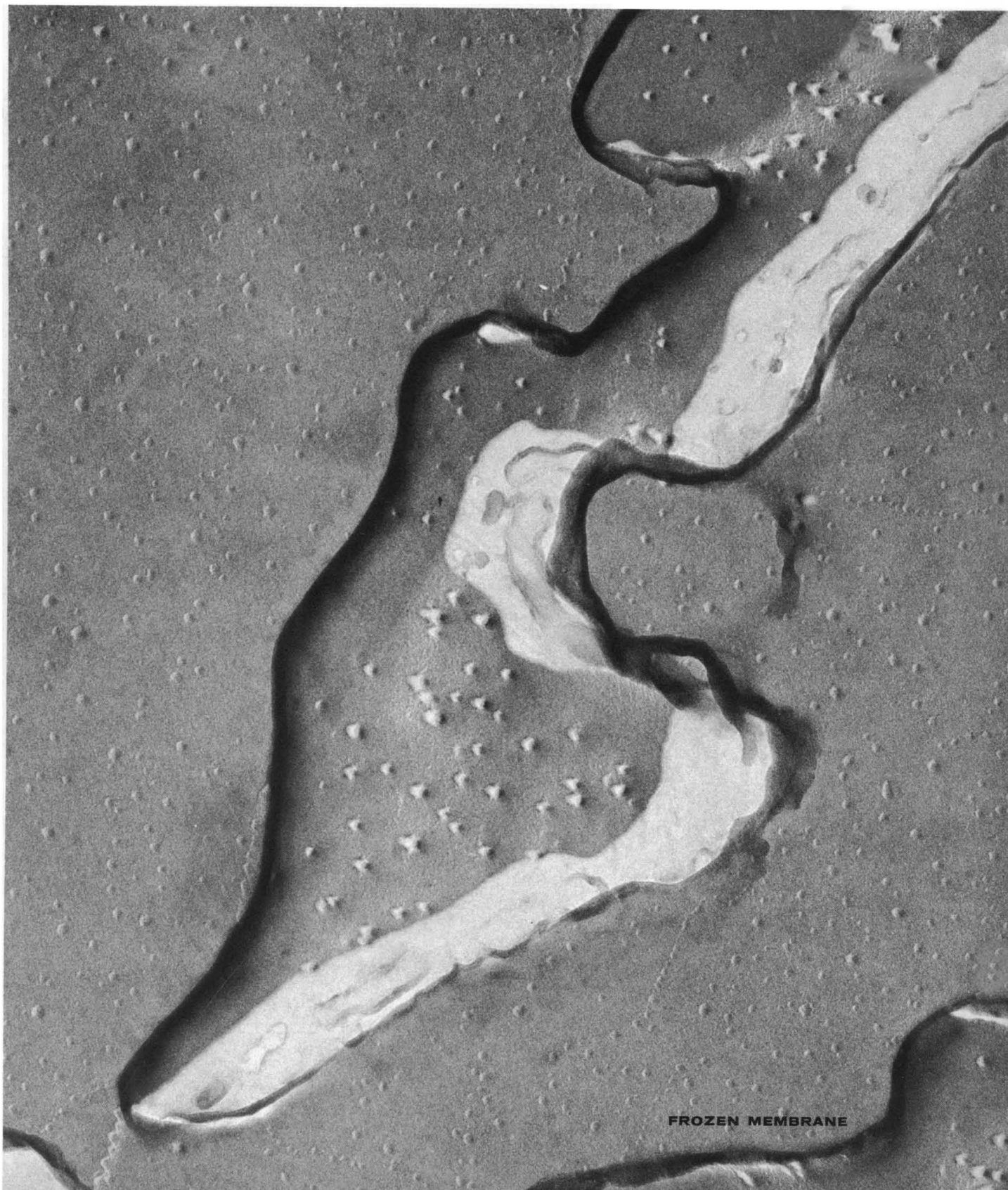


# SCIENCE

3 November 1967

Vol. 158, No. 3801

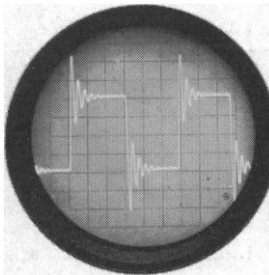
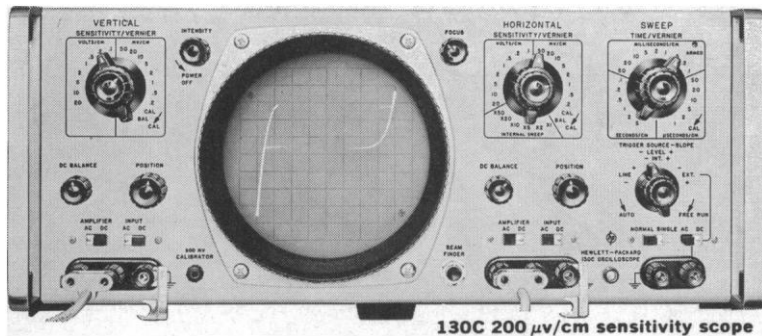
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FROZEN MEMBRANE

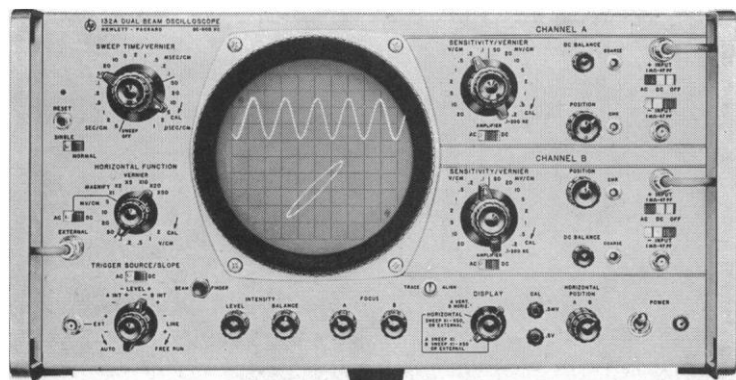


*Put either of these high-sensitivity 500 kHz hp scopes on your bench and...*



Trace on 130C at left shows how identical vertical and horizontal amplifiers facilitate display of component characteristics. As shown in adjacent trace, you get a clear picture of low-level signals with high 200  $\mu\text{v}/\text{cm}$  sensitivity, DC to 500 kHz.

## GET PERFORMANCE WHERE IT COUNTS



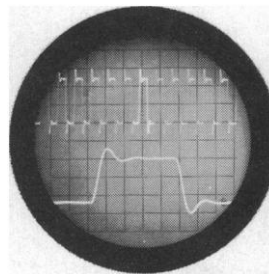
**132A 100  $\mu\text{v}/\text{cm}$  sensitivity dual beam scope**

A powerful combination of 200  $\mu\text{v}/\text{cm}$  sensitivity, 500 kHz bandwidth, balanced input on all 16 ranges, and identical X & Y amplifiers makes the hp 130C an ideal match for lab, production and systems measurements. Its high sensitivity permits direct measurement of low-level balanced signals without external amplification. Amplifiers may also be used single-ended—either ac or dc coupled. Other features include sweep expansion to X50 for accurate measurement of waveform details.

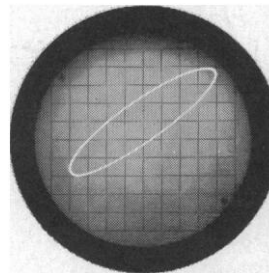
Extreme dual-beam versatility of the 132A makes it clearly superior for diverse electronic, scientific and bio-medical applications. Versatility is enhanced by Channel A & B amplifiers that have 100  $\mu\text{v}/\text{cm}$  sensitivity with high stability and a bandwidth of 150 kHz at 100  $\mu\text{v}/\text{cm}$ , increasing to 500 kHz at 1 mv/cm and above. Amplifiers reject common mode signals such as hum pick-up by 20,000:1 for clear displays of low-level differential signals. Amplifier outputs are provided for driving voltmeters, tape recorders or other equipment.

Both scopes provide automatic triggering which produces a baseline even in the absence of an input signal—provides stable triggering when the signal is applied, and enhances fast, easy set-up. Both have a beam finder, as well as an internal graticule CRT for making accurate measurements from any viewing angle. Both have characteristic hp reliability and have proved themselves in adverse environments. Prices: 130C, \$695.00; 132A, \$1395.00.

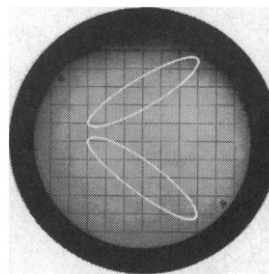
Ask your hp Field Engineer for complete specifications, or write to Hewlett-Packard, Palo Alto, California, 94304. Call (415) 326-7000. In Europe: 54 Route des Acacias, Geneva.



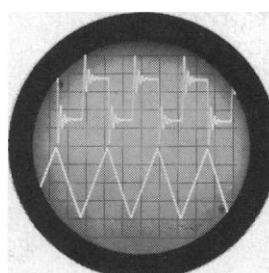
Two completely independent beams provide simultaneous X-Y and time plots . . . as shown on 132A at left. Adjacent trace shows how you can display a signal and magnify any portion of it on Channel B, using beam intensification to show location of fast sweep.



Accurate phase measurements of small or low level signals are possible through the use of identical amplifiers on both channels. 100  $\mu\text{v}/\text{cm}$  amplifiers have less than 2° phase difference for signals to 50 kHz.



You get numerous dual X-Y measurements using 5 mv/cm 300 kHz horizontal capability, plus two 500 kHz vertical amplifiers.



Make accurate time comparisons of two signals displayed at the same sweep speed.

116A

**HEWLETT *hp* PACKARD**  
An extra measure of performance

# Four new P's in the Mettler pod: some stay level, some weigh backwards, and some even weigh conventionally

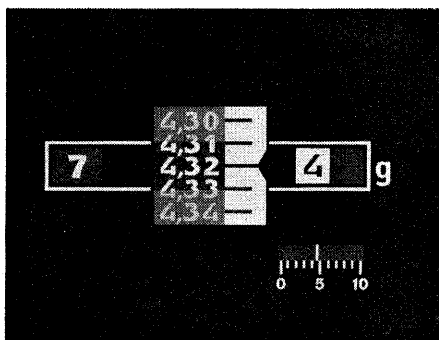
P160, P2000, P5 and P6 – these are the four new instruments we've added to our widely-accepted series of top-loading balances. They bring improved precision/capacity relationships while offering special advantages for particular applications.

## WEIGH UP, WEIGH DOWN...

Perhaps the most unusual of the new group is the P160. It has the 160 g capacity of our finest analytical balances and the milligram precision of our best top-loader.

Its scale reads two ways. Operating conventionally, it tells you, with milligram precision, just how much weight you have on the pan.

A turn of a knob wipes out all traces of conventionality – your scale now tells you, in positive values and with milligram precision, just how much weight the object on the pan has **lost**. This reversible scale is important in all work in-



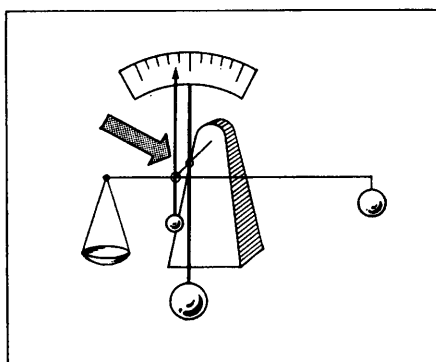
Digital or analog, up or down

volving weight loss studies such as drying and evaporation experiments and determination of residues. It makes possible, for the first time, gravimetric titration, in which titrant is dispensed directly by weight instead of indirectly by vol-

ume. We have done some homework on this subject.<sup>1</sup>

## ...BUT NEVER SIDEWAYS

Some of the new P balances have the exclusive Mettler **level-matic** feature. This automatically compensates for slight changes in balance level which are due to work-



Secrets of level-matic

ing on a less-than-ideal balance table. Essentially a fail-safe system, it protects the unwary balance operator against himself. If tilt exceeds its compensation range, **level-matic** automatically covers the readout scale. Faulty readings are impossible.

**Level-matic**, available as an option on the P160 and P2000 instruments, is supplied as an integral feature on the larger P5 balance.

## TWO KILOS IN A ONE-KILO CASE

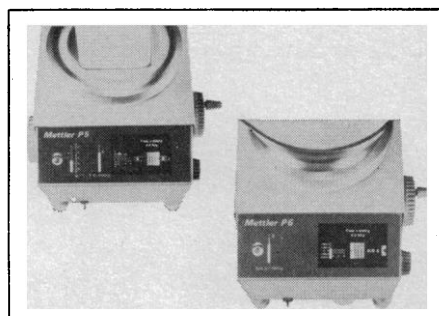
The model P2000 stands out by not really standing out. It is a remarkably compact unit that offers twice the capacity and 60% more

1) We've found 44 citations which suggest useful applications for, or advantages of, dispensing titrant by weight. If you'd like a copy, ask for Technical Information Bulletin 1014, "Gravimetric Titrimetry – a Review of the Literature."

taring than other instruments in its precision and size class. It has 2-kilo capacity with precision of  $\pm 0.05$  g and readability of 0.1 g.

## MEET THE BIG BOYS

The P5 and P6 are the higher-capacity members of the new breed of P's. With comparable capacities, 5000 g and 6000 g respectively, the two units distinguish themselves in terms of performance and precision.



P5 and P6 – top-loading balances

The P6 offers fully automatic operation – place the sample on the pan and read the result – across its full capacity. It provides precision of  $\pm 0.25$  g.

The P5, on the other hand, provides about another decimal precision –  $\pm 0.05$  g – with automatic operation over its 1000 g optical scale.

## FOR PRODUCT LITERATURE...

All the new Mettler balances are described in a new 10-page booklet. Get your copy from your laboratory supply dealer or request it from Mettler Instrument Corporation, 20 Nassau Street, Princeton, New Jersey 08540.

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# SCIENCE

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Surface of a model membrane (stearate bilayer) which has been fractured and etched (ice allowed to sublime). The fracture has cleaved the bilayer, and only a monolayer remains on the ice. Deep etching occurs through flaws in the monolayer (about  $\times 79,000$ ). See page 655. [D. W. Deamer and D. Branton, Department of Botany, University of California, Berkeley]

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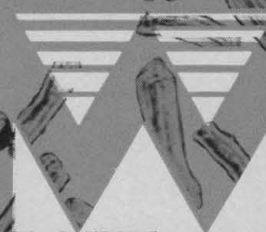
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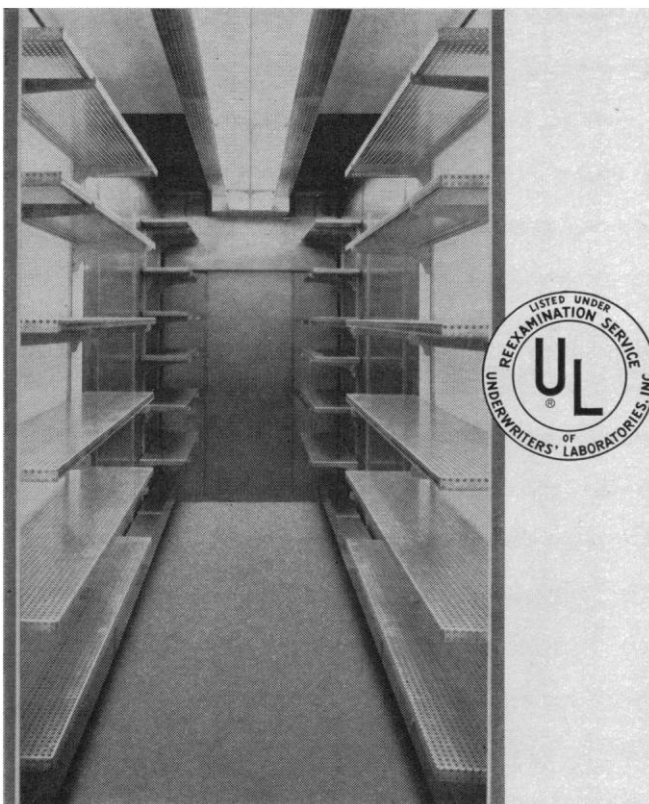
At the same time the real-time programs are running, individual programmers have direct access to the central processor and its associated peripheral equipment from teletype consoles. From these teletype stations, programmers may write, debug, edit and run their own programs. This feature makes it possible for a user to debug application programs for real-time systems without costly and inconvenient shutdown of the real-time systems.

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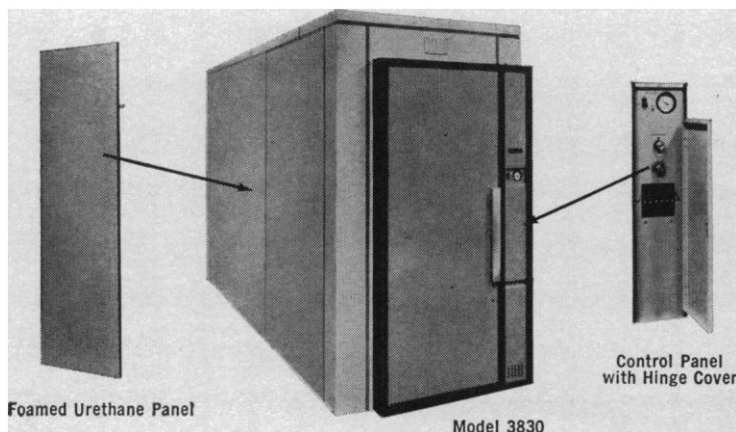
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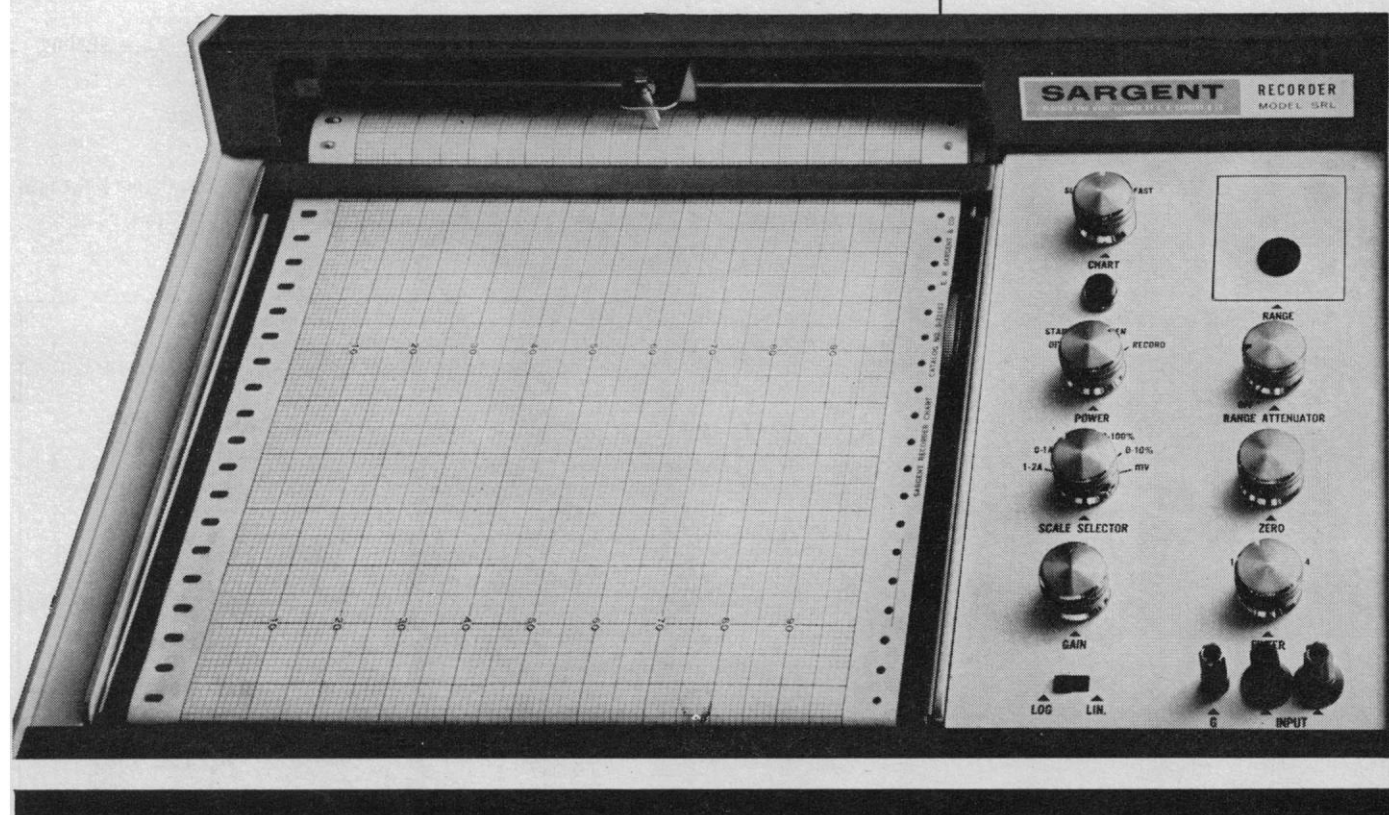
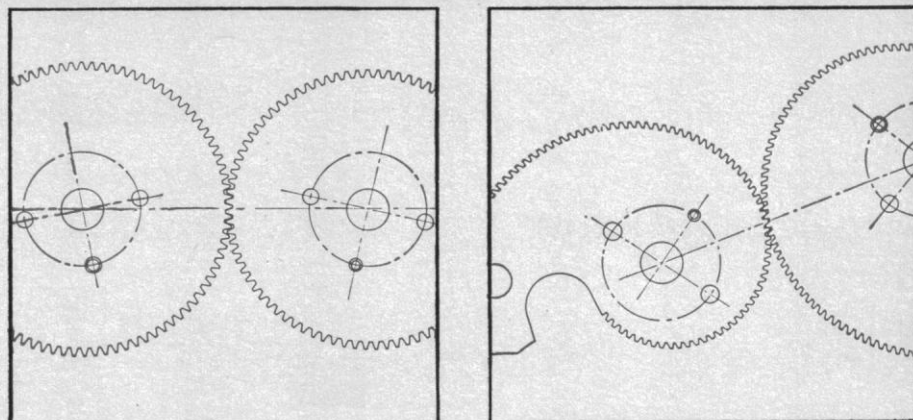
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volume 2

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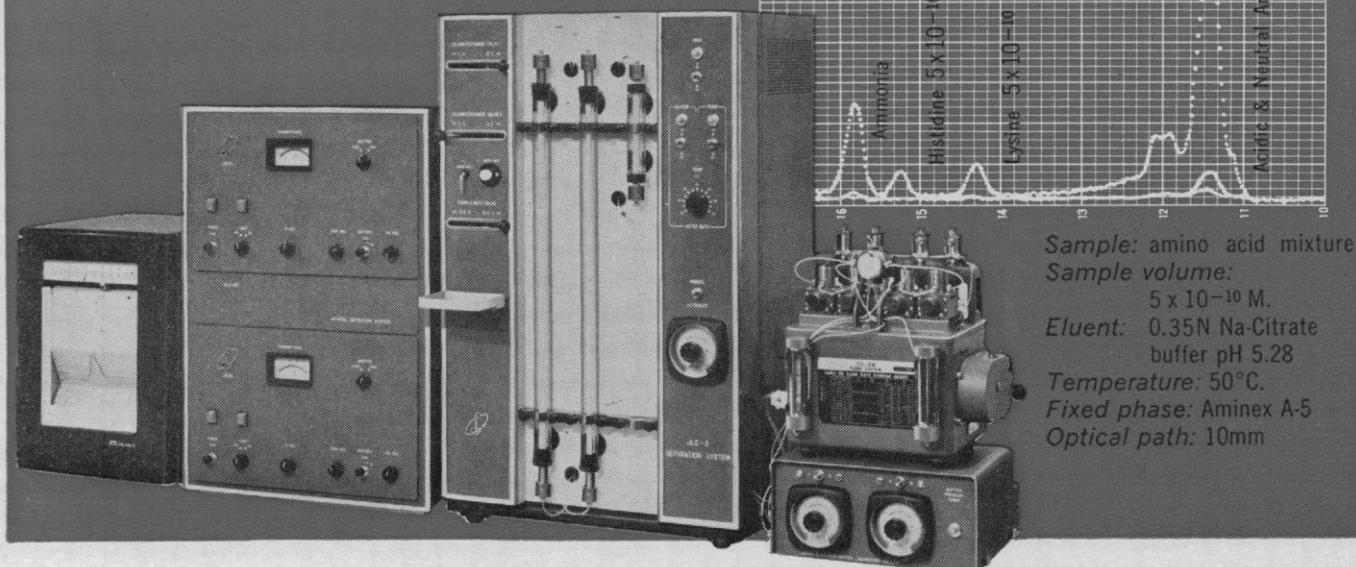
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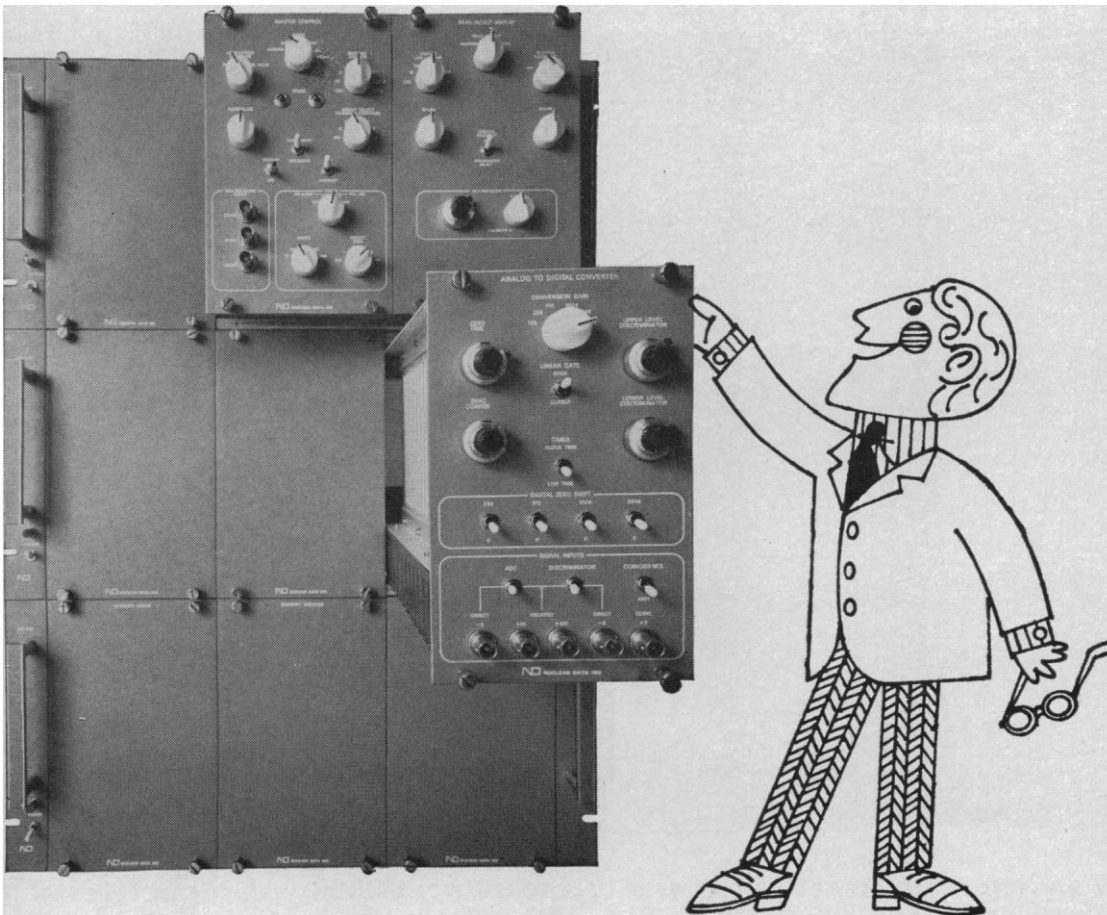
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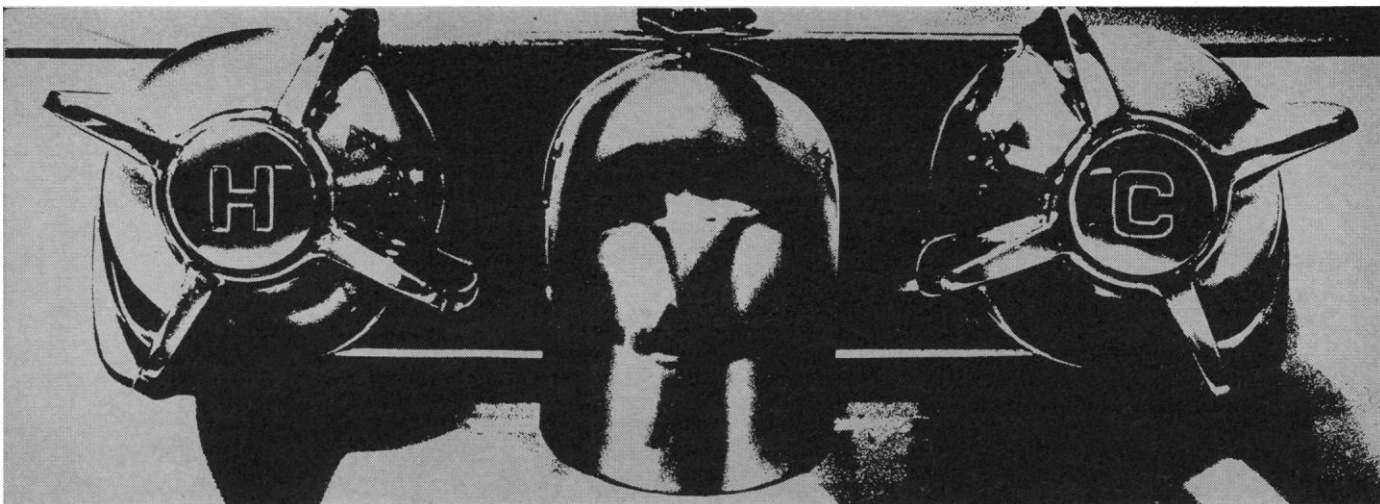
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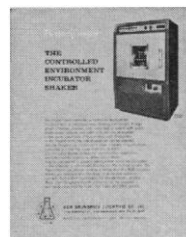
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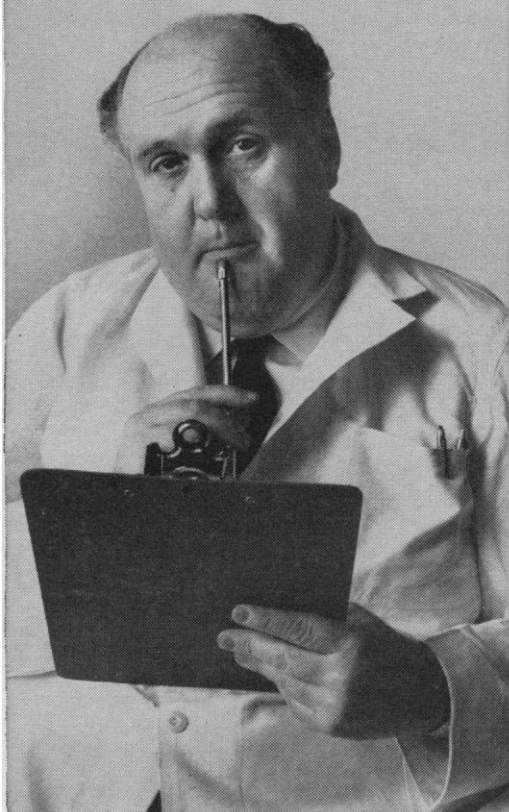
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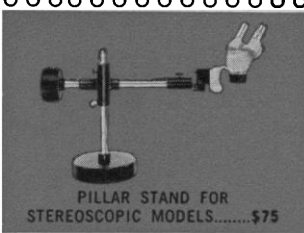
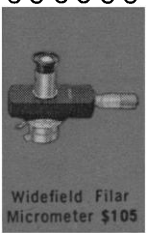
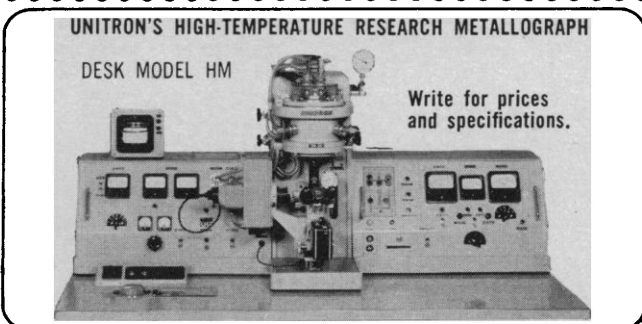
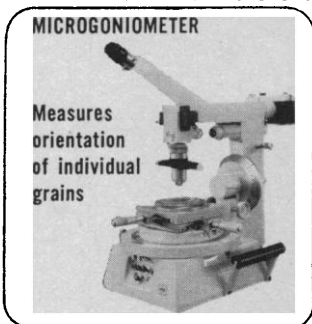
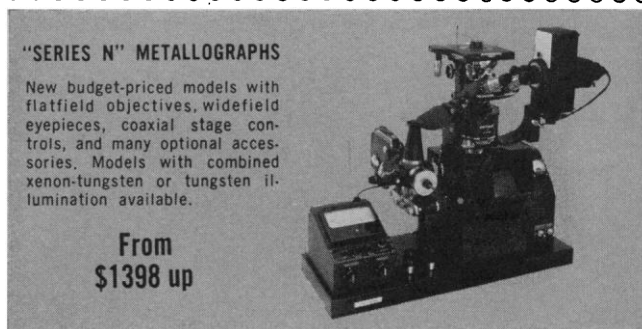
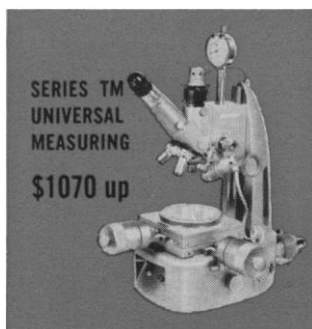
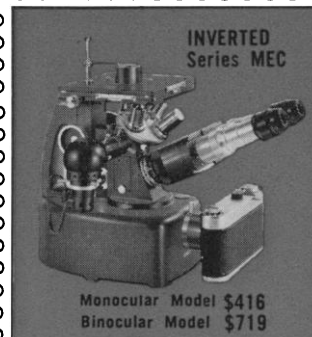
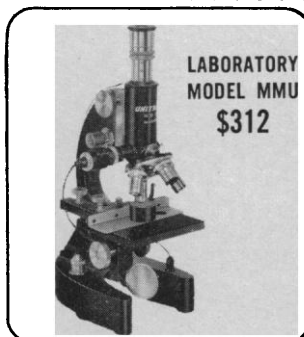
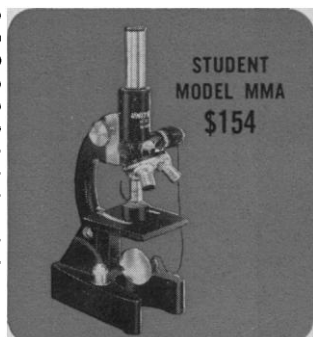
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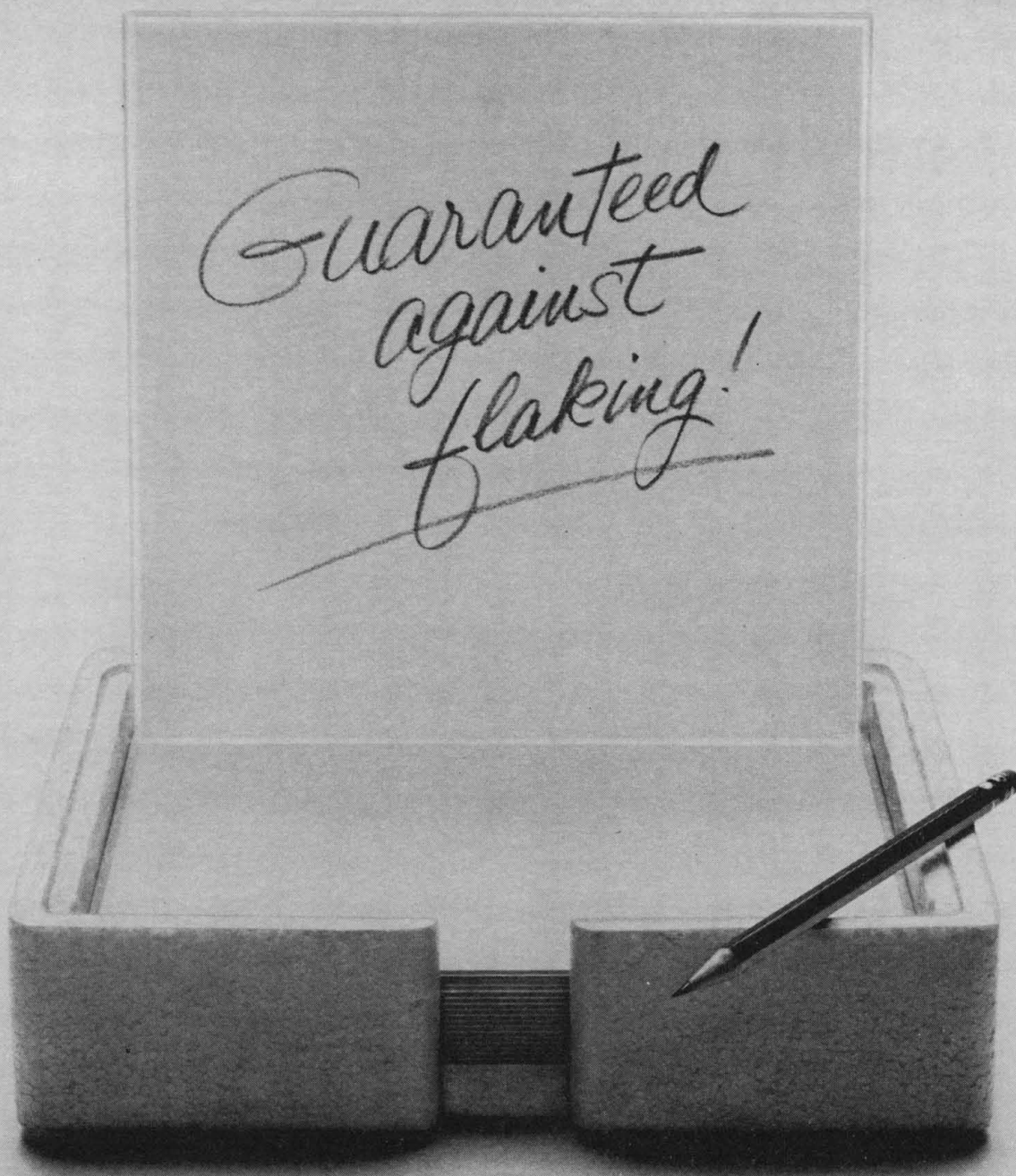
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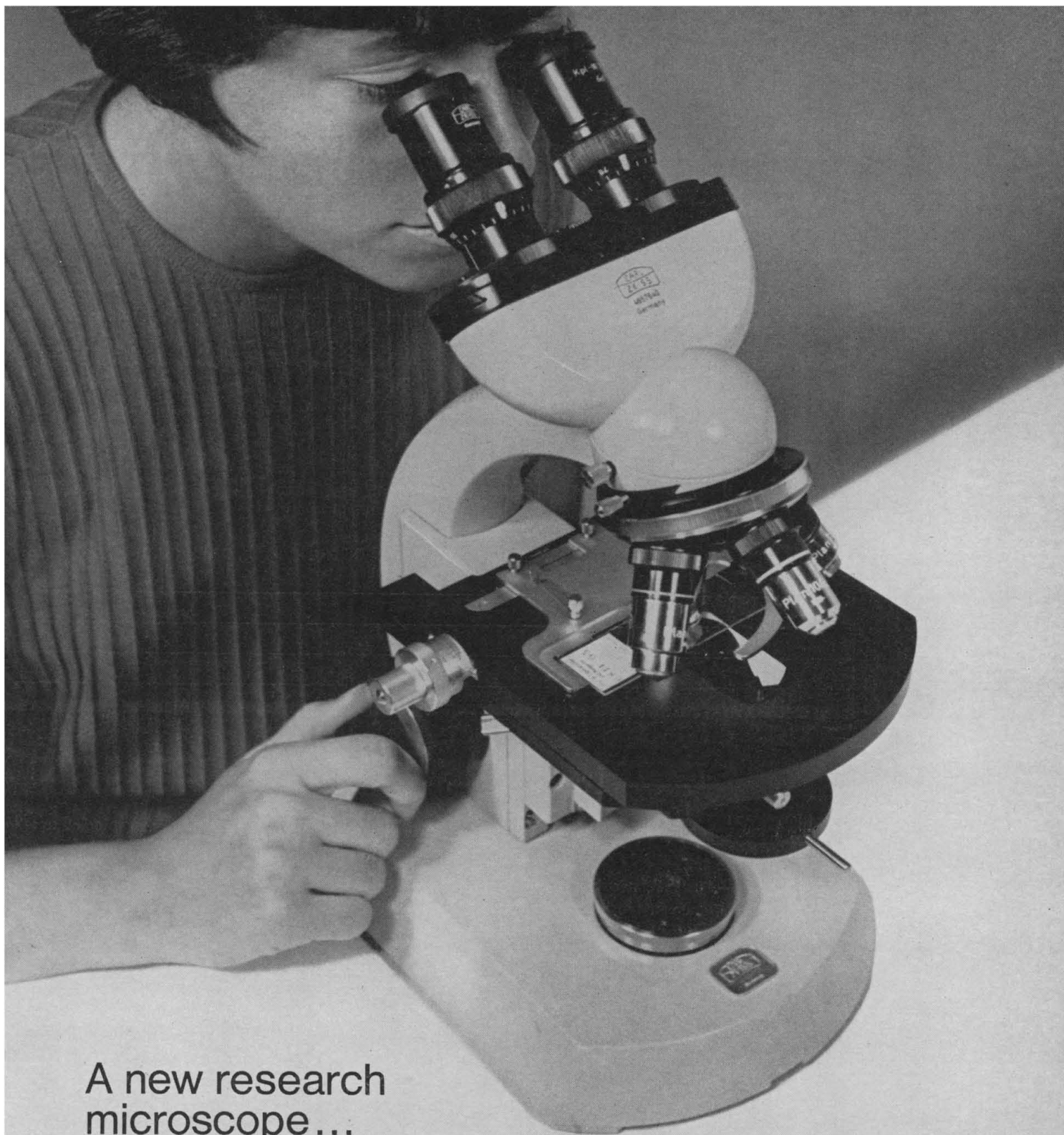
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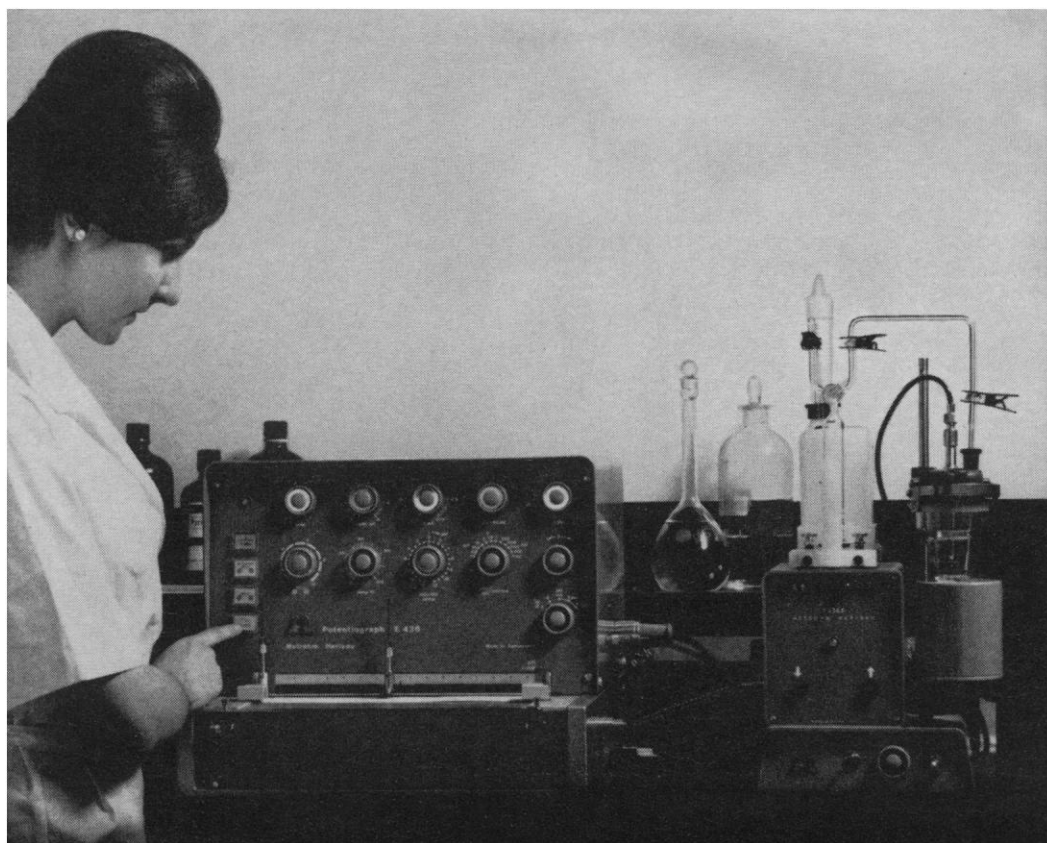
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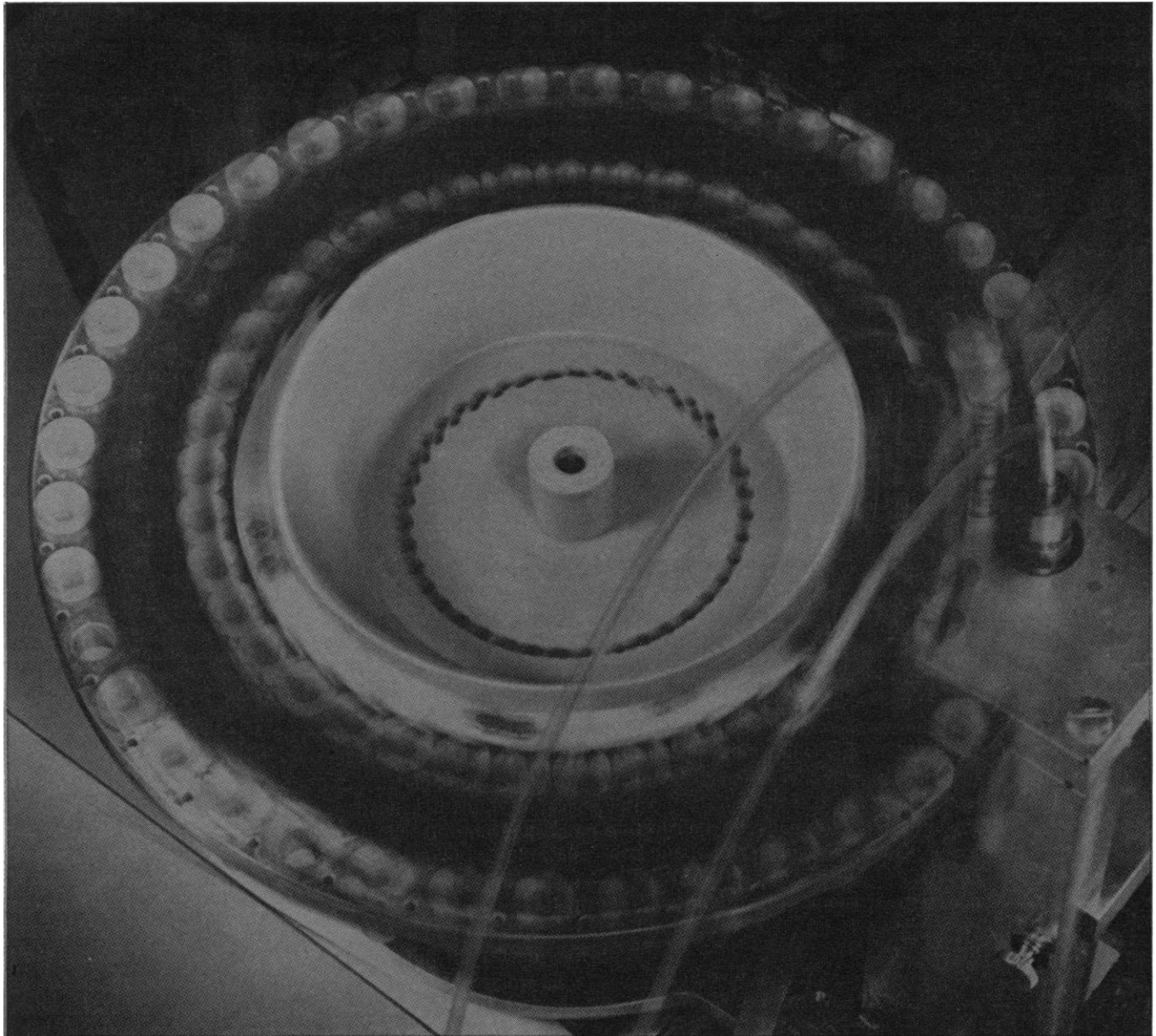


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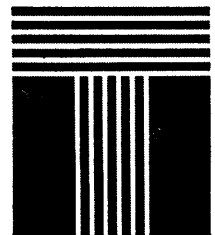
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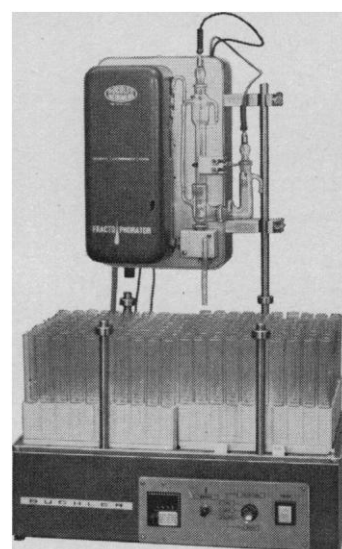


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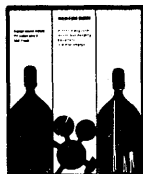
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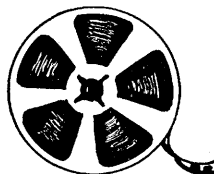
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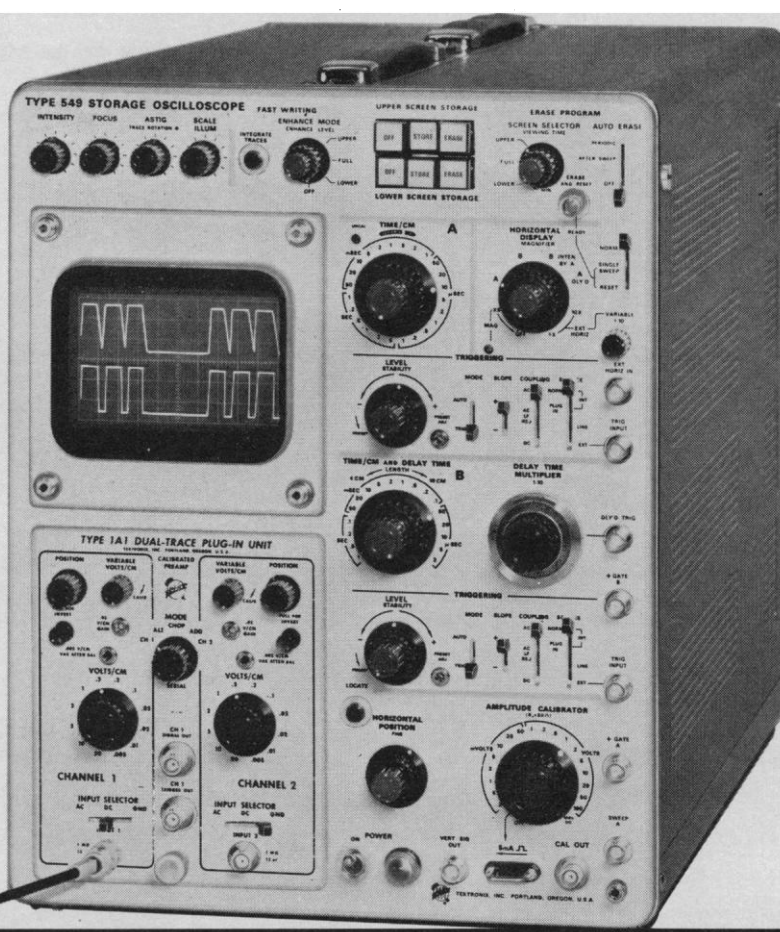
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### Split-screen displays

Unique with Tektronix storage oscilloscopes, split-screen displays bring you many advantages in waveform-comparison applications. You can use either half of the 6 cm by 10 cm display area for stored displays, the other half for nonstored displays, with independent control of each half. You can also use the entire screen for either type of display.

### Variable viewing time

Variable viewing time — an outstanding feature of the Type 549 — allows you to automatically store displays, view them for a selected time, then automatically erase them on either or both halves of the screen. Two modes of operation are possible. In the After-Sweep Automatic Erase Mode, the selectable viewing time of 0.5 s to 5 s begins at the end of each complete sweep. After the viewing time, the display is automatically erased and the cycle begins again when the next sweep is triggered by a signal.

In the Periodic Automatic Erase Mode, the sequence of storing, viewing time and erasure is continuous and independent of the sweep or signal. In this mode, the viewing time can also be varied from 0.5 s to 5 s.

There is no degradation of stored traces during the selected viewing time, in either mode, and you can retain or erase displays manually whenever desired.

### Bistable storage advantages

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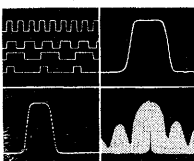
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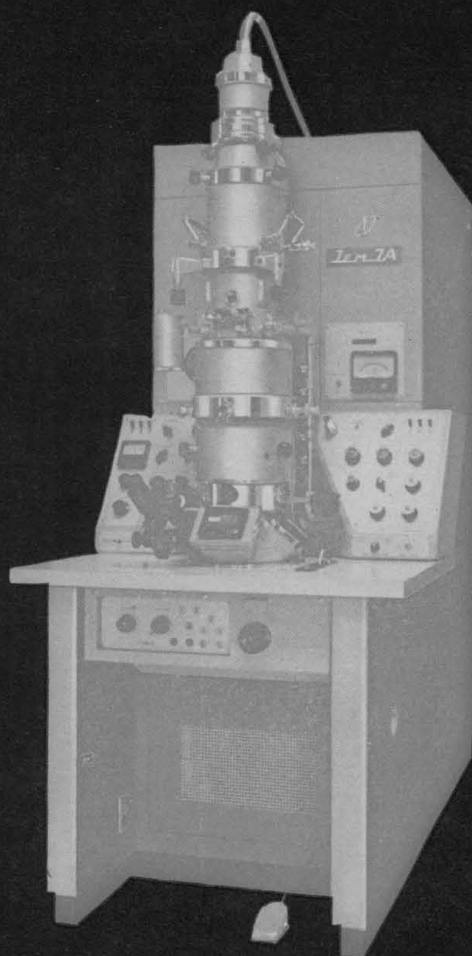


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against the bill when it was before Congress" (News in Brief, 21 July, p. 287). The NSMR has frequently voiced its favor of high standards, but consistently opposed legislation providing for meaningful enforcement. It has denied the existence of bad facilities and care (hearings on H.R. 1937 and H.R. 3557, 28-29 Sept. 1962, p. 317) until examples of these were made public. When it became clear that some sort of regulatory legislation was inevitable, it attempted to substitute nominal for real enforcement procedures.

Now the results of NSMR's own survey make it "questionable" whether most research institutions will "be in compliance with the law when it becomes effective. . . ." The survey results indicate that in about half of our research institutions conditions are below even the very modest minimum standards promulgated under the law. . . . Some research institutions already meet these standards. For others, it will mean an additional expenditure. These funds will be well spent if they result in facilities of which we need not feel ashamed. The need for enforcement by an impartial agency is clearer than ever. Of utmost importance at this time is an adequate appropriation by Congress for implementation of P.L. 89-544.

MARJORIE ANCHEL  
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### Sewage: A Rose by Another Name

It is not my intent to deprecate the efforts of Mateles and others (15 Sept., p. 1322) and those cited by the authors to produce single-cell protein (SCP) from hydrocarbons. In fact, fermentation may be more efficient than conventional agriculture in converting petroleum into protein. There are, however, other potential substrates for SCP that are now in the category of misplaced resources. They are domestic effluents and solid organic wastes (commonly known as sewage and garbage). Enormous sums of money are spent to degrade these by-products of our society and dilute them into air and water. For example, most of the present efforts of the Federal Water Pollution Control Administration appear to be directed toward dispersal by the usual, expensive methods of sanitary engineering. Yet, it is recognized that without additional tertiary treatment we are merely transferring problems

and nuisances from one place to another.

Why cannot fermentation systems be designed to convert organic wastes into SCP? The problem of converting so-called nasty materials into an approved food has been solved in the case of fish protein concentrate. Why not turn some attention to sewage protein concentrate? Of course, this rose would have to be called by another name, but it could be just as nutritious as SCP, FPC, or filet mignon.

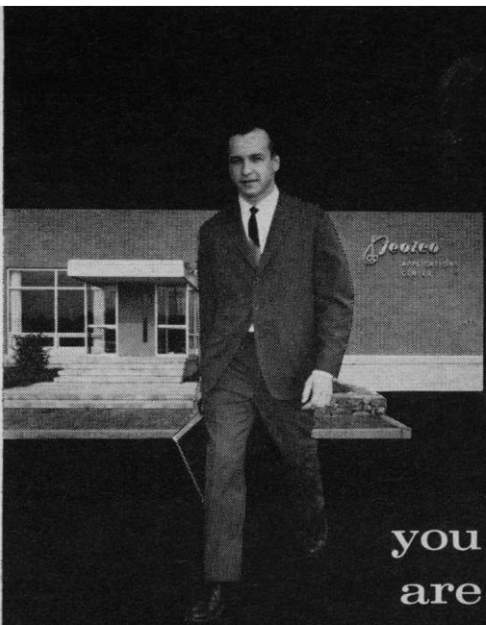
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### Vitamin D and Skin Pigments

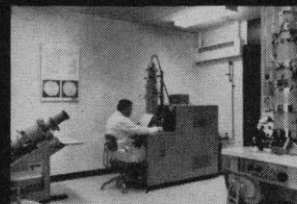
Loomis points out that the white race evolved in Europe because pigmented individuals develop vitamin D deficiency during the sunless winter months ("Skin-pigment regulation of vitamin D biosynthesis in man," 4 Aug., p. 501). His argument loses force when he states that native Africans are black (melanin granules) and Orientals yellow (keratohyaline granules) because individuals without this pigmentation suffered overproduction of vitamin D in equatorial latitudes. Even in this age of bikinis, the only reported cases of hypervitaminosis D are due to oral ingestion, though the chronic effects of slightly elevated vitamin D probably deserve further investigation. A more likely explanation of why light-skinned peoples suffer in the tropics, now as well as when the races were evolving, is found in solar-dependent skin cancer and simple sunburn [see, for example, F. Daniels, *Med. Clin. No. Amer.* 49, 565 (1965)]. Both these disorders are extremely common in Floridians of northern European extraction.

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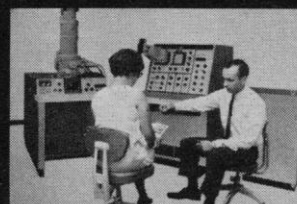
In his article in the *Handbook of Physiology* (1), F. Daniels discusses the difficulties in viewing black skin as an adaptation to strong solar radiation. In particular, he says that Blum (2) has raised the question that must be answered and can be stated: "How can nondisabling sunburn, the mildly disfiguring effects of chronic solar exposure, and skin cancers occurring well past the reproductive years, have a genetic selection value?" Daniels then sug-



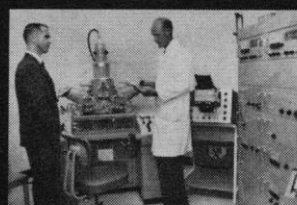
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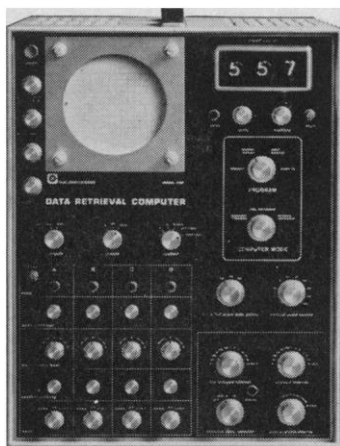
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gests that black skin may be of value in the tropics for reasons wholly unrelated to solar radiation. It should be remembered in addition that severe sunburn is essentially a disease of this century when 2-week vacations and jet air travel to Florida render it common among the unwary, whereas it is almost unknown among the peasants of Europe today who tan gradually as the summer-time approaches.

Although positive evidence for hypervitaminosis D among light-skinned peoples near the equator is lacking today, this is probably because (i) up to now there has been no reason to look for it; (ii) the well-known difficulties of assaying this vitamin; and (iii) of the habit of white men in the tropics of carefully avoiding direct sunlight by wearing clothes and pith helmets, and staying indoors when the sun is high to such an extent that they often are not even sunburned. These cultural substitutes for a black stratum corneum were not available, of course, when the races were evolving. Future confirmation of the hypervitaminosis D theory may come from reports of elevated serum levels of calcium and phosphate, kidney stones, and other symptoms of hypervitaminosis D in white persons living out-of-doors in Java, Kenya, and Peru.

W. FARNSWORTH LOOMIS  
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Brandeis University,  
Waltham, Massachusetts 02154

#### References

1. F. Daniels, Jr., in *Handbook of Physiology*, D. B. Dill, E. F. Adolph, C. G. Wilbur, Eds. (American Physiological Society, Washington, D.C., 1964), p. 969.
2. H. F. Blum, *Quart. Rev. Biol.* 36, 50 (1961).

### UFO's: Ideal Space Inhabitants

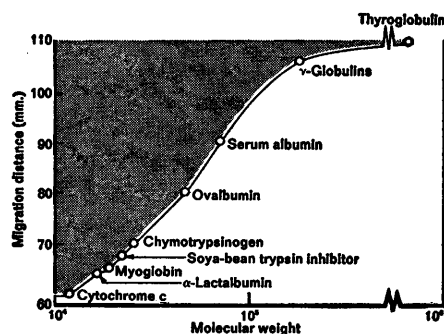
Markowitz' article, "Physics and metaphysics of unidentified flying objects" (15 Sept., p. 1274), was very helpful and prompts the following thought. Aside from infrequent sightings prior to 1945, UFO's became a source of public concern at a time when exploration of space moved closer to reality. I suggest that man, confronted with stepping into space, finds it intolerable to perceive space as uninhabited. The "sophisticated anxiety" of modern man might be, in part, responsible for populating space with products of intelligent beings.

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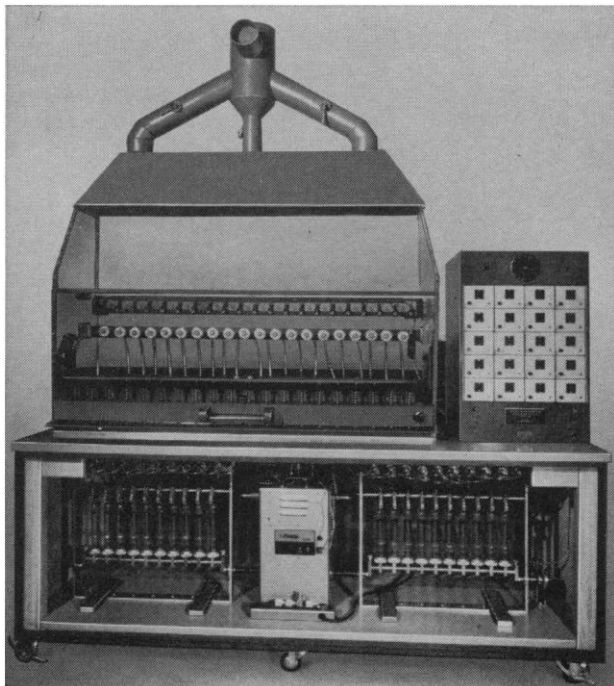
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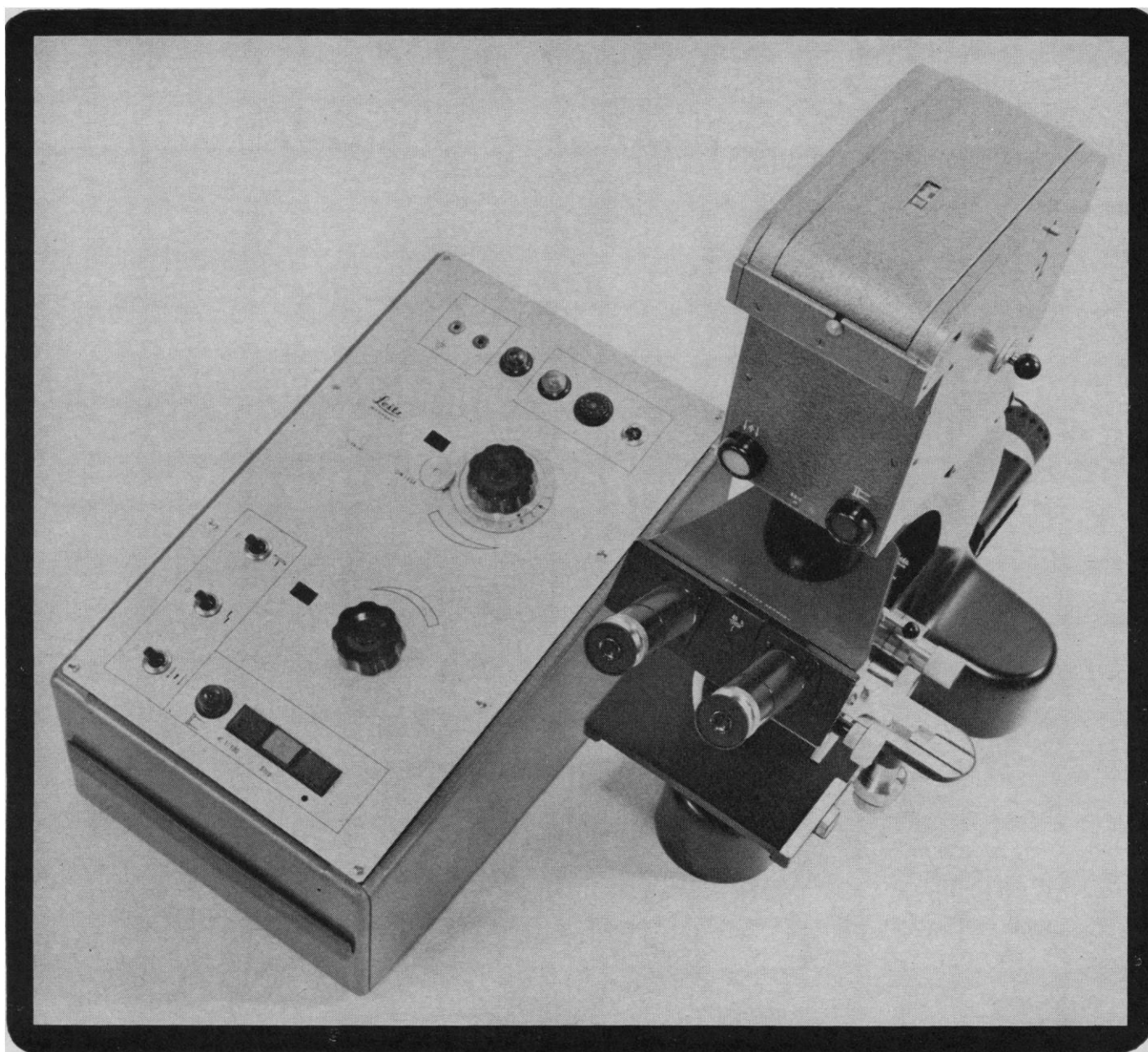


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# Funds for New Graduate Students

Academic scientists have not reacted sufficiently to drastic changes in the political climate. As a result, federal support for graduate education has been hard hit. Unless present political trends are reversed, federal funds for academic research may also be cut.

Graduate school enrollments have been increasing at the rate of about 10 percent per year and are expected to reach about 300,000 in 1968. However, the number of new fellowship and traineeship awards will drop from 15,000 in fiscal year 1966 to about 10,500 in fiscal 1968. The effects will be felt most painfully in the physical sciences. Among the programs supporting graduate study, new National Science Foundation graduate fellowships will fall from 3635 (in 1966) to about 2600 (in 1968); the National Defense Education Act Title IV fellowships, from 6000 to 3325; and the National Aeronautics and Space Administration traineeships, from 1335 to 75.

An alternative and important source of stipends for graduate students is research grants or contracts. If funds for research were expanding, some of the effects of the cuts in fellowship funds could be offset. However, overall federal support for the physical sciences has also diminished. Present indications are that federal funds for research and development in the physical sciences will drop at least 7 percent from fiscal 1967 to fiscal 1968. Because of inflation and other factors, the cost of conducting scientific activities increased by about 7 percent during the year.

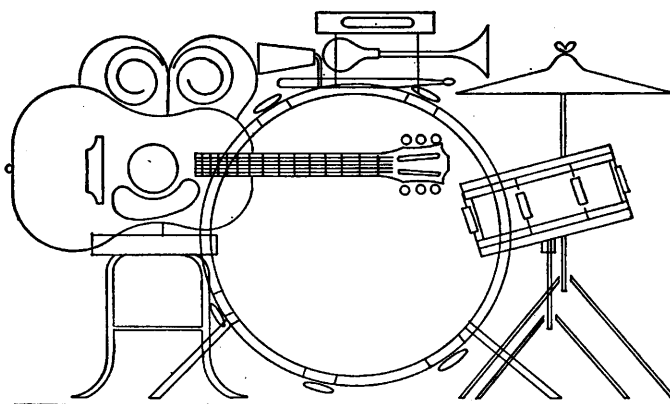
Those responsible for the conduct of research will have to operate with the equivalent of 14 percent less money. In a retrenchment, purchases of equipment and supplies take precedence over provision of stipends for graduate assistants. Moreover, experienced graduate assistants of known competence are supported in preference to beginners. Thus, one consequence of recent congressional actions will be a stunted or a lost generation of young scientists. Prominent among the casualties will be those who need financial assistance in order to continue their education.

Congress does not seem to have comprehended the effects of its actions. In its present mood it does not want to listen. Observers have the impression that it is unusually peevish and anti-intellectual. Largely because of the war in Vietnam, a deficit of as much as \$29 billion is projected. With an election year approaching and the public overwhelmingly against a tax increase, Congress feels that its only course is to decrease spending.

However, it is unwilling to cut military expenditures, social security, or medicare. It cannot reduce the interest on the national debt. If cuts in the budget are to be made, they must come out of a few activities. Science and education now seem among the more vulnerable. The *Congressional Record* for 18 October shows the current attitudes of many members of the House of Representatives. In wide-ranging debate concerning budget cuts, many activities and agencies were defended—for example, the Post Office Department, the Internal Revenue Service, the Federal Bureau of Investigation, even the supersonic transport. No member rose to speak for education or the National Science Foundation.

Today Congress seems unable to select a wise course of action. In this pre-election year, congressmen listen willingly to their constituents but to few others. If a further decline in support of science and higher education is to be prevented, academic scientists across the country must make themselves heard both now and later. The universities and their alumni associations represent a potentially powerful political force. The time has come for bringing that force into constructive action.—PHILIP H. ABELSON





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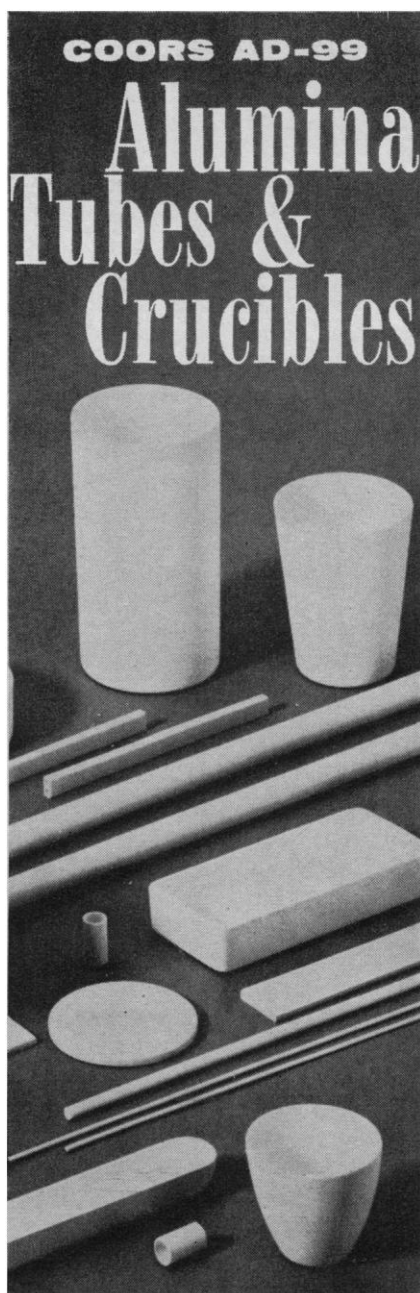
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seriously their responsibility to work on the interaction between sociological theory and technological invention, even to the point where sociologists work out specifications for needed technological innovation. For example, sociologists could have identified the desirability of coitus-independent contraceptives such as the IUD and should press the need for methods to predetermine the sex of offspring. Brim also raised the question of abortion as a major element in family planning. Abortion is a problem that has not yet been solved either technologically or socially, and a mere handful of sociologists are working on it.

Many questions were raised about the consequences of reduced family and population size. What are the effects of child spacing on interpersonal relations within the family? What changes occur in the relations between generations? In the role of women? There was a lively discussion of the need for research on the unintended results of institutionalizing a great social innovation like family planning.

Reuben Hill (Minnesota) focused on family studies, which see man as an initiator in the social process. Such studies are much needed as balance to the demographers' view of man as a passive particle in the grip of social forces. For family planning programs the optimal reference unit seems to be the nuclear family and its social network of neighbors and relatives, rather than the individual mother or society at large. Family planning is a special case of family decision making and problem solving, and it involves the husband and father no less than the mother, although the male member of the family constellation has been largely neglected in family planning research.

Mass communication was described by Daniel Lerner (Massachusetts Institute of Technology) as a technology without a theory. Because the mass media can reach very large communities simultaneously, repeatedly, and rapidly, they make feasible the creation of a climate of opinion in which rapid changes of attitude can occur. This kind of change arouses a whole range of demands—for more housing, more education, and more food, for example. Although mass media cannot alone induce acceptance, family planning programs will be most effective when presented as a form of behavior that can help satisfy the full range of rising expectations. This kind of coordination has been important to the

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success of family planning programs in Taiwan and Korea.

Leo Bogart (American Newspaper Publishers' Association) described American advertising as functioning chiefly on superficial levels of motivation that are not particularly relevant to family planning as a marketing problem. However, family planning programs could well use advertising's organizational expertise for distributing the product: it does little good to persuade people to use a product that is not readily available. One important organizational technique in achieving the right marketing mix is the use of a single coordinator with authority to cut across established hierarchical lines to get things done. Another useful device is to select specific target groups and gear each campaign to certain segments of the population. A third value may lie in promoting familiarity with many different kinds of contraceptives, taking the basic concept of contraception for granted; this may serve to alleviate anxiety about a radical innovation by assuming that it is already favorably known.

Catherine Chilman (Welfare Administration) pointed out that poverty groups in the United States have many of the characteristics of a developing nation. Family planning research on middle class families has as little relevance for these groups as for India or Hong Kong.

George M. Foster (Berkeley) suggested that people in all cultures appear to be basically so pragmatic that they will accept any innovation that they can see actually meets a need in their own lives. If this is true it follows that any attempt to establish change depends on four conditions: the people must perceive a need; they must have information on how that need can be met; the materials to meet the need must be easily available to them; and the society must not impose negative sanctions. Actually there now exists sufficient knowledge about these four conditions that they need not comprise the main barriers against family planning. Those barriers are rather to be found in the nature, structure, and personality of bureaucracies. The real contribution that social sciences can make to family planning—and to all technological development—is to enable people to understand themselves as individuals and as members of their organizations.

Foster also challenged the recurring emphasis on expanding freedom of

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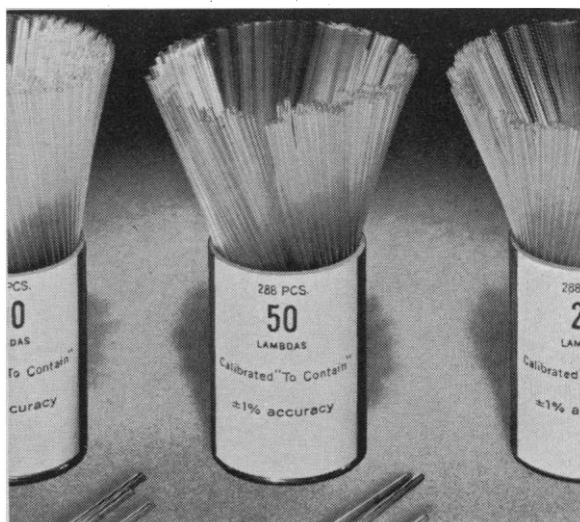
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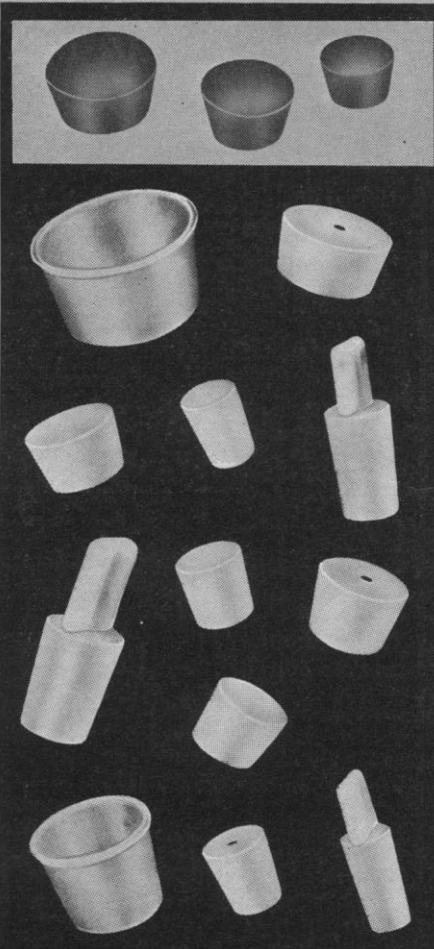


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choice and improving family function as euphemisms for the real goal of family planning programs. This goal he stated as bringing births and deaths into approximate balance at some level which will enable relatively civilized life to continue. This point engendered vigorous discussion. The consensus appeared to be that the three values—individual freedom, family integrity, population control—are not mutually exclusive but can and must be brought into a working synthesis, for the purpose of all population planning is to improve the quality of living. It is probably true that the priority of emphasis among the three approaches will differ with different social contexts, but all are essential.

Everett Rogers (Michigan State) reported on research on the diffusion of innovations and suggested ways of using the diffusion approach for family planning research. He stressed the inadequacy of static or demographic variables such as age, literacy, and family size, and suggested four other variables that hold high potential for family planning research: economic incentives, social-psychological perceptions, social structure norms, and communication strategies.

The final discussion, led by Nicholas Demerath (Washington University), concerned organizational theory. Administrative slow-downs in family planning programs can be relieved by research into the motivations and functioning of policy makers. Four special barriers need investigation. First, administrative elites in developing countries are often very small and seriously overloaded; second, they tend to work in the colonial tradition of custodial leadership; third, there is excessive bureaucratization, often increased by the zeal of technical consultants who are eager to get more people to work on their programs; and fourth, the ethnocentrism of technical consultants, often Americans, is a serious obstacle. Organizations capable of all-out efforts for population planning can never be built until Western consultants work in full partnership with local managerial talents, recognizing their high capabilities and working pragmatically in ways that are socially and culturally appropriate to the environment. The creation of personal competence is essential here, and it can be done by co-opting local talent and helping to give them locally appropriate forms of managerial training. In this discussion of organization, the question was raised

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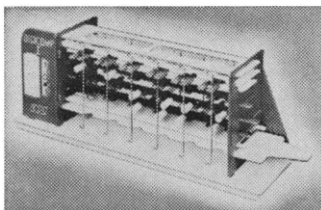
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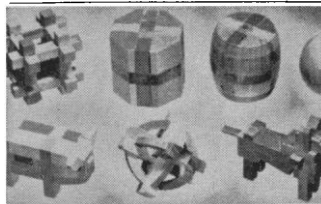
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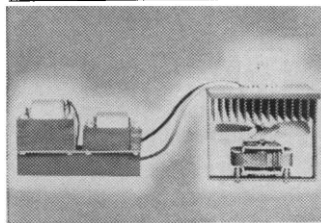
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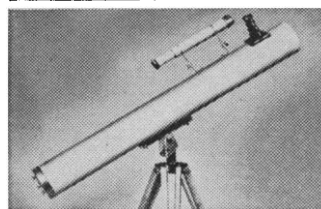
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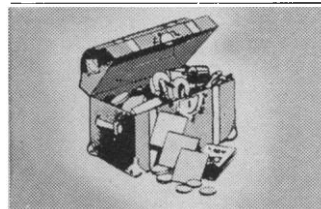
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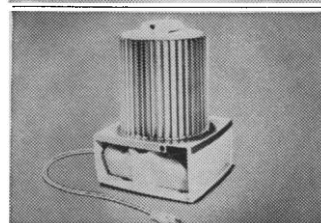
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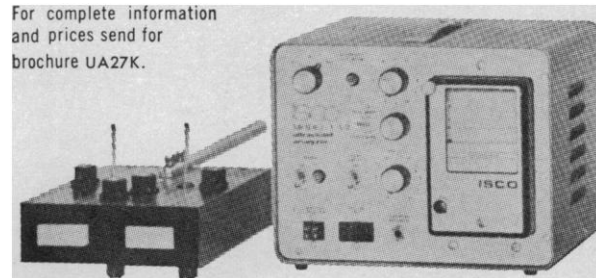


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whether public health administrators are the best source for leadership in creating effective family planning organizations. There was some feeling that the intense specialization required for membership in this group does not lend itself readily to the kind of flexible inventiveness needed for family planning programs.

In summing up the conference Lyle Saunders (Ford Foundation) compared contemporary family planning programs with the Wright brothers' airplane—a creaky and ungraceful invention of limited performance. The effort of this conference was to explore ways in which the social sciences can improve both the form and the performance of this innovation. A great variety of areas were explored where the innovation can benefit from a great deal more social science involvement. The conference also demonstrated that scientists can work in this applied field without losing their status in the scientific community.

The conference was sponsored jointly by the AAAS Council Study Committee on Population Explosion and Birth Control and the National Institute of Child Health and Human Development.

MARGARET SNYDER

*National Institute of Child Health  
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## Calendar of Events—November

### National Meetings

8-10. Eastern Analytical Symp., New York, N.Y. (E. G. Brame, Jr., Elastomer Chemistry Dept., duPont Experiment Sta., Wilmington, Del. 19898)

8-10. American Water Resources Assoc., 3rd annual conf., San Francisco, Calif. (A. A. Stone, International Engineering Co., 74 New Montgomery St., San Francisco 94105)

8-11. Respiratory Therapy, 4th annual conf., Boston, Mass. (M. J. Nicholson, 6 Beacon St., Suite 620, Boston 02108)

9-11. Gerontological Soc., Inc., 20th annual mtg., St. Petersburg, Fla. (Mrs. M. Adler, 660 S. Euclid St., St. Louis, Mo.)

10. Laboratory Animal in Gerontologic Research, symp., St. Petersburg, Fla. (R. H. Yager, Natl. Acad. of Sciences-Natl. Research Council, 2101 Constitution Ave., NW, Washington, D.C.)

10-11. New England Psychological Assoc., annual mtg., Hartford, Conn. (M. M. Riggs, New Hampshire Child Guidance Clinics, 121 S. Fruit St., Concord 03301)

11-12. American Acad. of Psychotherapists, annual conf., Warrenton, Va.

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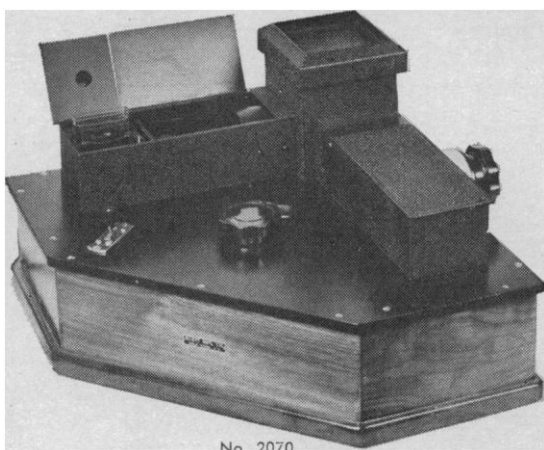
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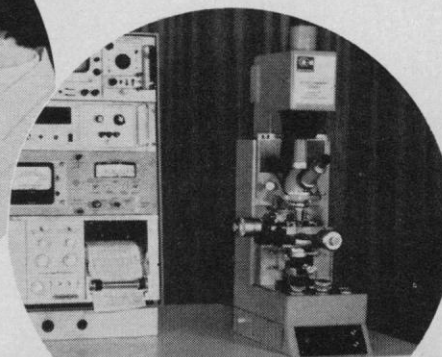
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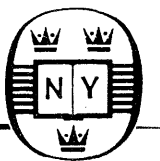


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11-15. American Soc. for **Cell Biology**, 7th annual mtg., Denver, Colo. (M. J. Moses, Box 2982, Duke Univ. Medical Center, Durham, N.C. 27706)

12-17. American Soc. of **Mechanical Engineers**, winter annual mtg., Pittsburgh, Pa. (A. B. Conlin, Jr., 345 E. 47 St., New York 10017)

13-15. **Industrial Diamond Revolution**, technical conf., Columbus, Ohio (Conference Hq., 330 S. Wells St., Chicago, Ill. 60606)

13-15. American **Petroleum Inst.**, 47th annual mtg., Chicago, Ill. (American Petroleum Inst., 1271 Ave. of the Americas, New York 10020)

13-16. **Engineering in Medicine and Biology**, 20th annual conf., Boston, Mass. (Professional Assocs., 6520 Clayton Rd., St. Louis, Mo. 63117)

14-16. American Federation of **Information Processing Societies**, fall joint computer conf., Anaheim, Calif. (Executive Secretary, 211 E. 43 St., New York 10017)

14-17. American **Acoustical Soc.**, fall mtg., Miami Beach, Fla. (J. Steinberg, Inst. of Marine Science, Univ. of Miami, Miami 33149)

14-18. **Air-Conditioning and Refrigeration Inst.**, annual mtg., Miami, Fla. (1815 N. Fort Myer Dr., Arlington, Va. 22209)

15-18. American Society of **Tool and Manufacturing Engineers**, semi-annual conv., Dearborn, Mich. (The Society, 20501 Ford Rd., Dearborn 48128)

16-18. American **Physical Soc.**, New York, N.Y. (W. W. Havens, 538 W. 120 St., New York 10027)

16-19. National Soc. for **Crippled Children and Adults**, annual mtg., Los Angeles, Calif. (K. Bauer, Director of Public Relations, 2023 W. Ogden Ave., Chicago, Ill.)

17-18. **Computer Applications in Clinical Electrocardiography**, postgraduate program, Washington, D.C. (J. S. France, Assistant Director, American College of Cardiology, Bethesda, Md. 20014)

19-21. International College of **Surgeons**, 5th Western regional mtg., Las Vegas, Nev. (F. M. Turnbull, Jr., 1127 Wilshire Blvd., Los Angeles, Calif. 90017)

19-22. Association of **Military Surgeons** of the U.S., annual mtg., Washington, D.C. (Brig. Gen. F. E. Wilson, AMSUS, 1500 Massachusetts Ave., NW, Suite 132, Washington, D.C. 20005)

20-21. **Manpower for Oceanography**, education symp., Houston, Tex. (American Soc. for Oceanography, 854 Main Building, Houston 77002)

20-22. Society of **Economic Geologists**, New Orleans, La. (J. O. Kalliokoski, Dept. of Geology, Princeton Univ., Princeton, N.J. 08540)

20-22. American Physics Soc., annual **Fluid Dynamics** mtg., Bethlehem, Pa. (P. S. Klebanoff, Natl. Bureau of Standards, Connecticut Ave. at Van Ness St., NW, Washington, D.C. 20234)

20-22. **Geological Soc. of America**, annual mtg., New Orleans, La. (G. E. Murray, Texas Technical College, Box 4680, Technical Station, Lubbock, Tex., or Miss D. Curtis, Shell Oil Co., Box 60193, New Orleans 70160)

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20-22. **Geochemical Soc.**, annual mtg., New Orleans, La. (E. C. T. Chao, % U.S. Geological Survey, Washington, D.C.)

20-22. **Mineralogical Soc. of America**, New Orleans, La. (G. Switzer, % U.S. National Museum, Washington, D.C. 10025)

20-22. **Paleontological Soc. of America**, New Orleans, La. (R. L. Langenheim, Dept. of Geology, Univ. of Illinois, Urbana)

26-29. **American Medical Assoc.**, clinical conv., Houston, Tex. (W. E. Burmeister, Director, Convention Services Dept., AMA, 535 N. Dearborn St., Chicago, Ill.)

26-30. **American Inst. of Chemical Engineers**, 60th annual mtg., New York, N.Y. (H. I. Wolff, Shell Chemical Co., 50 W. 50 St., New York 10020)

26-1. **Radiological Soc. of North America**, 53rd annual mtg., Chicago, Ill. (M. D. Frazer, RSNA, 713 East Genesee St., Syracuse, N.Y.)

27-29. **American Astronautical Soc.**, natl. mtg., New York, N.Y. (N. Levin, Guidance and Control, Plant 35, Grumman Engineering Corp., Bethpage, N.Y. 11714)

27-30. **Entomological Soc. of America**, annual mtg., New York, N.Y. (R. H. Nelson, ESA, 4603 Calvert Rd., College Park, Md.)

27-1. **Chemical Industries**, New York, N.Y. (International Exposition Co., 200 Park Ave., New York 10017)

28. **American Soc. of Therapeutic Radiologists**, Chicago, Ill. (J. A. Del Regato, Penrose Cancer Hospital, Colorado Springs, Colo. 80907)

29-30. **Society for Industrial and Applied Mathematics**, fall mtg., Santa Barbara, Calif. (H. B. Hair, 33 S. 17 St., Philadelphia, Pa. 19103)

29-1. **Wire and Cable Symp.**, Atlantic City, N.J. (J. Spengel, USAEC, Fort Monmouth, N.J. 07703, attn: AMSEL-KL-EE)

30-3. **American Anthropological Assoc.**, annual mtg., Washington, D.C. (C. Frantz, 1530 P St., NW, Washington, D.C. 20005)

#### International and Foreign Meetings

6-14. **Dentistry**, intern. symp., Quito, Ecuador. (O. C. Jaramillo, Decano, Facultad de Odontologia, Universidad Central, Quito)

6-24. **Meteorological Instructors**, regional seminar, Santiago, Chile. (World Meteorological Organization, 41, Av. Giuseppe Motta, Geneva, Switzerland)

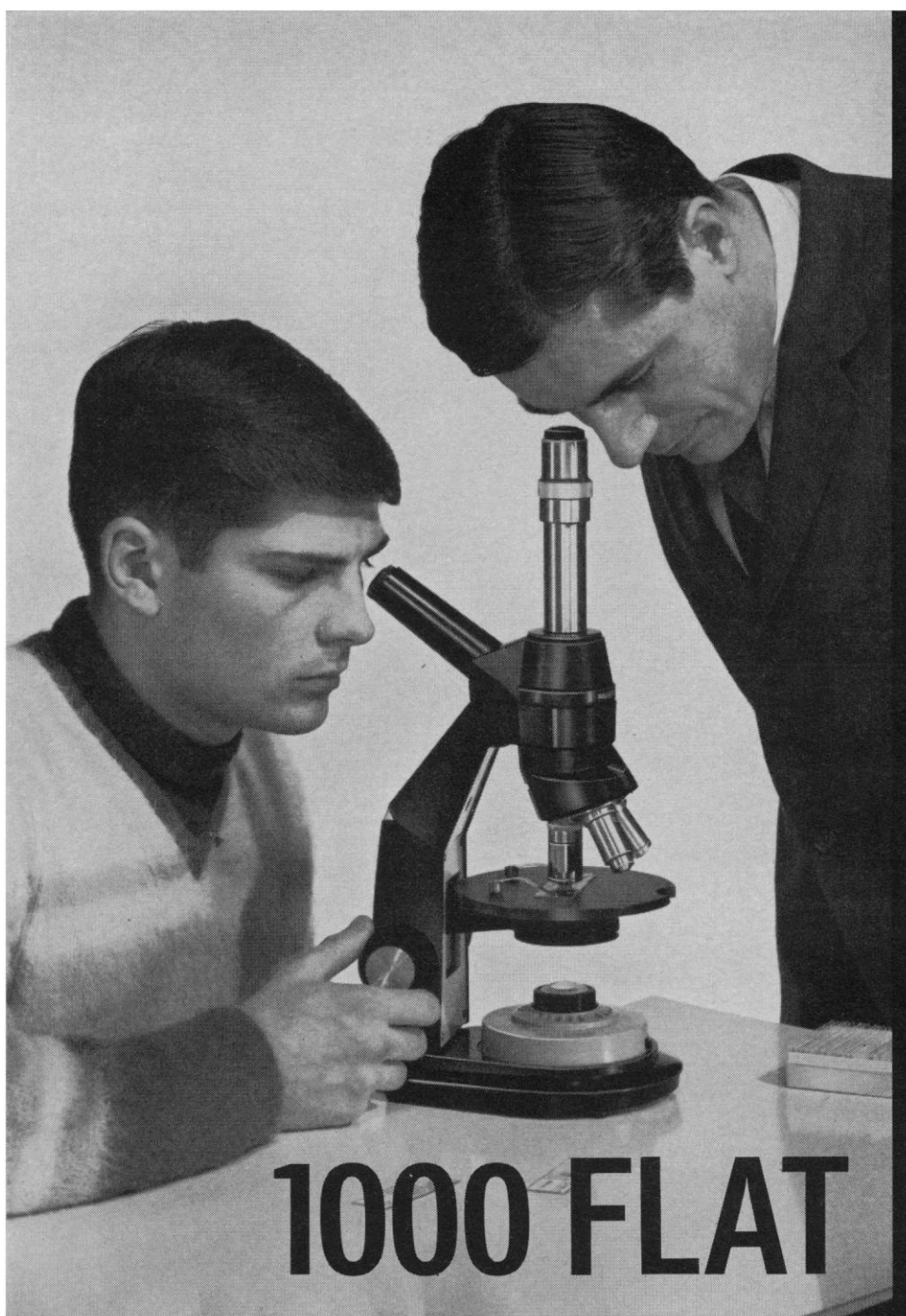
7-10. **Methods in Soil Ecology**, symp., Paris, France. (UNESCO, Pl. de Fontenoy, Paris 7)

8-10. **Electroplating**, intern. conf., Erfurt, Germany. (Dr. Burkhardt, PV Elektrotechnik, Pa 16, Galvanotechnik, Kammer der Technik, Torgauer Str. 76, 705 Leipzig 5, Germany)

9-10. **American Anthropological Assoc.**, annual mtg., Toronto, Ontario, Canada. (Executive Secretary, 1530 P St., NW, Washington, D.C. 20005)

9-11. **Hematology**, 2nd natl. conf., Bucharest, Rumania. (I. Caloenescu, Union of Medical Science Societies of the Socialist Republic of Rumania, 8 rue Progresul, Bucharest)

10-11. **Psychosomatic Disorders**, 11th



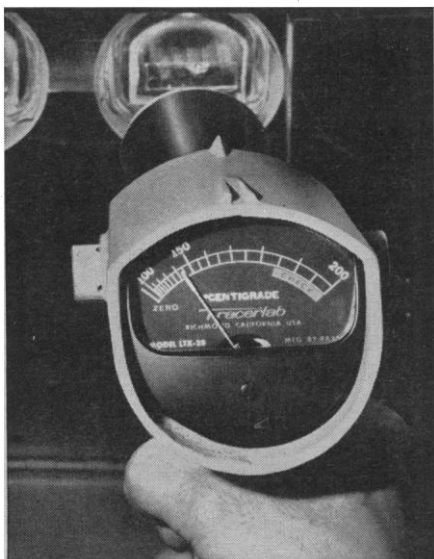
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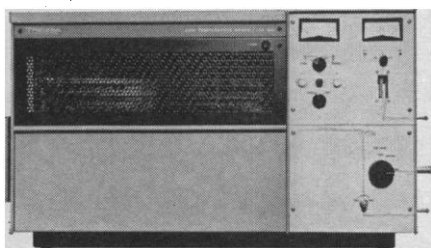
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annual conf., London, England. (A. H. Crisp, % Academic Psychiatric Unit, Middlesex Hospital, London, W.1)

13-18. International Federation of Cotton and Allied Textile Industries, Delhi, India. (M. Ludwig, Director, 29 am Schanzengraben, Postfach 280, 8093 Zurich, Switzerland)

14-16. Ecology of Atherosclerosis, intern. symp., Chicago, Ill. (P. L. White, Héart Assoc., 22 W. Madison St., Chicago 60602)

14-18. Industrial Electronics, 3rd intern. exhibition, Basel, Switzerland. (Fachmessenspektariat, Schweizer Mustermesse Basel, 4000 Basel 21)

15-17. Powder Metallurgy in Nuclear Technology, symp., London, England. (Inst. of Metals, 17 Belgrave Square, London, S.W.1)

15-29. World Meteorological Organization, Commission for Agricultural Meteorology, 4th session, Manila, Philippines. (41, Av. Giuseppe Motta, P.O. Box 1, CH-1211, Geneva 20, Switzerland)

17-18. International Game and Fish Conf., San Juan, Puerto Rico. (D. P. de Sylva, 1 Rickenbacker Causeway, Miami, Fla. 33149)

19-22. Asia-Oceania Congr. of Otorhinolaryngology, 1st, Manila, Philippines. (T. F. Garcia, Manila Doctors Hospital, 667 United Nations Ave., Manila 00100)

20-28. Hurricanes and Tropical Meteorology, 5th technical conf., Caracas, Venezuela. (K. V. Spengler, American Meteorological Soc., 45 Beacon St., Boston, Mass.)

21-25. Radioisotope Tracers in Industry and in Geophysics, symp., Prague, Czechoslovakia. (Intern. Atomic Energy Agency, 11 Kartner Ring, Vienna 1, Austria)

23-27. Geological Soc. of America, field trip, Yucatán, Mexico. (B. B. Hanshaw, U.S. Geological Survey, Washington, D.C.)

26-30. Pan American Medical Assoc., 42nd annual congr., Buenos Aires, Argentina. (J. J. Eller, Director General, 745 Fifth Ave., New York 10022)

26-1. World Federation for Mental Health, 20th annual mtg., Lima, Peru. (Administrative Hq., 1, rue Gevray, Geneva, Switzerland)

27-2. Science and Technology in Developing Countries, Beirut, Lebanon. (C. Nader, American Univ. of Beirut, Beirut)

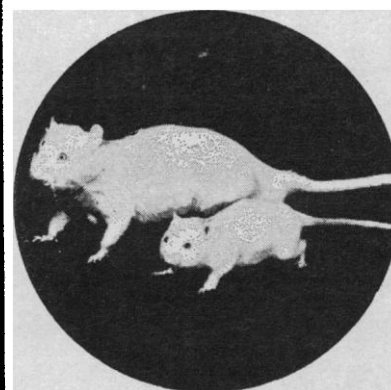
28-30. Decomposition of Organometallic Compounds to Refractory Ceramics, Metals and Metal Alloys, intern. symp., Dayton, Ohio. (E. W. Stefanko, Univ. of Dayton, Dayton 45409)

28-30. Trombosis, intern. mtg., Washington, D.C. (S. Sherry, Washington Univ. School of Medicine, St. Louis, Mo.)

29-1. Polymer Characterization, intern. symp., Columbus, Ohio (J. Bonds, Battelle Memorial Inst., Columbus Laboratories, 505 King Avenue, Columbus 43201)

29-5. Inter-American Congr. of Radiology, 9th, Montevideo, Mexico. (P. J. Hodes, Jefferson Medical College Hospital, 11th and Walnut Sts., Philadelphia, Pa. 19107)

30-1. Mission Planning and Planetology, intern. mtg., New York, N.Y. (R. Enzmann, chairman, 29 Adam St., Lexington, Mass.)



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## BOOKS RECEIVED

(Continued from page 626)

American Council on Education, Washington, D.C., ed. 7, 1967. xvi + 957 pp. \$14.

**The American Occupational Structure.** Peter M. Blau and Otis Dudley Duncan. Wiley, New York, 1967. xvii + 520 pp., illus. \$14.95.

**Analysis and Design of Integrated Circuits.** David K. Lynn, Charles S. Meyer, and Douglas J. Hamilton, Eds. McGraw-Hill, New York, 1967. xxvi + 545 pp., illus. \$16.50.

**Anatomy and Surgery of Hernia.** Leo M. Zimmerman and Barry J. Anson. Williams and Wilkins, Baltimore, ed. 2, 1967. x + 368 pp., illus. \$17.25.

**Animal Health and Housing.** David Sainsbury, with the assistance of Peter Sainsbury. Williams and Wilkins, Baltimore, 1967. x + 329 pp., illus. \$10.75.

**Animals in Our World.** Jacques Lecomte. Holt, Rinehart and Winston, New York, 1967. viii + 152 pp. \$4.95.

**Annual Review of Physical Chemistry.** Vol. 18. H. Eyring, C. J. Christensen, and H. S. Johnston, Eds. Annual Reviews, Palo Alto, Calif., 1967. x + 486 pp., illus. \$8.50.

**Ants From Close Up.** L. Hugh Newman. Photographs by Stephen Dalton and others. Crowell, New York, 1967. xvi + 112 pp. \$6.95.

**Aqueous Wastes from Petroleum and Petrochemical Plants.** Milton R. Beychok. Wiley, New York, 1967. x + 370 pp., illus. \$12.75.

**Arctic Bibliography.** Vol. 13. Prepared by the Arctic Institute of North America. Marie Tremaine, Ed. McGill University Press, Montreal, 1967. lxiv + 1554 pp. \$12.50.

**The Art of Hunting Big Game in North America.** Jack O'Connor. Drawings by Douglas Allen. Knopf, New York, 1967. x + 404 pp. \$8.95.

**Asphalt Pavement Engineering.** Hugh A. Wallace and J. Rogers Martin. McGraw-Hill, New York, 1967. x + 351 pp., illus. \$13.50.

**The Atomic Debates.** Brodie and the Rejection of the Atomic Theory, Three Studies. W. H. Brock, Ed. Humanities Press, New York, 1967. x + 186 pp., illus. \$6.50.

**Austin's Clean Rooms of the World.** Case Book of 200 Clean Rooms. Philip R. Austin. Ann Arbor Science Publishers, Ann Arbor, Mich., 1967. xiv + 396 pp., illus. \$33.75.

**Australian Academy of Science Year Book.** Australian Acad. of Science, Canberra, 1967. 111 pp.

**BASIC.** An Introduction to Computer Programming Using the BASIC Language. William F. Sharpe. Free Press, New York, 1967. xi + 137 pp., illus. Cloth, \$6.95; paper, \$3.95.

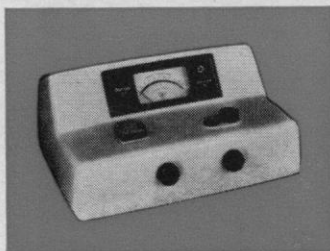
**Basic Experimental Chemistry.** A Laboratory Manual for Beginning Students. C. B. Anderson and J. L. Hawes. Benjamin, New York, 1967. vi + 233 pp., illus. Paper, \$11.75.

**Bayesian Decision Problems and Markov Chains.** J. J. Martin. Wiley, New York, 1967. xiv + 202 pp. \$10.95. Operations Research Society of America Publications, No. 13.

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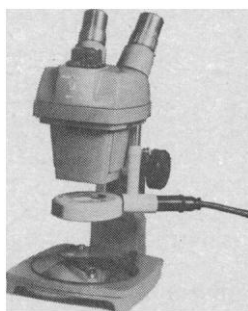


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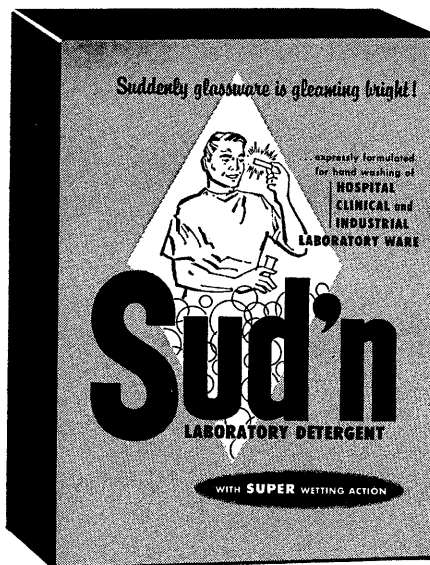
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**Bilharziasis.** International Academy of Pathology, Special Monograph. F. K. Mostofi, Ed. Springer-Verlag, New York, 1967. viii + 357 pp., illus. \$10.

**Biochemistry of the Avian Embryo.** A Quantitative Analysis of Prenatal Development. Alexis L. Romanoff. Interscience (Wiley), New York, 1967. xviii + 398 pp., illus. \$19.50.

**Biologie de l'Amérique Australe.** Cl. Delamare Deboutteville and Eduardo Rapoport, Eds. Vol. 3, Etudes sur la faune du sol: Documents biogéographiques. Consejo Nacional de Investigaciones Cientificas y Tecnicas, Buenos Aires; Editions du Centre National de la Recherche Scientifique, Paris, 1967. 725 pp., illus. 150 F.

**The Biology of Aquatic Vascular Plants.** C. D. Sculthorpe. St. Martin's, New York, 1967. xviii + 610 pp., illus. \$23.

**Biosynthetic Patterns in Microorganisms and Higher Plants.** H. Grisebach. Wiley, New York, 1967. xiv + 110 pp., illus. \$7.95. E. R. Squibb Lectures on Chemistry of Microbial Products.

**Canadian Cancer Conference.** Proceedings of the seventh conference, Honey Harbour, Ontario, 1966. Pergamon, New York, 1967. viii + 432 pp., illus. \$25.

**Cancer in Pregnancy.** Larry McGowan. Thomas, Springfield, Ill., 1967. xii + 142 pp. \$7.50. American Lecture Series, No. 682.

**Cancer Research Today.** I. Berenblum. Pergamon, New York, 1967. xii + 151 pp., illus. Cloth, \$5.50; paper, \$3.50.

**Challenging Mathematical Problems with Elementary Solutions.** Vol. 2. A. M. Yaglom and I. M. Yaglom. Translated from the Russian edition (Moscow, 1954) by James McCawley, Jr. Revised and edited by Basil Gordon. Holden-Day, San Francisco, 1967. x + 214 pp., illus. Cloth, \$6.50; Paper, \$4.50.

**Chemistry and Enzymology of Marine Algal Polysaccharides.** Elizabeth Percival and Richard H. McDowell. Academic Press, New York, 1967. xii + 219 pp., illus. \$12.

**The Chemistry of Ionization and Excitation.** Proceedings of a conference on radiation chemistry and photochemistry, Newcastle upon Tyne, Great Britain, September 1966. G. R. A. Johnson and G. Scholes, Eds. Taylor and Francis, London, 1967. xvi + 328 pp., illus. \$11.50.

**The Chemistry of Niobium and Tantalum.** F. Fairbrother. Elsevier, New York, 1967. viii + 243 pp., illus. \$17.50.

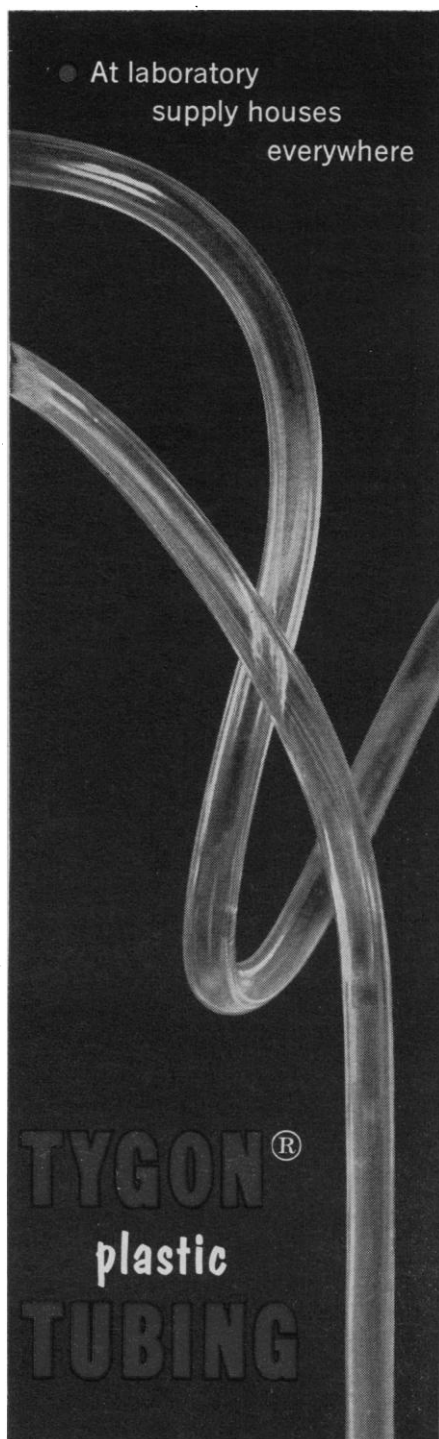
**Chemistry Problems.** M. J. Sienko. Benjamin, New York, 1967. viii + 427 pp., illus. Paper, \$3.95.

**Claude Bernard and Experimental Medicine.** Collected papers from a symposium. Minneapolis, Minn., April 1965, and an English translation of Bernard's *Cahier Rouge*. Francisco Grande and Maurice B. Visscher, Eds. Schenkman, Cambridge, Mass., 1967. Two volumes in one. 210 + vi + 120 pp., illus. Cloth, \$8.95; paper, \$4.95.

**Claude Bernard et les Problèmes Scientifiques de Son Temps.** Joseph Schiller. Editions du Cèdre, Paris, 1967. 231 pp. Paper.

**The Coming Revolution in Medicine.** David D. Rutstein. M.I.T. Press, Cambridge, Mass., 1967. xii + 180 pp. \$4.95.





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**Commonwealth Universities Yearbook, 1967.** J. F. Foster and T. Craig, Eds. Association of Commonwealth Universities, London, ed. 44, 1967. xxxii + 2657 pp. \$20.

**Computers, System Science, and Evolving Society.** The Challenge of Man-Machine Digital Systems. Harold Sackman. Wiley, New York, 1967. xviii + 638 pp., illus. \$14.50.

**The Concept of Development.** An Issue in the Study of Human Behavior. Dale B. Harris, Ed. Univ. of Minnesota Press, Minneapolis, 1967. x + 287 pp., illus. Cloth, \$6.75; paper, \$2.75. Reprint, 1957 edition.

**Corporate Marketing Planning.** John M. Brion. Wiley, New York, 1967. xiv + 577 pp., illus. \$13.95. Wiley Marketing Series.

**The Correspondence of Isaac Newton.** Vol. 4, 1694-1709. J. F. Scott, Ed. Published for the Royal Society by Cambridge University Press, New York, 1967. xxxiv + 578 pp., illus. \$38.50.

**Cortical Evoked Potentials in Man.** Ludovico Bergamini and Bruno Bergamasco. Thomas, Springfield, Ill., 1967. xii + 116 pp., illus. \$11.50.

**A Critical Review of Research in Land Economics.** Leonard A. Salter, Jr. Univ. of Wisconsin Press, Madison, 1967. xxii + 258 pp. Cloth, \$7.50; paper, \$2.95. Reprint of the 1948 edition, with an introductory essay by M. M. Kelso.

**Darwin and Henslow: The Growth of an Idea.** Letters, 1831-1860. Nora Barlow, Ed. Univ. of California Press, Berkeley, 1967. xii + 251 pp., illus. \$6.50.

**Dictionary of Alaska Place Names.** Donald J. Orth. U.S. Geological Survey Professional Paper 567, Washington, D.C., 1967 (available from the Superintendent of Documents, Washington, D.C.). x + 1084 pp., illus. \$8.50.

**The Dictionary of the Biological Sciences.** Peter Gray. Reinhold, New York, 1967. xx + 602 pp. \$14.75.

**Difference Methods for Initial-Value Problems.** Robert D. Richtmyer and K. W. Morton. Interscience (Wiley), New York, ed. 2, 1967. xiv + 405 pp., illus. \$14.95. Interscience Tracts in Pure and Applied Mathematics, No. 4.

**Differential Equations.** H. Bateman. Chelsea, New York, 1967. xii + 306 pp., illus. \$4.95.

**A Directory of Information Resources in the U.S. Federal Government.** With a supplement of government-sponsored information resources. National Referral Center for Science and Technology, Library of Congress, Washington, D.C., 1967. viii + 411 pp. Paper, \$2.75.

**Disease.** F. George Kay. Lynn, Worthington, Ohio, 1967. iv + 123 pp., illus. \$3.50. The Conquerors Series.

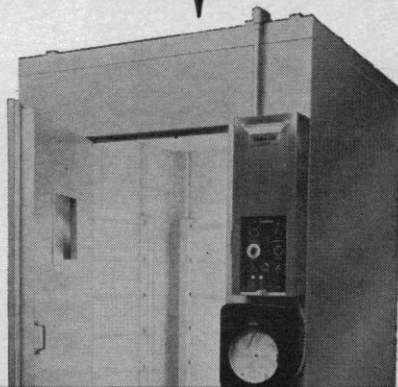
**The Doctors' Story.** In commemoration of the 200th anniversary of the Columbia University College of Physicians and Surgeons. Thomas Gallagher. Harcourt, Brace, and World, New York, 1967. xii + 234 pp., illus. \$5.95.

**Drugs and Society.** Bernard Barber. Russel Sage Foundation, New York, 1967. xii + 212 pp. \$6.50.

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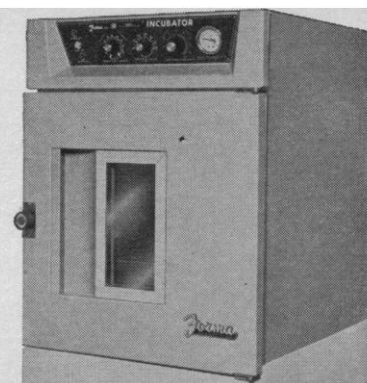
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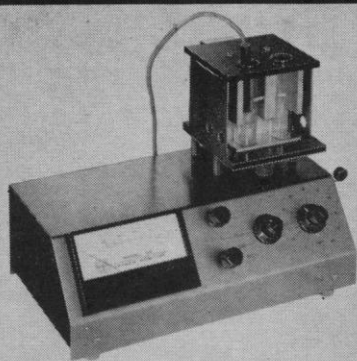


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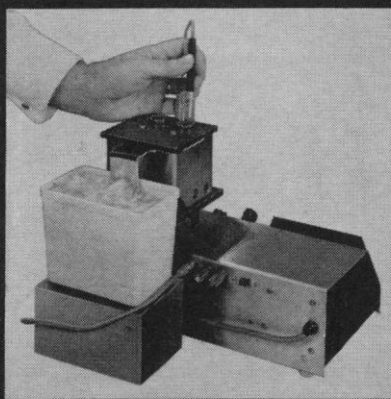
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dition. Columbia Univ. Press, New York, 1967. xiv + 167 pp., illus. \$7.

**Elementary Nonlinear Electronic Circuits.** George E. Anner. Prentice-Hall, Englewood Cliffs, N.J., 1967. xiv + 272 pp., illus. \$9.75. Prentice-Hall Electrical Engineering Series.

**Energy and Entropy in Chemistry.** P. A. H. Wyatt, Macmillan, London; St. Martin's, New York, 1967. x + 192 pp., illus. \$6.

**Ernest Mercier.** French Technocrat. Richard F. Kuisel. University of California Press, Berkeley, 1967. xii + 184 pp. \$5.75.

**Ethnopharmacologic Search for Psychoactive Drugs.** Proceedings of a symposium, San Francisco, January 1967. Daniel H. Efron, Bo Holmstedt, and Nathan S. Kline, Eds. National Inst. of Mental Health, Chevy Chase, Md., 1967 (order from Superintendent of Documents, Washington, D.C.). xxiv + 468 pp., illus. \$4.

**Field Methods in the Study of Culture.** Thomas Rhys Williams. Holt, Rinehart and Winston, New York, 1967. xii + 76 pp. Paper, \$1.95.

**Financial Markets and Economic Activity.** Donald D. Hester and James Tobin, Eds. Wiley, New York, 1967. x + 256 pp., illus. \$8.95. Cowles Foundation Monograph 21.

**Financial Research and Management Decisions.** Alexander A. Robichek, Ed. Wiley, New York, 1967. xvi + 232 pp., illus. \$8.95.

**The Five-Day Course in Thinking.** Edward de Bono. Basic Books, New York, 1967. xiv + 209 pp., illus. \$5.95.

**The Formation and Properties of Precipitates.** Alan G. Walton. Interscience (Wiley), 1967. xii + 232 pp., illus. \$11. Chemical Analysis Series.

**The Foundations of Physical Cosmology and the Principles of Conservation and Relativity.** Primo Nunes de Andrade. Published by the author, Rua das Laranjeiras 226, Rio de Janeiro, 1967. 111 pp. Paper.

**The Foundations of Scientific Inference.** Wesley C. Salmon. Univ. of Pittsburgh Press, Pittsburgh, 1967. viii + 157 pp., illus. Paper, \$2.25.

**Frame Analysis.** Arthur S. Hall and Ronald W. Woodhead. Wiley, New York. ed. 2., 1967. xviii + 329 pp., illus. \$11.95.

**The Future as Nightmare.** H. G. Wells and the Anti-utopians Mark R. Hillegas. Oxford University Press, New York, 1967. xii + 200 pp. \$5.75.

**The Genetic Code.** The Molecular Basis for Genetic Expression. Carl R. Woese. Harper and Row, New York, 1967. viii + 200 pp., illus. Cloth, \$9.50; paper, \$5.95.

**Gesammelte Abhandlungen.** Hermann Minkowski. David Hilbert, Ed. Chelsea. New York, 1967. xxxi + 465 pp., illus. \$17.50. Reprint, 1911 edition.

**Governing Nature.** Earl Finbar Murphy. Quadrangle Books, Chicago, 1967. vi + 333 pp. \$7.50. Problems of American Society.

**Gravity, Deformation and the Earth's Crust.** As Studied by Centrifuged Models. Hans Ramberg. Academic Press, New York, 1967. x + 214 pp., illus. \$11.

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**A Guide to the Identification of the Genera of Bacteria.** With Methods and Digests of Generic Characteristics. V. B. D. Skerman. Williams and Wilkins, Baltimore, ed. 2, 1967. xii + 303 pp., illus. \$9.75.

**Halogen Chemistry.** Vol. 1. Viktor Gutmann, Ed. Academic Press, New York, 1967. xiv + 473 pp., illus. \$21.

**Handbook of Formulas for the Analysis of Complex Frames and Arches.** G. S. Glushkov, I. R. Egorov, and V. V. Ermolov. Translated from the Russian edition (Moscow, 1966). Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1967. 352 pp., illus. \$15.75.

**Hardness Measurement of Metals and Alloys.** Hugh O'Neill. Chapman and Hall, London; Barnes and Noble, New York, ed. 2, 1967. xvi + 238 pp., illus. \$11.

**High Temperature Resistant Fibers.** American Chemical Society symposium, Phoenix, Ariz., January 1966. A. H. Frazer, Ed. Interscience (Wiley), New York, 1967. vi + 300 pp., illus. Paper, \$12.50.

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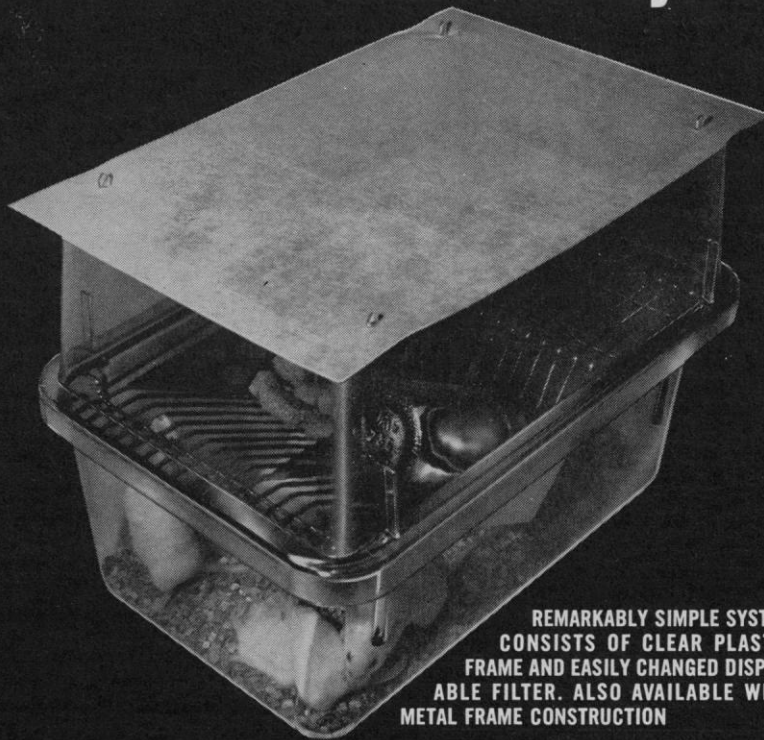
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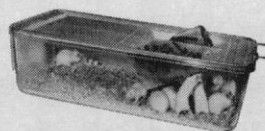
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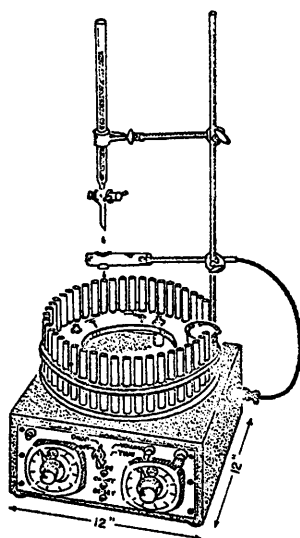
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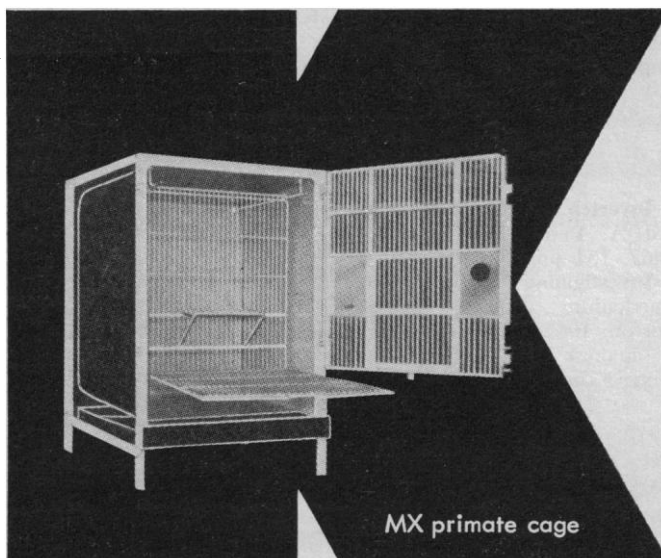
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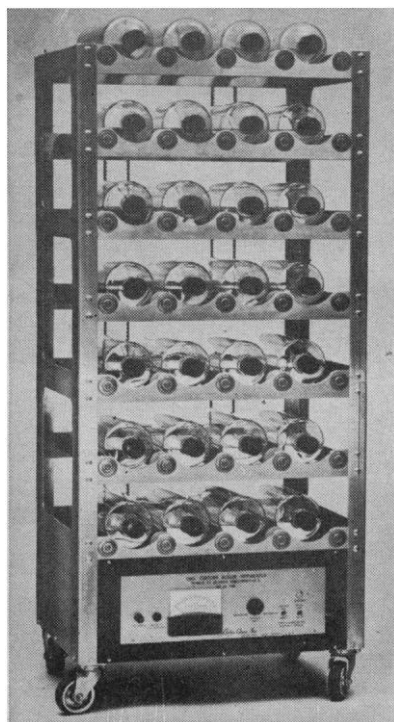
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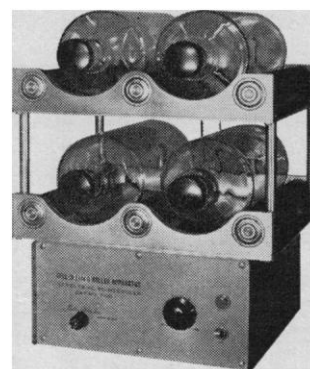


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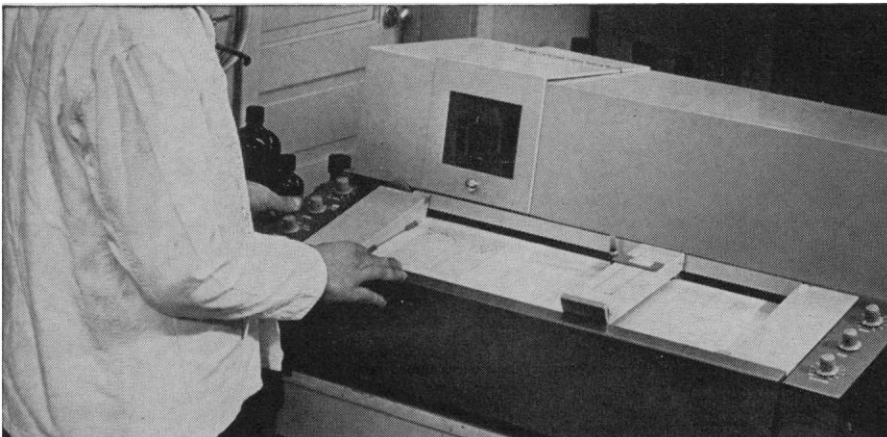
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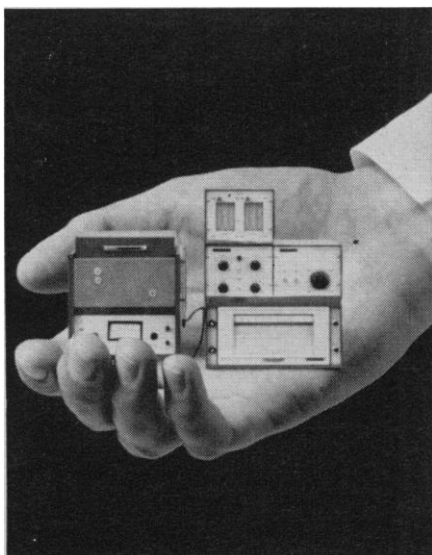


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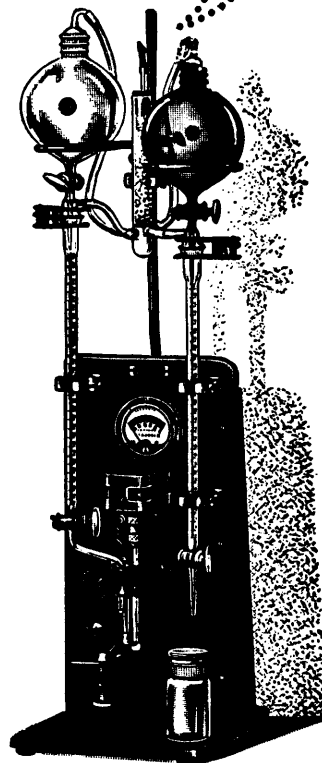
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