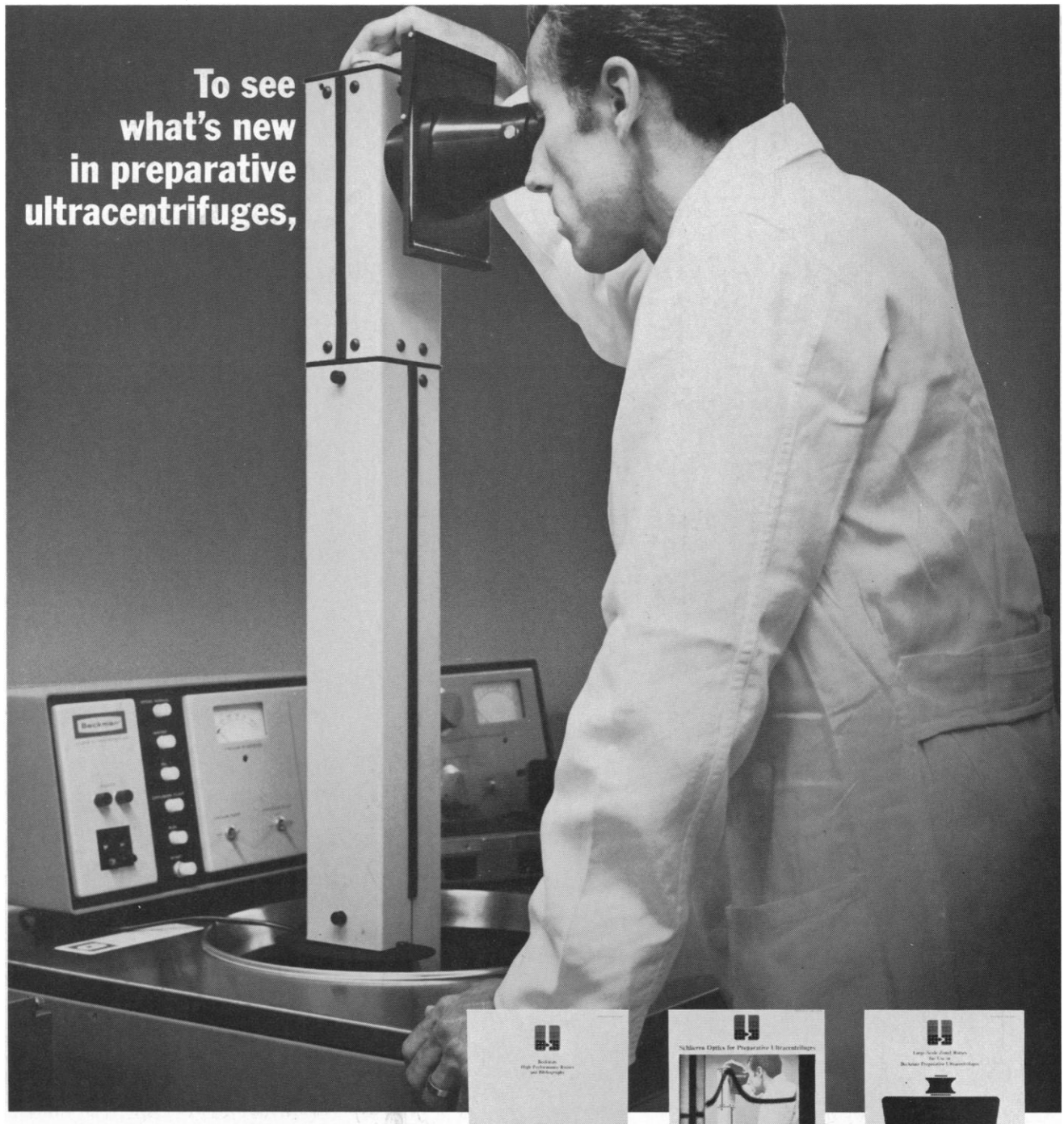
SCIENCE 6 December 1968
Vol. 162, No. 3858
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Preconvention Issue



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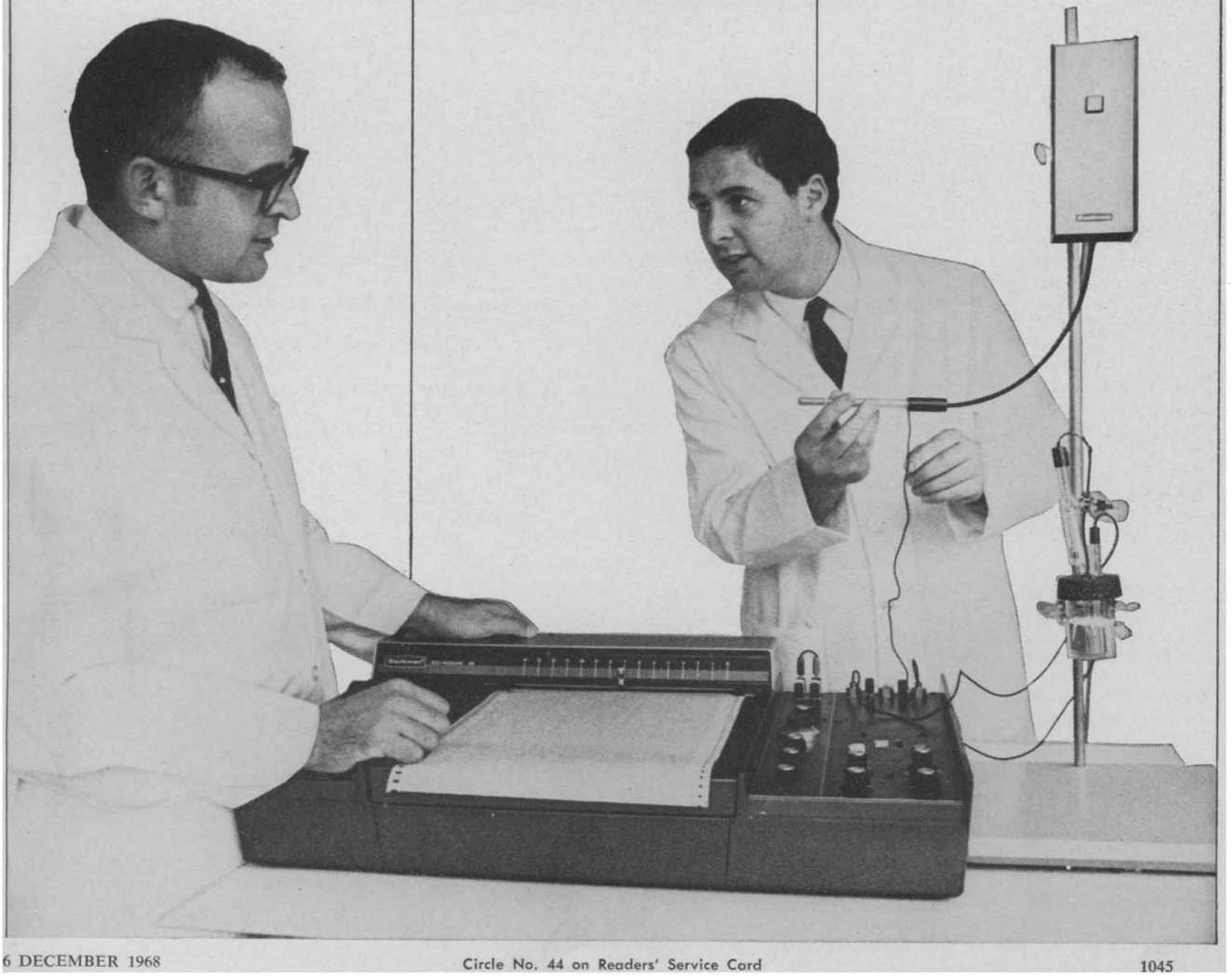

6 December 1968
Vol. 162, No. 3858

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

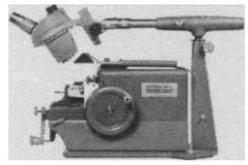
COVER

Photo of aerial view of Colorado River delta was chosen to illustrate the fact that different subjects may assume similar patterns. In this case delta region resembles outline of a tree or a system of blood vessels. See review of *Neurosciences*, page 1115. [Litton Industries, Aero Service Division, New York City]

LABORATORY INSTRUMENTS

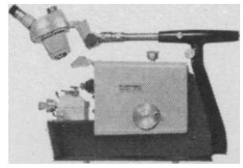
SORVALL

MT-1 "Porter-Blum" Ultra-Microtome



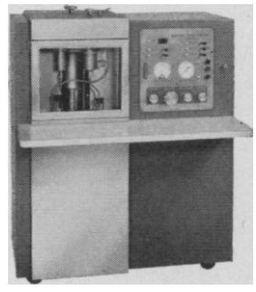
1/40 to 1/2 Micron. This precision instrument is ideal for research or teaching applications. The MT-1 has been used in most major advances in microtomy techniques. Mechanical advance. Accessories expand versatility.

MT-2 "Porter-Blum" Ultra-Microtome



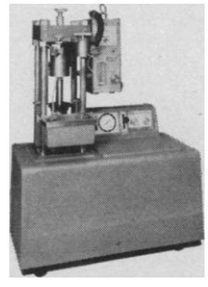
100Å to 4 Microns. Automatic, and utilizing a mechanical advance system similar to the MT-1. The MT-2 is a refined, power-driven sectioning instrument offering extreme accuracy, stepless cutting speed adjustment, and ease of use.

RF-1 Ribi Refrigerated Cell Fractionator



Bacteria, fungi, tissue cells may be disrupted under controlled conditions. Pathogenic materials may be processed with safety. Subcellular substances can be isolated in unaltered state. Yields to 85-95%.

RM Ribi Cell Fractionator



For cell disruption where pathogenic, or hazardous, materials are not a problem. The RM has a performance capability similar to the RF-1, and offers an optional cooling module that permits temperature control of the effluent. Competitively priced.

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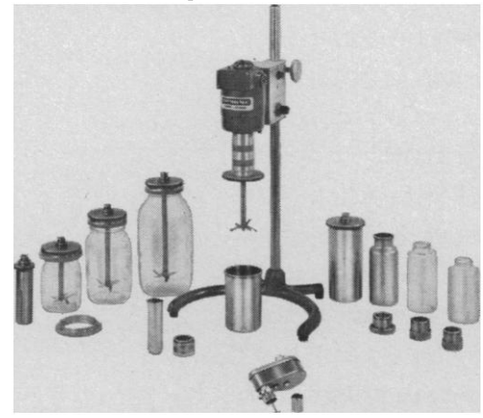
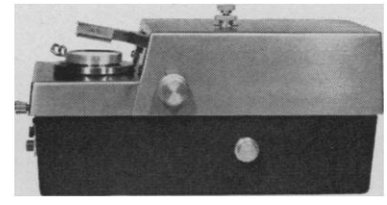


For homogenizing, mixing, blending, emulsifying. Speeds to 16,000 RPM with macro unit — to 50,000 RPM with optional micro unit. Wide variety of chambers and knife assemblies. Direct overhead drive. Electronic speed control.

TC-2 "Smith & Farquhar" Tissue Sectioner



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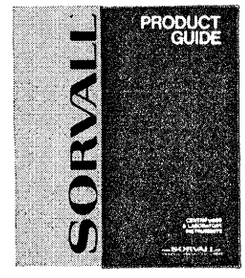

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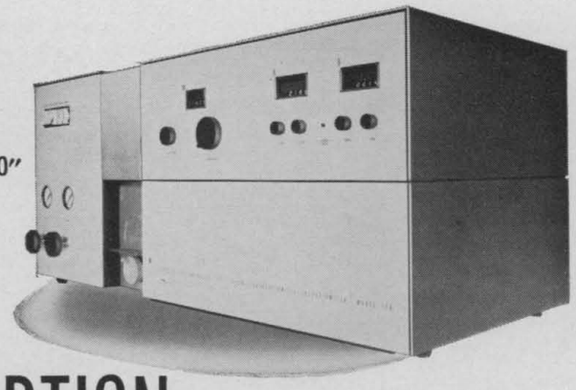

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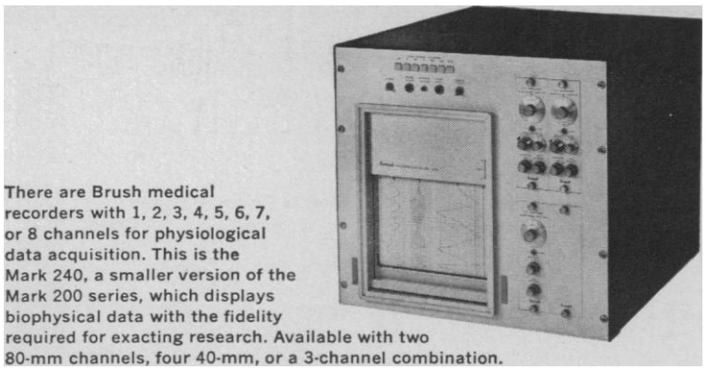

There are Brush medical recorders with 1, 2, 3, 4, 5, 6, 7, or 8 channels for physiological data acquisition. This is the Mark 240, a smaller version of the Mark 200 series, which displays biophysical data with the fidelity required for exacting research. Available with two 80-mm channels, four 40-mm, or a 3-channel combination.

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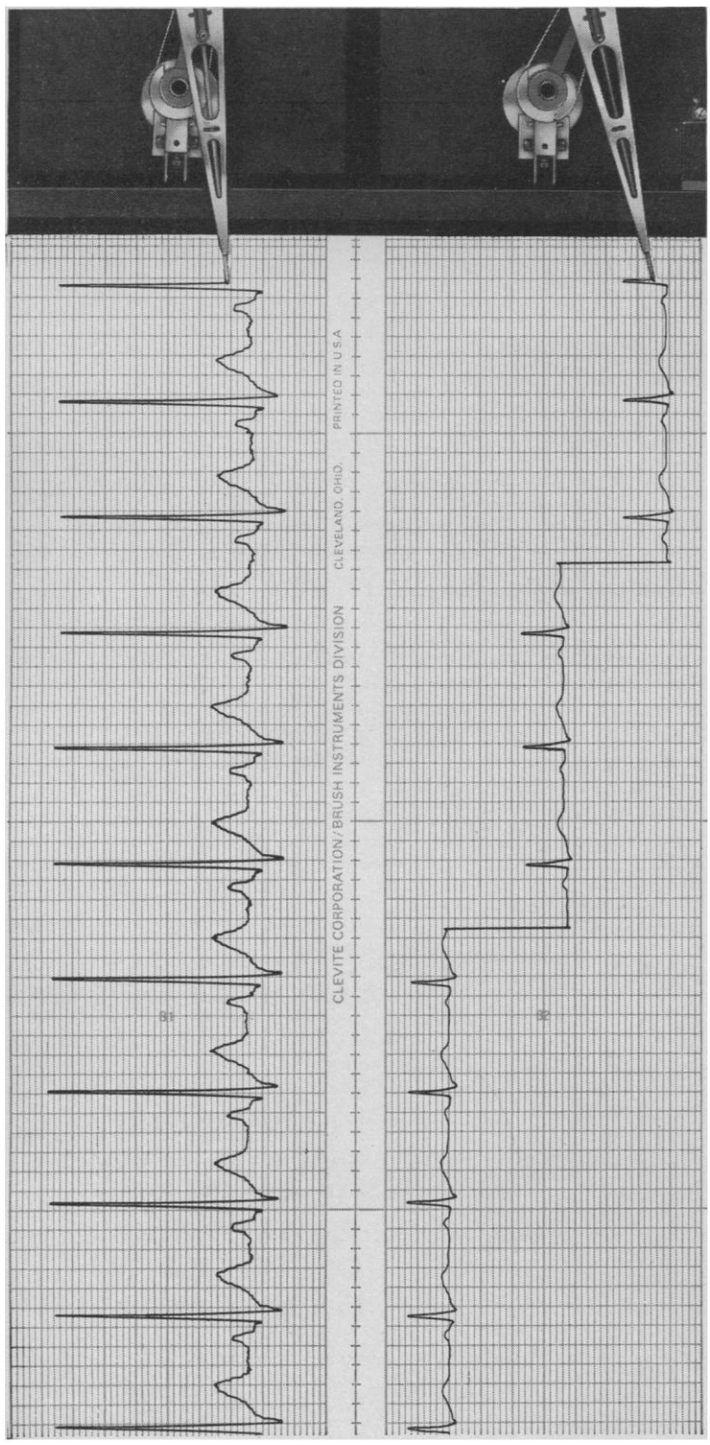

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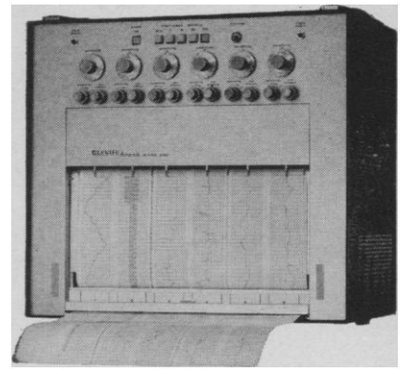
You can believe the high degree of resolution and system accuracy only when you see some sample physiological wave forms actually recorded on a Brush instrument. Write for your set of samples.

CLEVITE BRUSH

Actual chart from a Brush medical recorder reproduced at left shows the trace clarity, sharpness and high resolution that contribute to the superb accuracy of Brush instruments. Note precise duplication of wave form at different baseline positions across the chart (*without* recalibration).

Six important reasons why Brush medical recorders are best for physiological data acquisition



The Mark 260 is a high-performance portable recorder at half the big-system price. Six analog channels and four event channels. Features the Brush patented pressure-fluid system. Frequency response: 70 Hz at half scale; 40 Hz at full scale.

1. Self-calibrating

Brush medical recorders are factory calibrated with instrument standards one step removed from The National Bureau of Standards. Unlike ordinary recorders, they stay that way, test after test, year after year, regardless of baseline position, attenuation, or gain setting.

2. More Physiology

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3. Wide Application

Brush data acquisition systems will accommodate a wide variety of physiological parameters, including:

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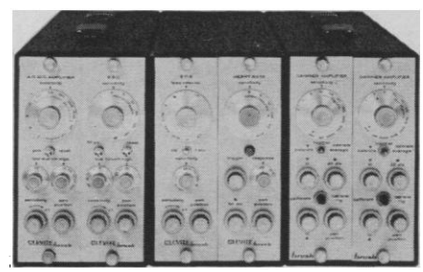
4. Choice of Front Ends

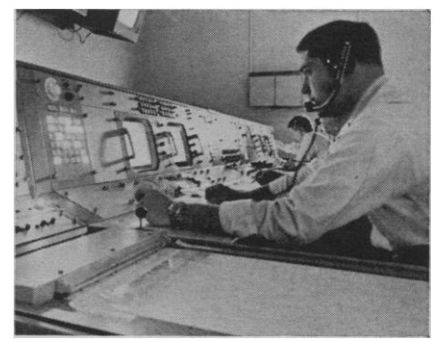
Brush's variety of bio-medical front ends can link nearly all physiological signal sources to *any* display device. All have broadband frequency response (to 10 kHz), a property which



not only preserves wave-form fidelity, but, combined with high power output, provides ample capability to drive tape recorders, oscilloscopes, digital counters, computers, and oscillographs. Or any combination at the same time.

5. High Performance

Physiological monitoring station at NASA's Manned Space Center, Houston, incorporates three 8-channel Brush Mark-200 recorders — one for each Apollo astronaut — for continuous display of ECG, respiration, blood pressure, and body temperature during flight. Telemetered data comes to Houston from stations around the world.



6. Quality Built

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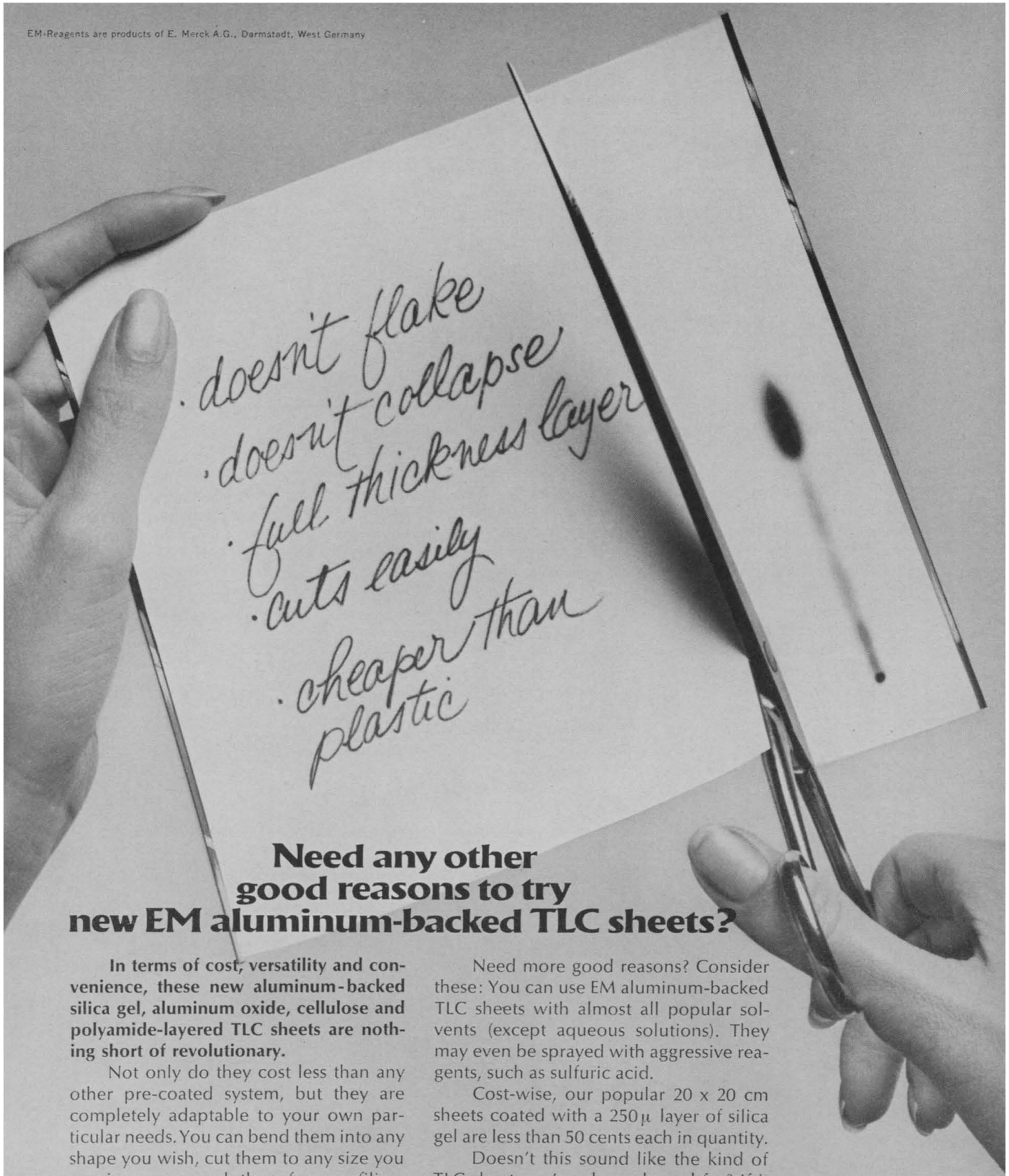

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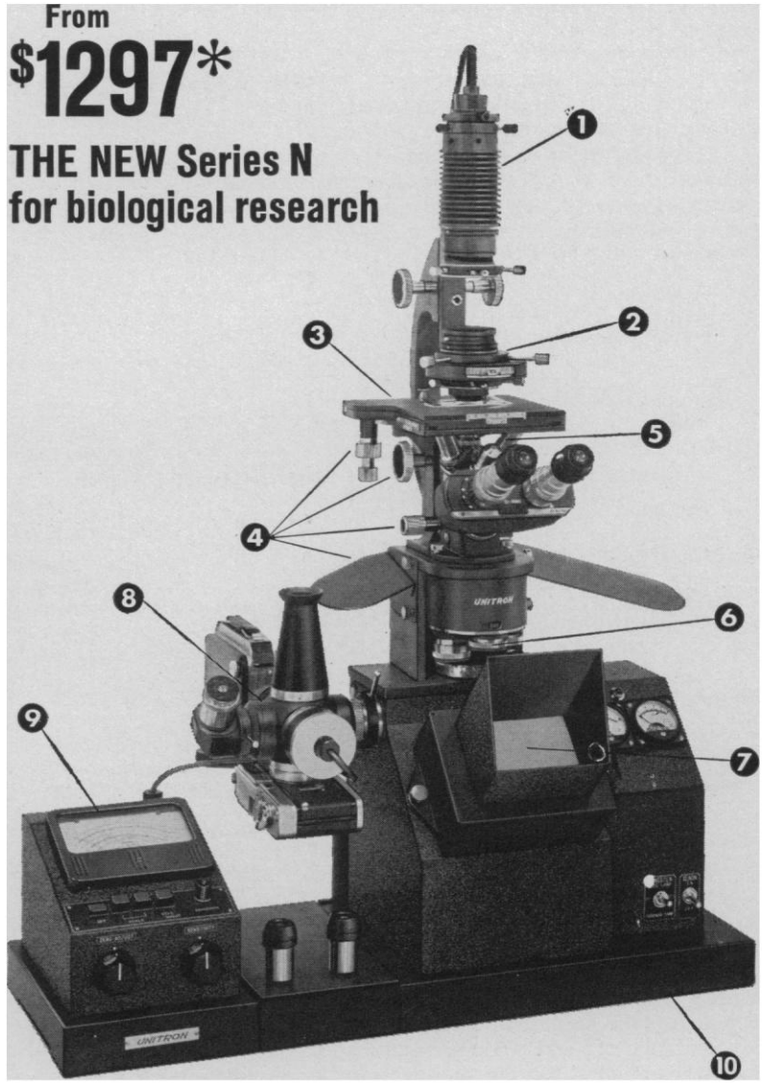

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AGRICULTURE AND THE QUALITY OF OUR ENVIRONMENT

Editor: N. C. Brady

476 pages, bibliography, author and subject indexes. 1967. Price: $13.50. AAAS members' cash orders: $11.50.

Agriculture and the Quality of Our Environment addresses itself to this two-pronged problem: How does environmental quality affect agriculture and how does agriculture affect the quality of the environment?

This book provides a good summary and analysis of agriculture's stake in the quality of our environment. It also identifies the part which science must play to solve environmental pollution problems.

MOLECULAR MECHANISMS OF TEMPERATURE ADAPTATION

Editor: C. Ladd Prosser

398 pp., 127 illus., bibliog., index, 1967. Price: $12.50. AAAS members' cash orders: $10.50.

Molecular Mechanisms of Temperature Adaptation is a collection of papers on the general physiology of temperature adaptation in cold-blooded animals, plants, and microorganisms. Twenty-four contributors report recent research findings on the diverse molecular mechanisms of response, acclimation, and adaptation to heat and cold in bacteria, plant cells and tissues, insects, fishes, amphibians, and reptiles.

Examples of biochemical and physiological mechanisms of both genetic and environmentally induced adaptations to heat and cold are given. Temperature is used as an environmental parameter for elucidating cellular mechanisms of organism-environment interactions.

GROUND LEVEL CLIMATOLOGY

Editor: Robert H. Shaw

408 pp., 144 illus., bibliog., index, 1967. Price: $12.50. AAAS members' cash orders: $10.50.

Ground Level Climatology consists of twenty papers dealing generally with the theme of weather and agriculture (including forestry) and specifically with the climate closely surrounding plants and animals—the microclimate. Investigators in the field of ground level climatology seek to understand the complex relationships between living organisms and their environment: the relation of climate to the distribution and abundance of plants and animals; the effects of weather modification on physical processes within the microclimate; and the effects of moisture, temperature, and energy balance on physiological functions.

GERM PLASM RESOURCES

Editor: Ralph E. Hodgson

394 pp., 59 illus., bibliog., index, 1961. Price: $9.75. AAAS members' cash orders: $8.50.

The 25 papers treat the subject according to origin of germ plasm, developmental programs, new approaches to uses and perpetuation, and protection of plant and animal germ plasm.

Progress in improving the usefulness of the available germ plasm is measured. The need for additional germ plasm is pointed out, and problems relating to further development, preservation, and utilization of germ plasm to advance plant and animal production are indicated.

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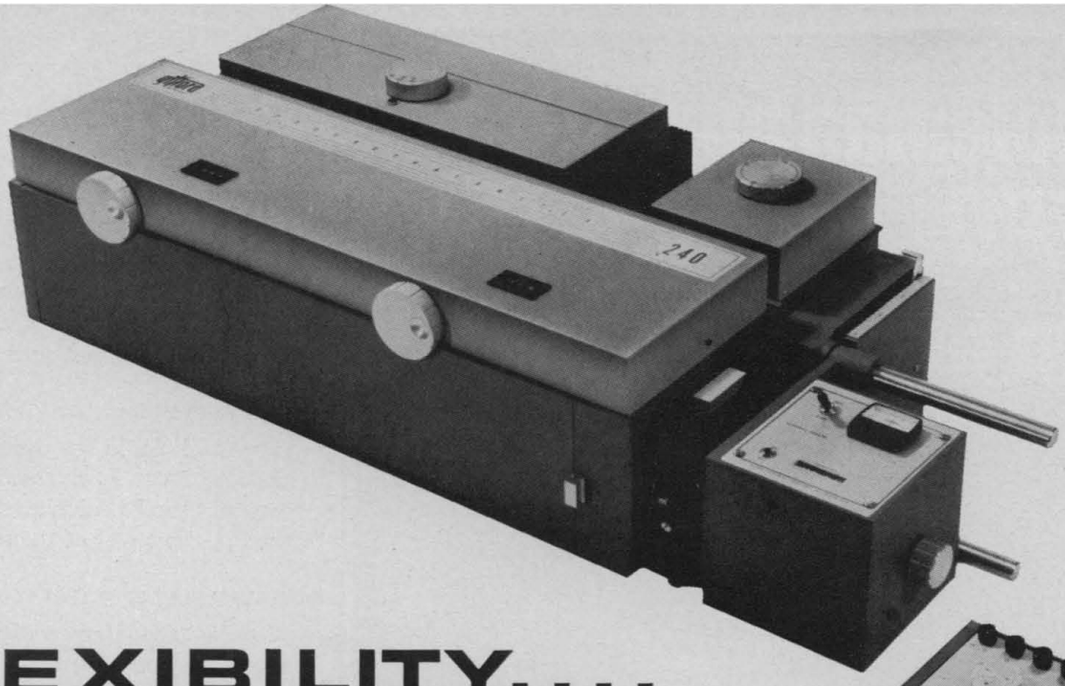

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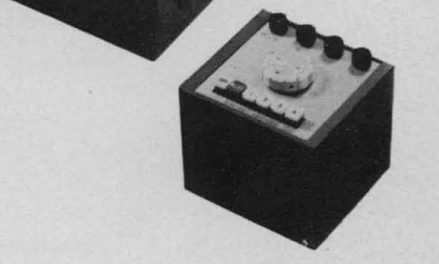

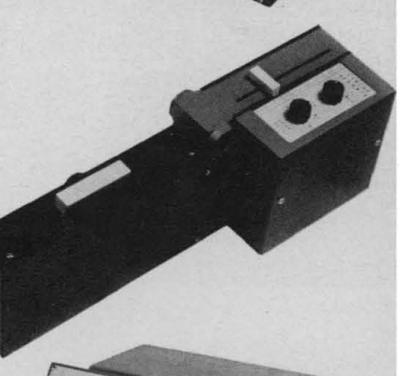

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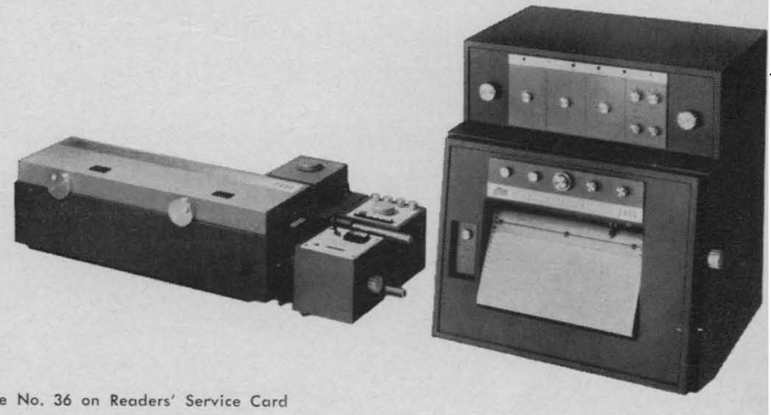

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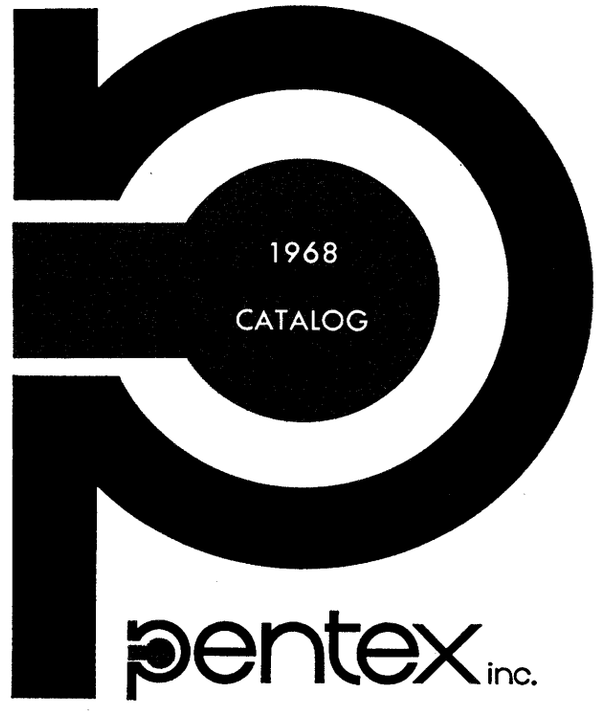

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CHOICE OF HOTEL: First_____ Second_____ Third_____

ROOM: ☐ Single ☐ Double ☐ Twin ☐ Suite Preferred rate $_____

Number in party_____ sharing this room will be (list name and address of each person, including your own):

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Be sure to list definite arrival and departure date and time. Hotel reservations will be held *only* until 6 PM unless otherwise specified.

NAME:_____
(Individual requesting reservation)

ADDRESS:_____
(Street) (City and State) (Zip Code)

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HOTEL	SINGLE	DOUBLE	TWIN	SUITES†	PARKING
Adolphus	$10–14	$14–17	$15–18	$35–up	Free
Baker	11–17	14–20	16.50–20	32–75	Free
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*All rooms are subject to a 3% city transient room tax. † Rates for suites, parlor and one- to three-bedroom. There is a charge of $4.00 for cots.

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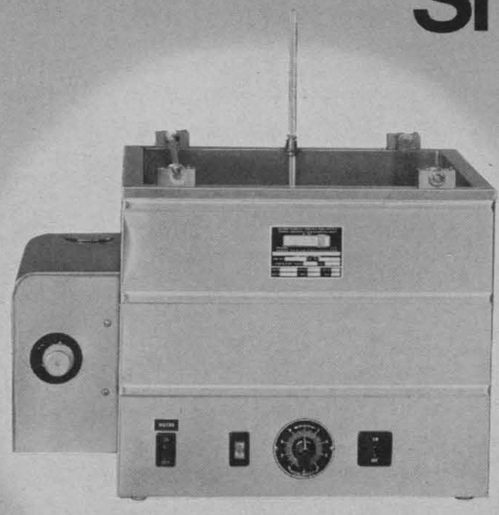

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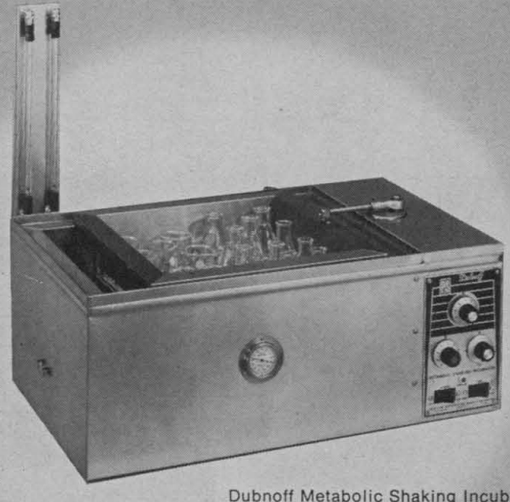
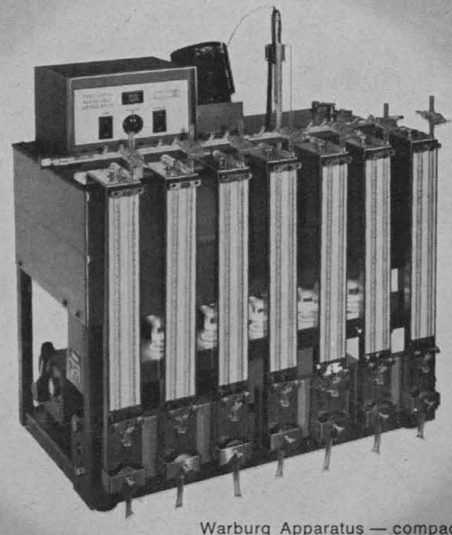


Dubnoff Metabolic Shaking Incubator — handles 20ML beakers, 25ML and 50ML flasks simultaneously.



Warburg Apparatus — compact, economical 7-unit model shown. Also 18-unit model.

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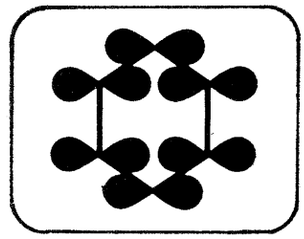

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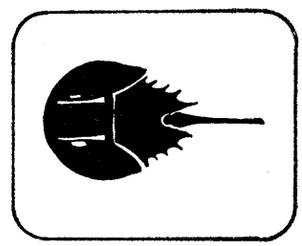

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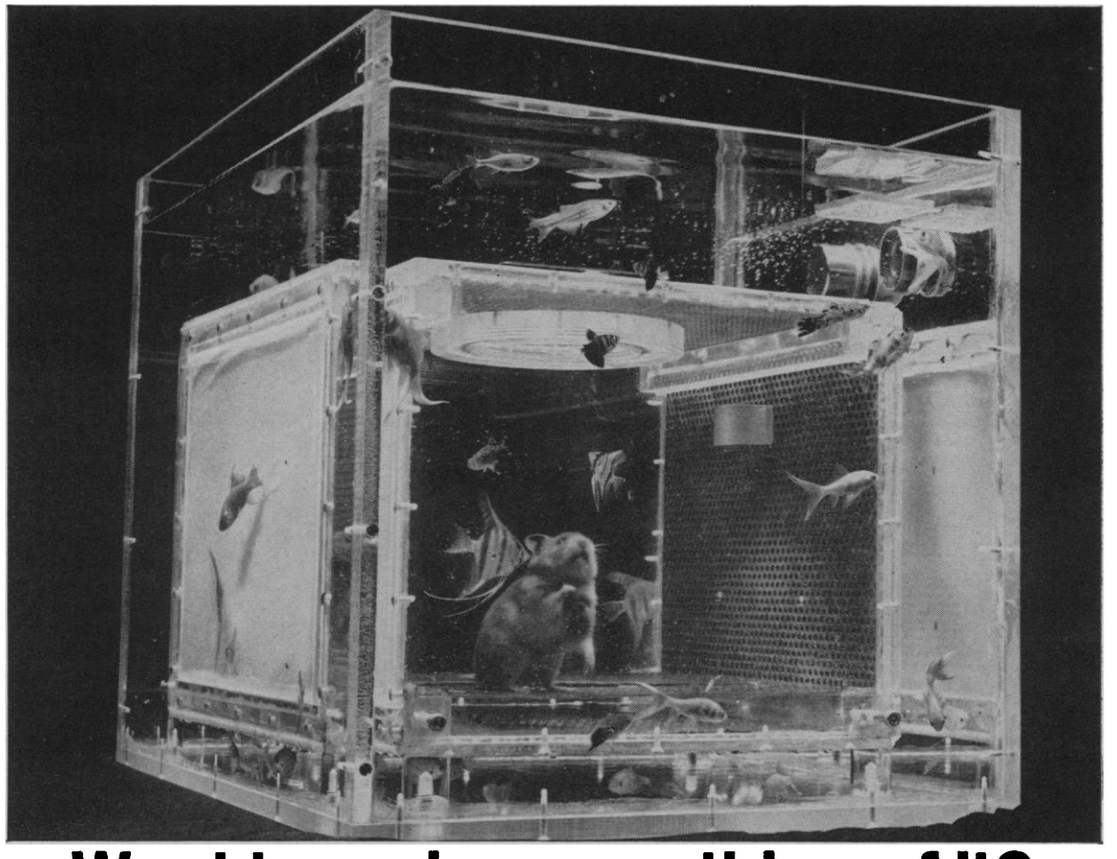

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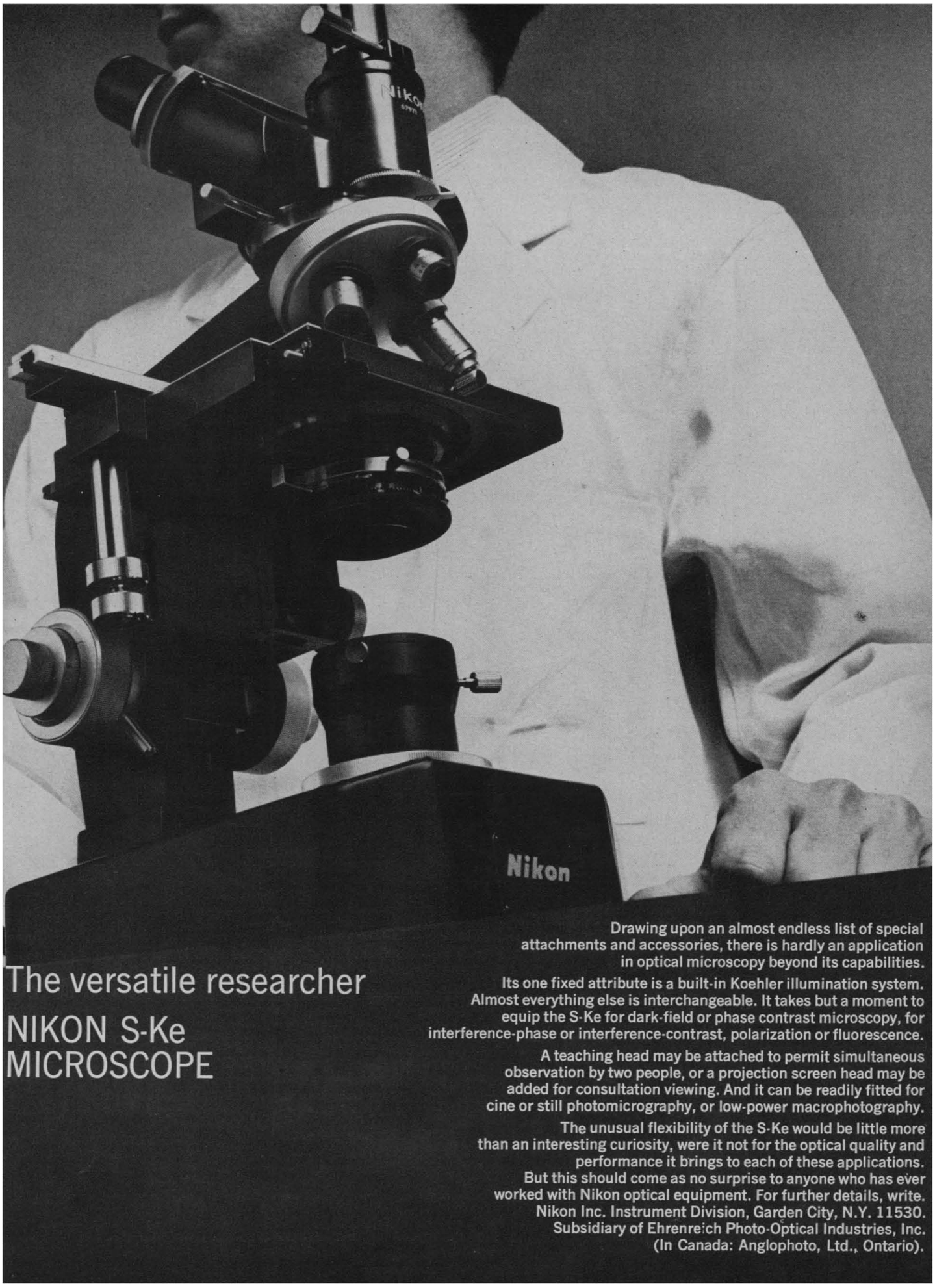

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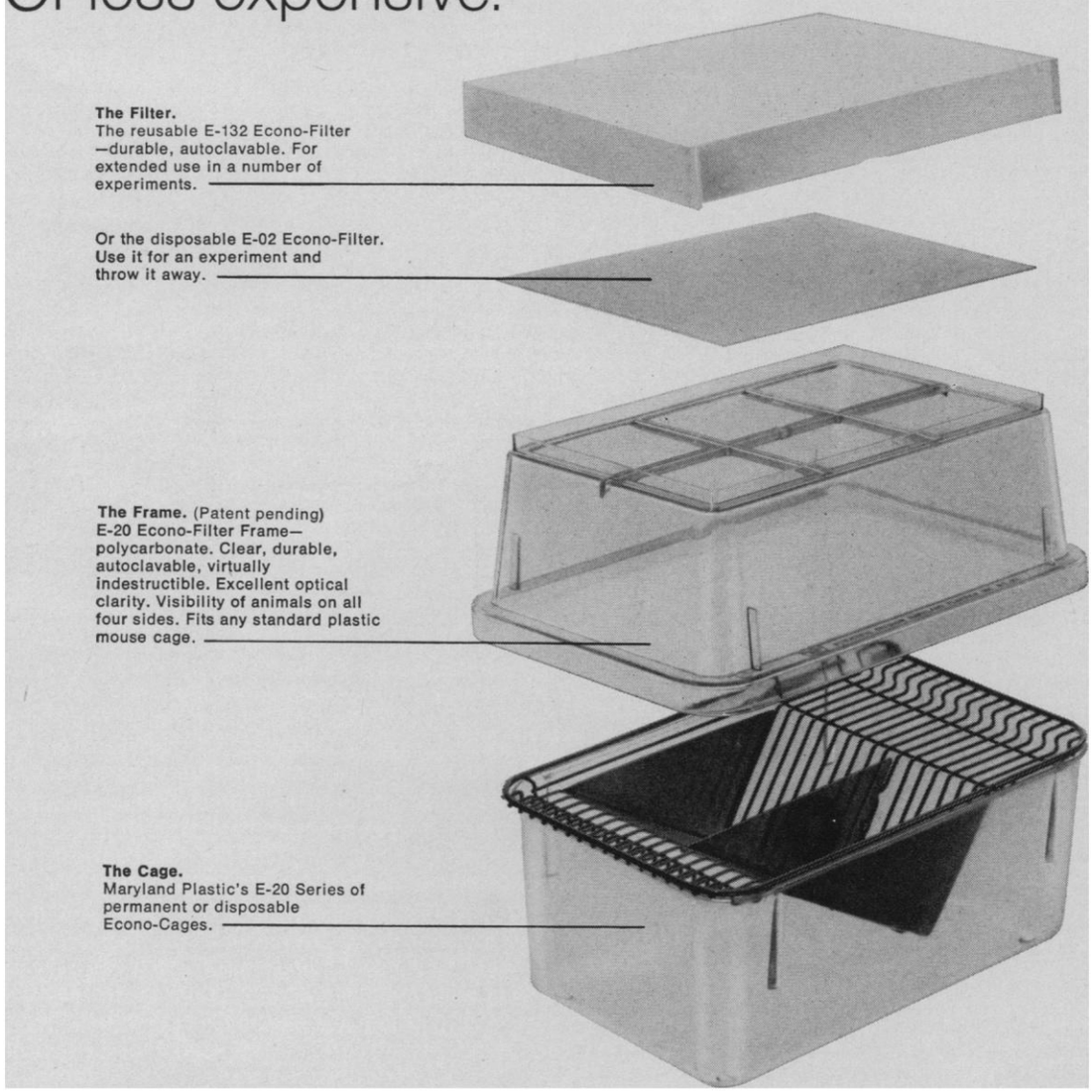

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Since the introduction of double-beam spectrophotometers capable of generating either a linear (% transmittance) or a logarithmic (absorbance) output, an interesting and useful new way of recording that output has evolved.

It is now possible to record the *logarithm* of absorbance as a function of wavelength. With the proper external recorder, of course.

But before we detail for you some of the advantages of log-absorbance recording, a few fundamentals.

We discuss here some of the advantages of recording the logarithm of absorbance...

To begin, the term absorbance (A) is defined thus:

$$A = ecl$$

where c is the concentration of sample in the absorption cell,

l is the *light-path* (the inside distance between front and back windows of the cell), and

e is a numerical coefficient.

The fact is that e is a characteristic of each compound or substance. It is dependent on temperature and wavelength, but independent of either the concentration, c, or the light-path length, l.

If we plot A versus wavelength for three samples of the same substance in concentrations in the ratio 1:2:5, we get the curves shown in figure 1. There is, unhappily, no basic correspondence among them.

But watch what happens with our original equation,

$$A = ecl$$

when we take the logarithm of both sides,

$$\log A = \log ecl$$

Since the logarithm of a product is the sum of the logarithms of its factors,

$$\log A = \log e + \log cl$$

such as for "fingerprinting" a compound...

Now when we plot *log A* versus wavelength (figure 2), we immediately see our three 1:2:5 samples are represented by curves that have identical shapes. Each curve is that of *log e* displaced along the *log A* axis by the amount *log cl*. And each curve is separated by intervals that correspond to the 1:2:5 ratio of *cl*.

Here's where the "fingerprinting" of compounds comes in. Reference files of *log A* recordings facilitate the identification of unknown compounds by making it easy to compare their *log A* curves to those already on file. Large files of this sort are used in organic synthesis.

Now, a new topic: *log A* recording is also a valuable technique in studies of the kinetics of first-order reactions.

For proof of this statement, we resort once again to a basic equation:

$$-\frac{dc}{dt} = kc$$

where $-\frac{dc}{dt}$ is the rate at which the concentration is decreasing with time.

k is the velocity or rate constant, and

c is the concentration

A few manipulations of this basic equation yield:

$$t = \left[\frac{2.303}{k} \log c\right] - \left[\frac{2.303}{k} \log (c\text{-}x)\right]$$

Wherein we note that the first term in brackets is a constant and, therefore, the reaction time, t, is directly proportional to the second bracketed term, $\log (c\text{-}x)/k$.

Since $(c\text{-}x)$ is the concentration at time t, it will be proportional to the absorbance, A. And $\log (c\text{-}x)$ will likewise be proportional to *log A*.

and for quickly determining reaction rates...

As long as the reaction is first-order, both $\log (c\text{-}x)$ and *log A* will be linear with time. So when we plot *log A* versus time at a fixed wavelength for a first-order reaction of a dye fading, we get the curve shown in figure 3.

The linearity of the curve in figure 3, in itself, tells us that this is a first-order equation. And where the linear section of the curve terminates (at the right of the curve) indicates a departure from strict first-order reaction. Finally, the rate constant, k, can be determined from the slope of the linear section.

These applications—for fingerprinting a compound and for studying the kinetics of first-order reactions—are but two to which *log A* recording is eminently suited. Other applications include the precise specification of color and the measurements of small differences in color.

In all cases, this type of log recording requires an advanced, accurate, versatile recorder. The Sargent SRLG Recorder is just that. It uses precision, non-linear *gears* for accuracy and fidelity; these gears are much superior to electrical circuit approximations. Amplifier gain is adjusted *automatically* at all points in the log scale. There's also a switch for inactivating the zero adjustment and automatically setting the voltage-divider zero-point. Conformance of the logarithmic scale to the theoretical function is ±0.003 at any point.

But the SRLG is a *linear-log* recorder. (You change the mode of operation by simply changing the gears.)

Its accuracy on the linear scale is ±0.25% of full span and its reproducibility is ±0.1% of full span.

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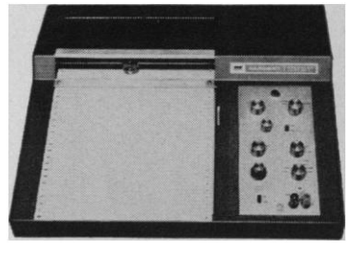
The SRLG Linear-Log Recorder, like all Sargent recorders, is true potentiometric in its basic (millivolt) ranges, with no voltage dividers to load the circuit. Its full-scale pen response is less than 1 second. There are seven switch-selected, calibrated spans and three switch-selected chart speeds. Plus improved input filtering and circuit guarding to eliminate A.C. components of the input signal. All circuitry is solid-state. And batteries have been replaced by zener-diode regulation of all critical voltages.



For additional information, including complete specifications and prices, please call or write us. s-224

FIGURE 1

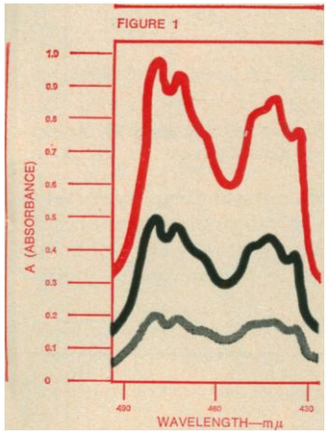


FIGURE 2

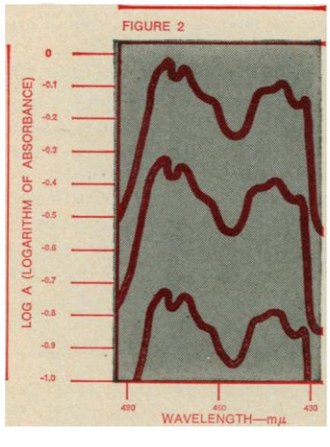
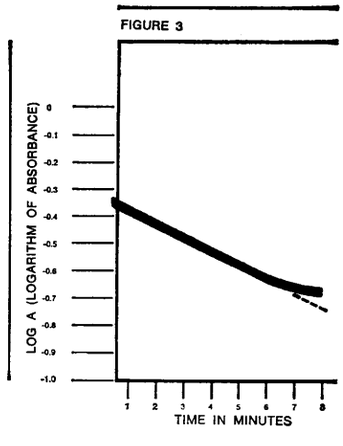


FIGURE 3



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social response need not imply mere response-suppression. It may imply constructive rearrangement of social conditions in order to decrease the probability of destructive responses. Like response-suppression, this is also "control," but not of Anderson's much feared Orwellian variety. . . .

There seems to be little relation between the assumption that violence is undesirable and advocacy of suppression of dissent. (Anderson notwithstanding, there are also important differences between campus dissent and campus violence.) Violence *is* inherently undesirable when there exist alternative ways of attaining specific socioeducational goals. Whether these ways exist or not might itself prove to be a redundant question should it turn out that what the campus revolutionary really lacks is patience, as opposed to hope.

D. A. BEGELMAN
Fairfield Hills Hospital, Newtown, Connecticut 06470

Protesting Mathematicians

I was amazed to read the News and Comment section (20 Sept., p. 1225) "Defense research: Questions for Vietnam dissenters" about the mathematicians who signed an announcement in the Notices of the American Mathematical Society which read in part: "We urge you [mathematicians] to regard yourselves as responsible for the uses to which your talents are put. We believe this responsibility forbids puting mathematics in the service of this cruel war."

The first statement is unexceptionable; the second, as indicated, is a matter of opinion. What amazes me is that signers of the announcement are still working on their defense research contracts, not because they have not been fired, but because they have not resigned. I can understand that they would consider it a futile gesture to resign without protest, but how they can make such a protest without resigning is incomprehensible. Do they expect others to do what they say, rather than what they do? It is true that the Notice as quoted by *Science* does not contain the word resign, but the meaning of "forbids" is clear. I am curious to hear the sequel.

DAVID SINCLAIR
Martinsville, New Jersey 08836

Endangered Nonhuman Primates

A growing threat to some species of nonhuman primates in their natural habitats is not well known even to those scientists who value them for biomedical laboratory investigations. These primates are endangered by human urbanization and agricultural expansion which intrude upon their natural habitats. They are extensively hunted for food and wastefully utilized for export. Chimpanzee mothers are often shot dead in order to obtain single babies for shipment. Many animals die of diseases contracted after they are trapped.

Only recently the first effective action was taken to protect the primates. The Committee of Scientists for the Use of Primates in Medical Research, of which I am chairman, adopted the following resolution in January 1968 and requested the Surgeon General that it be brought before the World Health Assembly:

> Whereas there is general recognition by the scientific community of the importance of non-human primates for bio-medical purposes,
>
> Whereas there is a widespread belief among competent scientists that some primate species are in danger of depletion as a result of capturing and of encroachment on natural habitats by developing human populations,
>
> Therefore it is requested that WHO convene a meeting of a scientific group as soon as possible to examine the problem in detail and recommend measures designed to ensure the continued supply of these animals for the welfare of man and also for the conservation of the species.

The U.S. delegation to WHO introduced the topic for discussion with the result that conservation of primate species is now established as a matter of international concern. These beginnings are occurring none too early, for the task of implementing methods of protecting the primate populations will be long and thorny. Nevertheless, this development represents an interdisciplinary effort (medicine, zoology, anthropology, conservation, and others) and these moves offer hope that certain endangered species will be protected before they become extinct. Strong support by the scientific community will be required to convert platitudes into successful procedures.

EDWARD I. GOLDSMITH
Department of Surgery, New York Hospital–Cornell Medical Center, 525 East 68 Street, New York 10021

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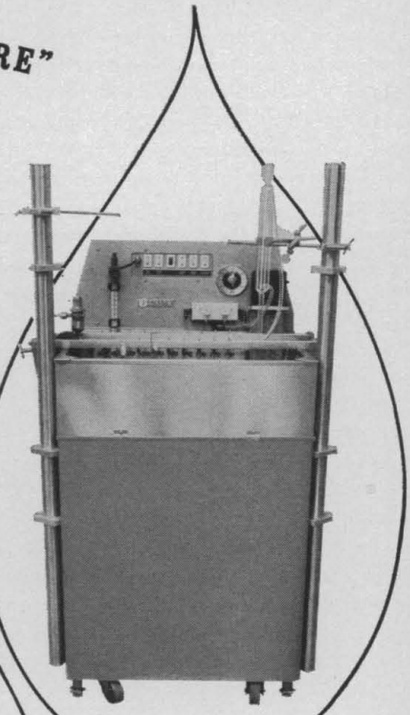

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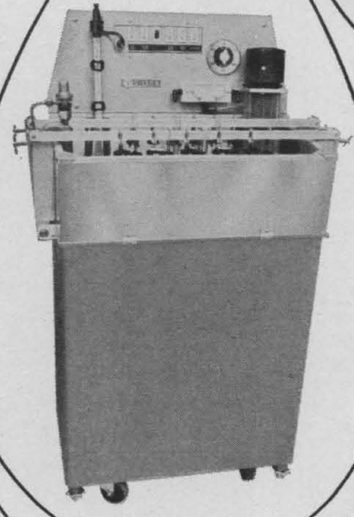

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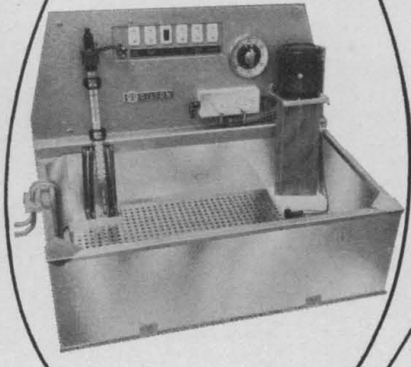

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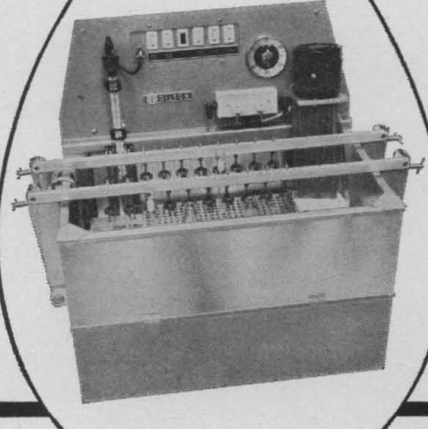

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6 December 1968, Volume 162, Number 3858 **SCIENCE**

A New Base for Political Support of Academic Science

Academic scientists generally find little to be cheerful about prospects for federal support of their research. Hostile congressional attitudes toward university-based science have surfaced. These may be seen in the discussion of the Mansfield Amendment.* They are also evidenced by the comparatively large drop in appropriations for the National Science Foundation.

The election had little effect on the composition of Congress, especially on that of the House of Representatives. The attitude of Richard Nixon toward academic research is not clear, but the executive branch can provide only such funds as Congress is willing to sanction. Thus the fate of federal support of university research rests largely in the hands of those who were responsible for the cuts of 1968. Prospects for federal programs now would be dark were not the potentially powerful organizations of higher education entering the picture.

Among the most politically potent of these is the National Association of State Universities and Land Grant Colleges, which has representation in all the 50 states. Member institutions are particularly powerful in Nixon country, where they are generally the intellectual centers of their states. Alumni form the power structure, dominating many of the state legislatures. Officers of the universities, especially the presidents of the universities, are experienced in political maneuvering. They must defend their budgets before the legislatures. Many of the presidents have close relations with influential men in their communities, have access to the levers of power, and know how to operate them.

A decade ago, presidents of the state universities were not very friendly toward the federal support of research. The grants programs tended to enhance the power of the faculty at the expense of the administration. However, federal funds were useful, and subsequently additional programs of aid to higher education were inaugurated. As a result, administrators are giving more attention to Washington and have been acting in concert.

Two recent examples illustrate the political potentials of the Association acting together with other organizations in the field of higher education. In early October the U.S. Senate, in an uncharacteristic display of petulance, passed the Mansfield Amendment to the Defense Appropriation Bill. The instrument limited overhead on Department of Defense grants and contracts to 25 percent. The Association and allied organizations were able to respond quickly through their members. The Mansfield Amendment did not survive the House-Senate Conference.

Potentially more significant was the effort of the Association, together with the American Association of State Colleges and Universities, in drafting the Miller Bill.† This legislation, when enacted and fully implemented, will have profound effects on academic research. In its present form the Miller Bill provides for an annual appropriation of $150 million for institutional grants for the support of scientific research and the training of scientists. This appropriation is intended to supplement the present mechanisms. A recently issued report on hearings on the Miller Bill indicates a favorable consensus, including spokesmen of major educational organizations and such eminent scientists as Brooks, Handler, Haworth, Hornig, and Wiesner.

The old base for support of academic research has deteriorated. However, a new force is developing capable of stabilizing and strengthening a vital national effort.—PHILIP H. ABELSON

* *Congressional Record* **114**, No. 163 (3 Oct. 1968), pp. A11963–71. † "Institutional Grants Bill H.R. 875," *Hearings before the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics, U.S. House of Representatives* (Government Printing Office, Washington, D.C., 1968).

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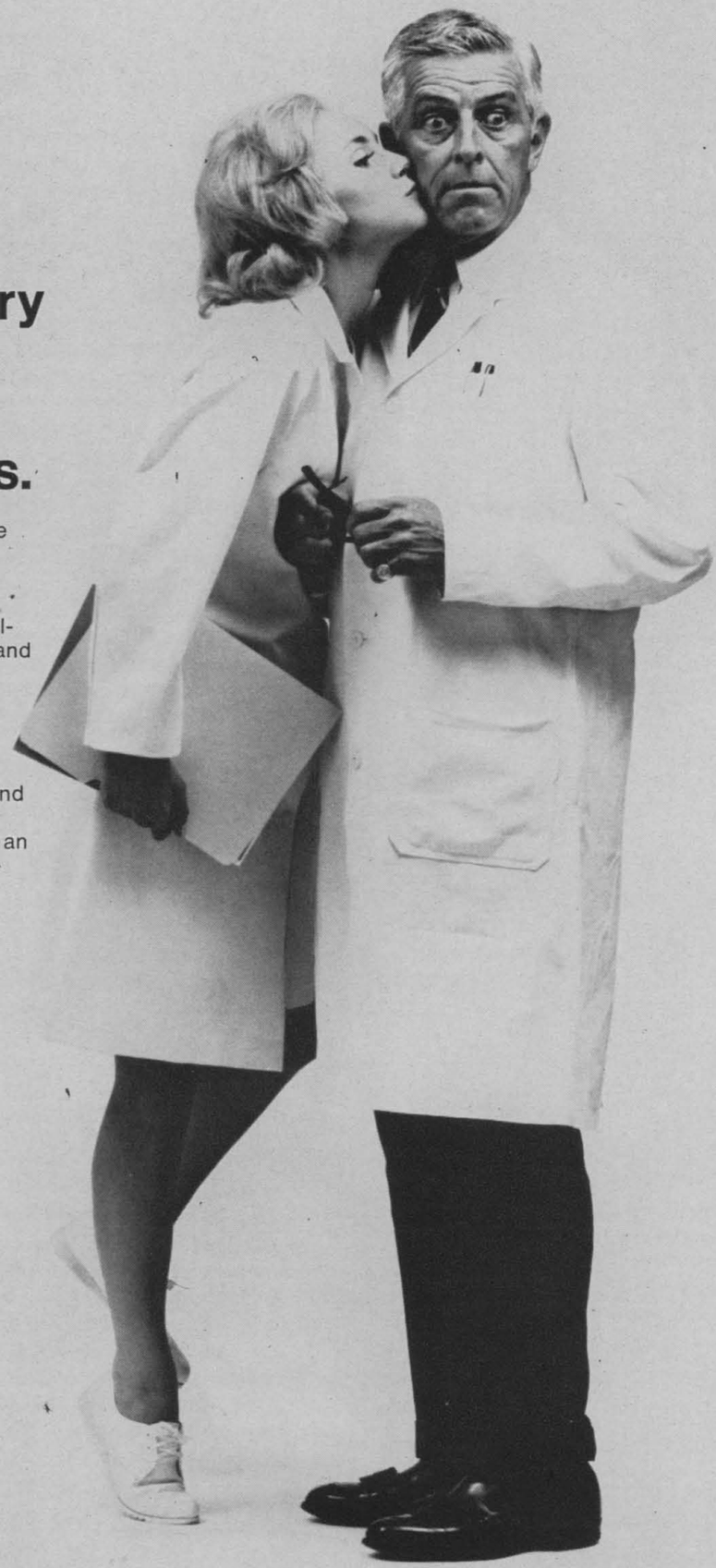

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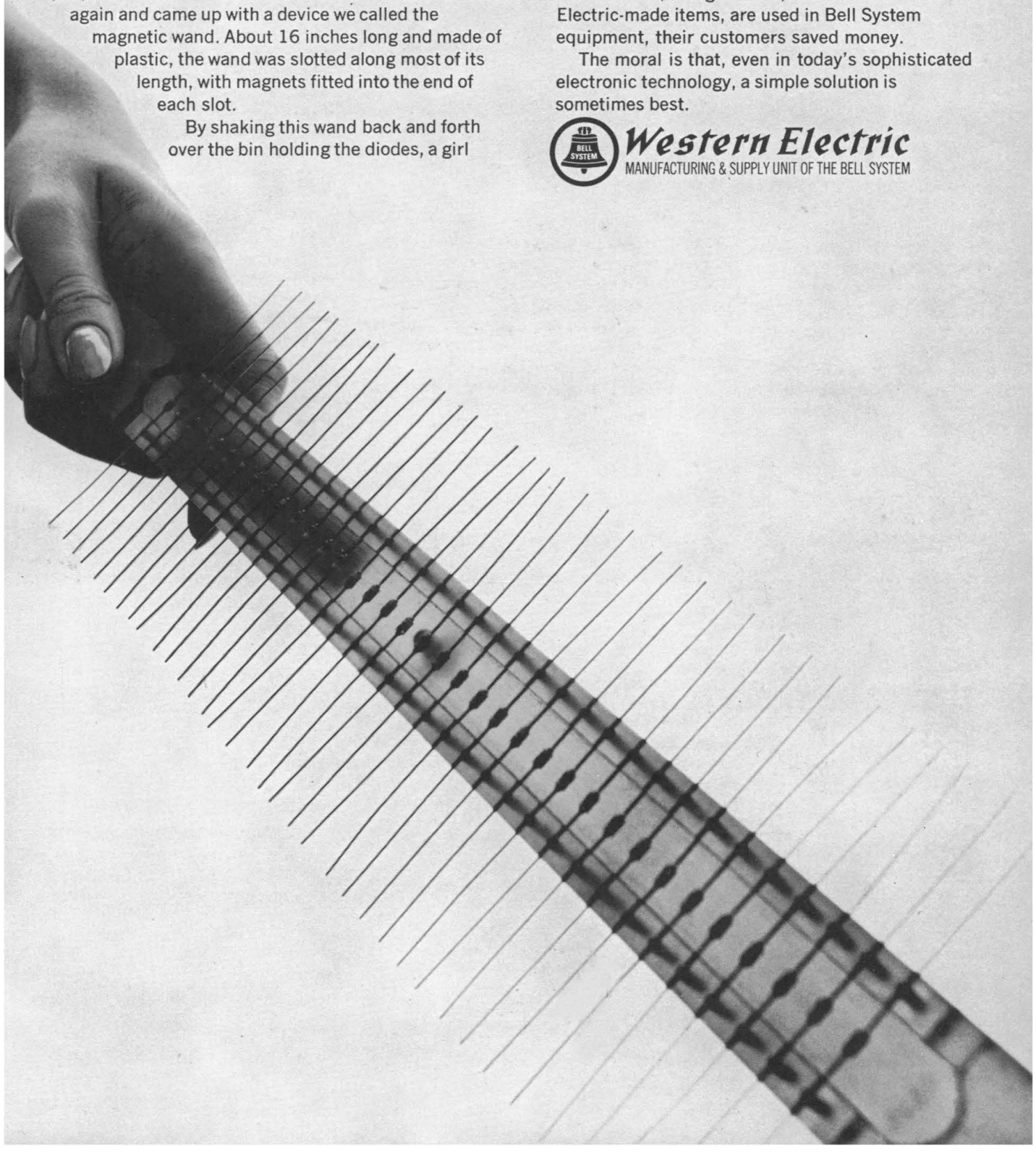

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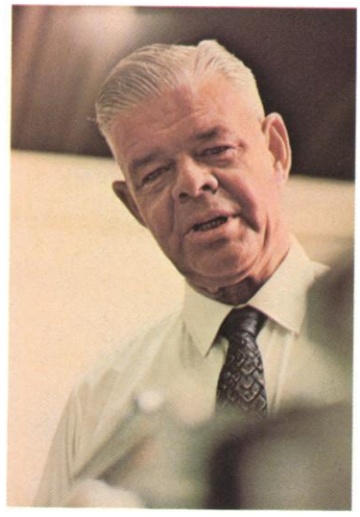

Howard Cary—
President of Cary Instruments,
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CONSERVATIVE DESIGN: WHAT & WHY

One similarity between the two instruments is the fact that both are conservatively designed. By conservative design we mean (1) that at no point in the instrument system are the electrical or mechanical components operated near their tolerance limits, and (2) that performance specifications are greater than required under normal sample conditions. This design philosophy produces acceptable performance even under the most rigorous sampling conditions. Just as important, it insures longer instrument life and complete confidence in

outperform the Cary 14 is the Cary 15. And, vice-versa.

the quality of the recorded information.

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While the electronics of the Cary 14 and 15 differ, the photometric accuracy of each is competitively unsurpassed.

The Cary 14 uses a prism-grating double monochromator, plus a dual beam sampling system and a single detector. Reference and sample beams are separated by time then compared and the ratio recorded on a chart which is effectively 20 inches wide. Measurements are accurate within 0.002 abs between zero and 1 abs; 0.005 near 2 abs. At high absorbance levels of 4, or even 5, valid measurements can be obtained using reference beam attenuation.

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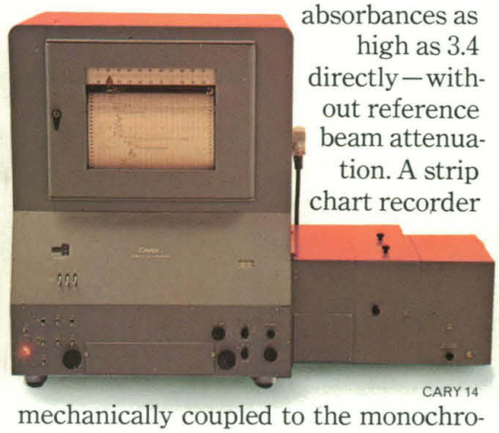

CARY 14

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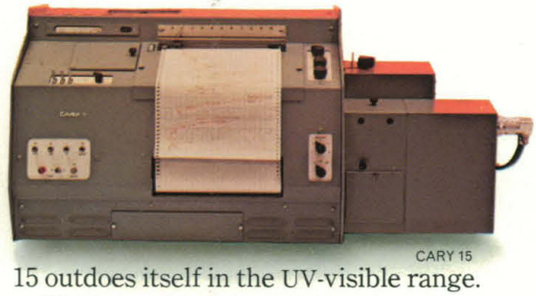

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prove useful in studying the evolution of various Ophidian groups. However, litters of the same species from different geographical areas can differ in their responsiveness to various extracts. The effective substances are apparently nonvolatile and heterogeneous, and have a molecular weight of about 5000.

For most mammals, we have little or no reliable evidence of the role of chemical signals in guiding behavior. However, the prominence, diversity, and frequent occurrence of skin glands emitting strongly odorous secretions suggest a corresponding dependence on odor signals. Thus 40 different types of skin glands have been described; among them are the cutaneous, pedal, preorbital, chin, inguinal, retrocorneal, occipital, caudal, preputial, anal, and scapular glands. Urine and feces may be used to mark territory. In discussing the role of skin glands in mammalian communication, R. Mykytowycz (CSIRO, Canberra, Australia) pointed out that social interaction may play a decisive role in population dynamics. His own studies on experimental populations of wild rabbits have shown that the use of secretions from anal and chin glands varies among individuals, depending on factors such as social status, territoriality, reproductive stage, and age. The use of human panels revealed the existence of differences in the intensity of smell between sexes and age groups and among individuals of different social status. It is only recently, however, in the studies of Müller-Schwartze on mule deer, that attempts have been made to determine the communicative powers of the separate chemical components of skin-gland secretions.

Among primates, the Prosimii seem best equipped with skin glands, and skin secretions may also be exploited by at least one human cultural group to convey information. Thus in the Kanum-irebe tribe of southern New Guinea the secretion from the axillary sweat glands is used in a ritual performed by the host to demonstrate his friendship with a departing guest. Some mammals have the ability to control the flow of secretions voluntarily (the skunk, for example).

Much of the recent quickening of interest in pheromones stems from the demonstrations by Bruce, Whitten, Bronson and others that the volatile external secretions of mammals play an important intraspecific role in reproductive physiology. This evidence was reviewed by W. K. Whitten (Jackson

Laboratories, Bar Harbor, Maine). He used the term "primer" pheromone to describe a substance acting on the endocrine system (probably through the central nervous system) to produce a response which is generally slow to develop, as opposed to a "signaling pheromone" which elicits an immediate behavioral response. Studies on house mice provide most of our understanding of mammalian primer pheromones although they have also been found in deer mice and field voles. Three effects have been described: inhibition of estrous cycles in segregated female groups, induction of estrus by urine from male mice, and pregnancy block by strange males. The pheromones responsible for the last two effects both occur in the urine, are androgen-dependent, labile, and may, in fact, be the same pheromone, as Whitten suggests. An additional factor or identifier would be required to change the context. The pheromone that produces pregnancy block is highly strain-dependent, and strains exist in which no block occurs. The neuroendocrine pathways mediating the effects of these primer pheromones probably involve the hypothalamus and pituitary.

Whitten concluded that current evidence does not suggest that pheromones are effective in regulating population density, but they may provide alternative stimulatory pathways that enhance the probability of reproductive success.

Experiments on the role of odor in the control of reproductive behavior in higher primates were reported by R. E. Michael (Primate Research Center, Beckenham, Kent, England). Two adult male rhesus monkeys were trained to press a lever to gain access to ovariectomized females, certain of which were also estrogenized. After it was determined that they worked more consistently for estrogenized than nonestrogenized females, temporary anosmia was induced in the males, and estrogen was administered to the nonestrogenized females. However, the males showed no change in behavior toward the females until their sense of smell was assumed to have returned. This experiment suggests that odors play a role in the male's recognition of the hormonal states of the female.

T. Engen (Brown University) reviewed the detection, recognition, discrimination, and scaling of odors by man. He emphasized the value of applying signal detection theory as opposed to the classical concepts of threshold in the study of odor detection. He also

argued that odors are not easily recognized unless the context has been established, and cited the finding that the channel capacity for odor quality is little more than four bits of information at best (and for intensity one and a half bits). This is a good performance when compared with certain other human capacities, for example, two to four bits for audition and vision.

In a thoughtful summarizing paper, J. Le Magnen (Collège de France, Paris) stressed the peculiar advantages and properties of chemical, as opposed to other forms of sensory communication, in regulating the relations between individuals, and between individuals and other aspects of their external environment. Such properties include the extreme specificity of chemical messages and their discriminative accuracy, depending, in some cases, on a single chemical structure. The equivalent in acoustic signals would be a highly specific call stimulating only one type of receptor and heard only by members of one sex of a given species—others being deaf to it. In addition, odors have a direct releasing action on endocrine systems, and chemical cues can acquire significant properties in consummatory acts such as mating and feeding.

Le Magnen also pointed out some disadvantages associated with chemical signals (as opposed to sound and light). In particular, they are unusually dependent on the condition of the channel of communication—for example, wind direction—which reduces their efficiency as direction and distance indicators. Possibilities for chemical modulation of the signals are also severely limited. In certain insects, which emit their sexual attractant rhythmically, the effect is probably detected over a distance of less than 1 meter. On the other hand, spatial modulation by the natural occurrence of stationary sources of stimuli may provide an effective means of communication resembling the use of arrows and road signals by man. Le Magnen mentioned experiments on service dogs in which some subjects could detect differences of less than 15 minutes in the age of a trail.

The papers presented, along with others, will be included in the first volume of a continuing series of monographs [*Advances in Chemoreception,* J. W. Johnston, Jr., D. G. Moulton, A. Turk, Eds. (Appleton-Century-Crofts, New York), in preparation].

DAVID G. MOULTON
Department of Biology, Clark University, Worcester, Massachusetts

Calendar of Events

National Meetings

December

26–31. American Assoc. for the **Advancement of Science**, 135th, Dallas, Texas. (Secretary, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

26–31. Society for **General Systems Research**, Dallas, Texas. (M. D. Rubin, Mitre Corp., Bedford, Mass. 01730)

27–30. Institute of **Mathematical Statistics**, Washington, D.C. (J. R. Rosenblatt, 337 Administration Bldg., Gaithersburg, National Bureau of Standards, Washington, D.C. 20234)

28–30. **History of Science** Soc., Dallas, Texas. (J. C. Greene, Dept. of History, Univ. of Connecticut, Storrs 06268)

January

9–11. Society for **Historical Archaeology**, 2nd, Tucson, Ariz. (B. L. Fontana, Arizona State Museum, Arizona Univ., Tucson 85721)

12–17. **Brain Research**, Snowmass-at-Aspen, Colo. (J. E. Swett, Dept. of Anatomy, Univ. of Colorado Medical Center, Denver 80220)

13–14. Applications of **Sea-Going Computers**, La Jolla, Calif. (C. B. Jackson, MTS Data Engineering Committee, P.O. Box 2158, La Jolla 92037)

13–15. **Agricultural Waste Management** Conf., Syracuse, N.Y. (Agricultural Waste Management Conf., 400 Roberts Hall, Cornell Univ., Ithaca, N.Y. 14850)

13–15. **Animal Waste Management**, Syracuse, N.Y. (R. C. Loehr, 208 Riley-Robb Hall, Cornell Univ., Ithaca, N.Y.)

13–17. Society of **Automotive Engineers**, Inc., Detroit, Mich. (Manager, Meetings Div., 485 Lexington Ave., New York 10017)

13–17. **Highway Research** Board, 48th, Washington, D.C. (Div. of Engineering, Natl. Research Council, 2101 Constitution Ave., NW, Washington 20418)

15–18. National Soc. of **Professional Engineers**, Las Vegas, Nev. (K. E. Trombley, Natl. Soc. of Professional Engineers, 2029 K St., NW, Washington, D.C. 20006)

17–18. Symposium on **Blood**, Detroit, Mich. (E. F. Mammen, Dept. of Physiology and Pharmacology, Wayne State Univ., 1400 Chrysler Freeway, Detroit 48207)

17–18. American Soc. for **Surgery of the Hand**, New York, N.Y. (L. Milford, 869 Madison Ave., Memphis, Tenn. 38104)

18–23. American Acad. of **Orthopaedic Surgeons**, New York, N.Y. (J. K. Hart, 29 E. Madison, Chicago, Ill. 60602)

19–21. American Soc. for **Engineering Education**, Flint, Mich. (E. H. Wright, American Soc. for Engineering Education, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

20–21. Symposium on **Control Mechanisms in Intermediary Metabolism**, Miami, Fla. (Dept. of Biochemistry, Univ. of Miami Medical School, P.O. Box 875, Biscayne Annex, Miami 33152)

20–22. American Inst. of **Aeronautics and Astronautics**, New York, N.Y. (AIAA, 1290 Sixth Avenue, New York 10019)

20–22. Society of **Thoracic Surgeons**, San Diego, Calif. (F. C. Byron, City of

Hope Medical Center, 1500 E. Duarte Rd., Duarte, Calif. 91010)

20–22. **Aerospace Sciences** Mtg., 7th, New York, N.Y. (P. P. Wegener, Dept. of Engineering and Applied Science, 208 Dunham Lab., Yale Univ., New Haven, Conn. 06520)

21–24. **Physiological Aspects of Crop Yield**, Lincoln, Neb. (F. A. Haskins, Dept. of Agronomy, Univ. of Nebraska, Lincoln 68503)

22–24. Symposium on **Membrane Function and Electron Transfer to Oxygen**, Miami, Fla. (Dept. of Biochemistry, Univ. of Miami Medical School, P.O. Box 875, Biscayne Annex, Miami 33152)

23–25. American Soc. for **Engineering Education**, Baton Rouge, La. (E. H. Wright, American Soc. for Engineering Education, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

23–25. **Radiotherapy** Symp., Miami, Fla. (M. Vuksanovic, Radiation Therapy Div., Univ. of Miami Medical School, 1700 NW Tenth Ave., Miami 33136)

23–27. American **Mathematical** Soc., 75th, New Orleans, La. (H. M. Geham, Univ. of Buffalo, Buffalo, N.Y. 14214)

24–27. American **Group Psychotherapy** Assoc., New York, N.Y. (M. Schiff, Room 702, 1790 Broadway, New York 10019)

25–27. **Mathematical** Assoc. of America, 52nd, New Orleans, La. (H. L. Alder, Mathematical Assoc. of America, Univ. of California, Davis 95616)

26–28. Conference of **Immunologists**, Pasadena, Calif. (J. S. Garvey, Div. of Chemistry and Chemical Engineering, California Inst. of Technology, Pasadena 91109)

26–31. Modern **Dispatch Techniques of Interconnected Power Systems**, New York N.Y. (Inst. of Electrical and Electronics Engineers, Inc., 345 E. 47 St., New York 10017)

27–30. American Soc. of **Heating, Refrigerating and Air-Conditioning Engineers**, Inc., Chicago, Ill. (J. H. Cansdale, American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 345 E. 47 St., New York 10017)

28–30. **Fast Burst Reactor**, Albuquerque, N.M. (G. R. Keepin, Box 1663, Los Alamos, N.M. 87544)

29. New York **Heart** Assoc., New York, N.Y. (New York Heart Assoc., Inc., Heart House, 2 E. 64 St., New York 10021)

29–31. **Health Physics** Soc., 3rd, Los Angeles, Calif. (J. S. Handloser, EG&G, 130 Robin Hill Rd., Goleta, Calif. 93017)

30–1. Developmental Aspects of **Perception, Hearing, Speech and Learning**, Gainesville, Fla. (G. R. Kilgore, J. Hillis Miller Health Center, Univ. of Florida, Gainesville 32601)

31–2. Southern **Radiological** Conf., 13th, Point Clear, Ala. (M. Eskridge, Mobile Infirmary, P.O. Box 4097, Mobile 36604)

International and Foreign Meetings

January

1–3. Conference on the **Early Development of Behaviour**, Sussex, England. (Director, Conf. on Early Development of Behaviour, 310 Edgware Road, London, W.2, England)

3–5. **Nondestructive Examination** Conf., Swansea, England. (Assistant Secretary,

Iron and Steel Inst., 4 Grosvenor Gardens, London, S.W.1, England)

6–10. Australian Acad. of **Sciences**, Canberra. (D. H. Green, % Dept. of Geophysics and Geochemistry, Australian Natl. Univ., Canberra)

6–11. Caribbean **Chemical** Symp., 5th, Bridgetown, Barbados. (Chemistry Dept., Univ. of West Indies, P.O. Box 64, Bridgetown)

7–9. Society of **Glass Technology**, Ormskirk, England. (H. Rawson, Dept. of Glass Technology, Elmfield, Northumberland Road, Sheffield 10, England)

7–9. Symposium on **Orbital Symmetry Correlation in Organic Reactions**, Cambridge, England. (J. F. Gibson, Scientific Affairs Officer, Chemical Soc., Burlington House, London, W.1, England)

12–16. Marine **Biological** Assoc. of India, Mandapam Camp. (The Association, Marine Fisheries P.O., Mandapam Camp, India)

15–16. Symposium on **Lubrication in Hostile Environments**, Risley, England. (Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1, England)

20–23. International Symp. on **Advances in Chromatography**, Las Vegas, Nev. (A. Zlatkis, Dept. of Chemistry, Univ. of Houston, Houston, Tex. 77004)

22–24. Hawaii International Conf. on **System Sciences**, Honolulu. (F. F. Kuo, Dept. of Electrical Engineering, 2565 The Mall, Univ. of Hawaii, Honolulu 96822)

28–31. International Symposium on **Information Theory**, Ellenville, N.Y. (D. Slepian, Bell Telephone Labs., Murray Hill, N.J. 07971)

February

18–21. International **Oceanological Equipment and Services** Exhibition, Brighton, England. (BPS Exhibitions Ltd., Oceanology International 69, 6 London Street, London, W.2)

19–21. International **Solid-State Circuits** Conf., Philadelphia, Pa. (J. H. Wuorinen, Bell Telephone Labs., Murray Hill, N.J. 07971)

23–27. Pan American Congr. for **Psychoanalysis**, 4th, New York, N.Y. (H. Montessori, Intern. Psychoanalytical Assoc., 2B Prins Hendriklaan, Amsterdam Z, Netherlands)

27–28. Congress of Intern. Inst. for **Sugar Beet Research**, 32nd, Brussels, Belgium. (The Institute, 150 rue Beauduin, Tirlemont, Belgium)

March

2–6. International Soc. of **Anesthesia Research**, 43rd, Bal Harbour, Fla. (B. B. Sankey, 3645 Warrensville Center Rd., Cleveland, Ohio 44122)

3–6. Symposium on **Protein Structure and Function**, St. Marguerite, P.Q., Canada. (T. H. G. Michael, Chemistry Inst. of Canada, 151 Slater St., Ottawa 4, Ont.)

7–12. International Acad. of **Pathology**, 58th, San Francisco, Calif. (P. K. Mostofl, % Armed Forces Inst. of Pathology, Washington, D.C. 20305)

9–11. International Conf. and Exposition on **Urban Transportation**, Pittsburgh, Pa. (Pittsburgh Urban Transit Council,

945 Union Trust Bldg., Pittsburgh 15219)

9–22. International Postgraduate Congr. for **Practical Medicine**, Daves, Switzerland. (W. Brune, Kongressburo der Bundesarztekammer, Haedenkampstr. 1 5000 Koln-Lindenthal, Germany)

10–12. International Conf. on **Urban Transportation**, 4th, Pittsburgh, Pa. (G. R. Schaefer, WABCO Mass Transit Center, Westinghouse Air Brake Co., Pittsburgh)

12–13. Conference on **Safety on Construction Site**, London, England. (Institution of Civil Engineers, Great George St., London, S.W.1)

17–18. International Symp. of **High-speed Testing: The Rheology of Solids**, Boston, Mass. (R. H. Supnik, % Plas-Tech Equipment Corp., 4 Mercer Rd., Natick, Mass. 01760)

20–23. International Assoc. for **Dental Research**, 47th, Houston, Tex. (A. D. Frechette, 211 E. Chicago Ave., Chicago, Ill. 60611)

24–27. International Convention of Inst. of **Electrical and Electronics Engineers**, New York, N.Y. (The Convention, 345 E. 47 St., New York 10017)

25–28. **Autoclaved Building Products**, 2nd intern. symp., Hanover, Germany. (Secretary, Second Intern. Symp. 1969, 'Haus der Kalksandstein-industrie', Postfach 66, 3 Hanover-Herrenhausen)

25–28. **Liquefied Natural Gas**, London, England. (Conference Dept., Inst. of Mechanical Engineers, 1 Birdcage Walk, Westminster, London, S.W.1)

27–28. International Congr. for **Heating, Ventilating, Air Conditioning**, 19th, Frankfurt am Main, Germany. (S. Ausschuss, Kongress fur Heizung, Luftung, Klimatechnik, Kongressburo, Konigstr. 5, 4 Dusseldorf 1, Germany)

31–4. International Symp. on **Concrete Bridge Design**, 2nd, Chicago, Ill. (American Concrete Inst., P.O. Box 4754, Redford Sta., 22400 W. Seven Mile Rd., Detroit, Mich. 48219)

April

7–11. Federation of European **Biochemical** Societies, 6th, Madrid, Spain. (Secretariat, Centro de Investigaciones Biologicas, Velazquez, 144, Madrid 6)

8–11. International Symp. on **Laboratory Animals**, Washington, D.C. (B. F. Hill, Charles River Breeding Labs., Inc., Wilmington, Mass.)

9–12. **British Medical** Assoc., clinical mtg., Valletta, Malta. (British Medical Assoc. House, Tavistock Sq., London, W.C.1, England)

14–17. **Cleft Palate**, intern. congr., Houston, Tex. (B. J. McWilliams, Cleft Palate Research Center, Univ. of Pittsburgh, 313 Salk Hall, Pittsburgh, Pa. 15213)

15–17. **Civil Engineering Problems of the South Wales Valleys**, Cardiff, England. (Institution of Civil Engineers, Great George St., London, S.W.1, England)

15–18. International **Magnetics** Conf., Amsterdam, Netherlands. (T. Holtwijk, Philips Research Labs., Eindhoven, Netherlands)

17–18. British Inst. of **Radiology**, London, England. (British Inst. of Radiology, 32 Welbeck St., London, W.1)

19–27. Yugoslav Seminar and Exhibition of **Regulation, Measuring and Auto-**

mation-Jurema 1969, 14th, Zagreb. (Jurema, Unska U1, P.O.B. 123, Zagreb)

21–23. Canadian Inst. of **Mining and Metallurgy**, 71st, Montreal, Canada. (Executive Director, The Institute, Suite 906, 1117 St. Catherine St. W., Montreal 2, P.Q.)

21–25. **Switching Techniques for Telecommunication Networks**, London, England. (Conference Dept., Institution of Electrical Engineers, London, W.C.2)

21–26. Canadian **Pulp and Paper** Assoc., 10th, Vancouver, B.C. (W. K. Voss, Ontario Paper Co. Ltd., Thorold, Ont.)

22–25. **Cotton Textile Research**, 1st intern. symp., Paris, France. (Institut Textile de France, 23 rue des Abondances, 92, Boulogne, France)

22–29. **Hydrology of Deltas**, intern. symp., Bucharest, Roumania. (A. I. Johnson, Water Resources Div., U.S. Geological Survey, Federal Center, Denver, Colo. 80225)

28–2. Symposium on **Radiation-Induced Carcinogenesis**, Athens, Greece. (R. N. Mukherjee, Unit of Radiation Biology, Intern. Atomic Energy Agency, Karntner Ring 11–13, A-1010 Vienna, Austria)

May

5–8. **Instrumentation in Aerospace Simulation Facilities**, 3rd intern. congr., Farmingdale, N.Y. (C. R. Spitzer, MS-236, NASA Langley Research Center, Hampton, Va. 23365)

5–8. International **Microwave** Symp., Dallas, Tex. (J. B. Horton, MS 905, Texas Instrument Co., Box 5012, Dallas 75222)

5–9. Commonwealth **Mining and Metallurgical** Congr., 9th, London, England. (Congress Secretary, Commonwealth Council of Mining and Metallurgical Institutions, 44 Portland Pl., London, W.1, England)

6–8. **Nuclear Electronics** Symp., Ispra, Italy. (L. Stanchi, C.C.R. Euratom, 21020 Ispra)

6–8. **Power Thyristors and Their Applications**, London, England. (Conference Dept., Institution of Electrical Engineers, Savoy Pl., London, W.C.2, England)

6–8. **Radiosensitizing and Radioprotective Drugs**, 2nd intern. symp., Rome, Italy. (H. Moroson, Sloan-Kettering Inst. for Cancer Research, Donald S. Walker Lab., 145 Boston Post Rd., Rye, N.Y.)

6–9. **Fluid Sealing**, 4th intern. conf., Philadelphia, Pa. (J. J. Sherlock, Midwest Aero Industries, Inc., P.O. Box 536, Oak Ridge Sta., 4834 Delemere Ave., Royal Oak, Mich. 48073)

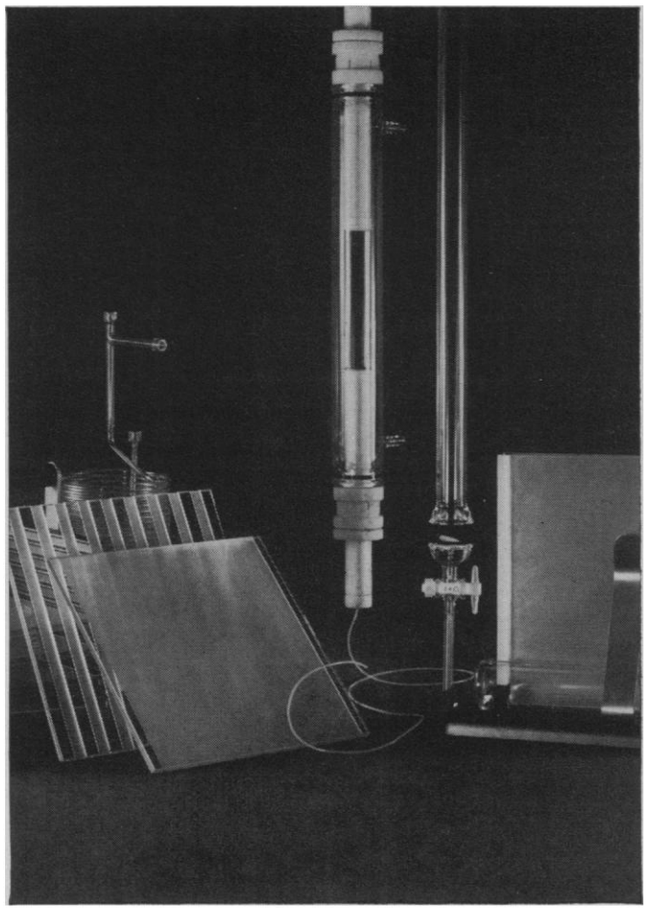
7–9. International Joint Conf. on **Artificial Intelligence**, Washington, D.C. (D. E. Walker, Mitre Corp., Bedford, Mass. 01730)

10–11. International Soc. for the Study of **Social and Behavioral Sciences**, Princeton, N.J. (J. Jaynes, Dept. of Psychology, Princeton Univ., Princeton 08540)

11–18. International Exhibition on **Diagnostics**, Munich, Germany. (Munchener Messe-und Ausstellungs-Gesellschaft MBH, Theresienhohe 13, 8 Munich 12)

15–18. International **Revolving-Shutter** Products Fair, Stuttgart, Germany. (Stuttgarter Ausstellungs GMBH, Postfach 990, 700 Stuttgart 1)

26–30. **Spectroscopy**, 15th intern. collo-



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- ☐ THERMOMETERS
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- ☐ URINOMETERS
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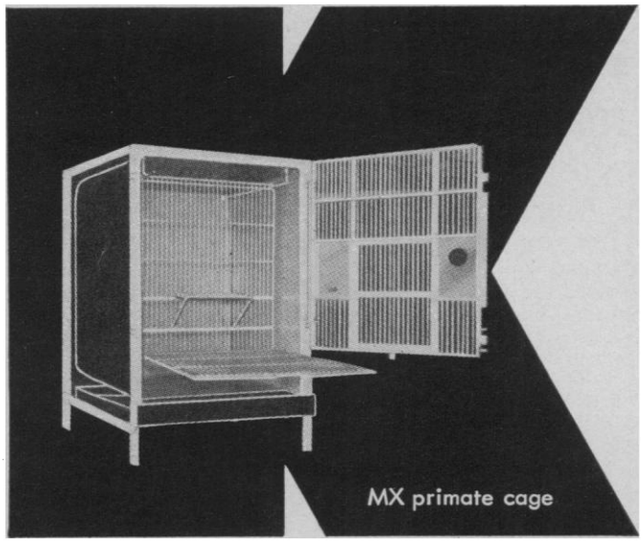

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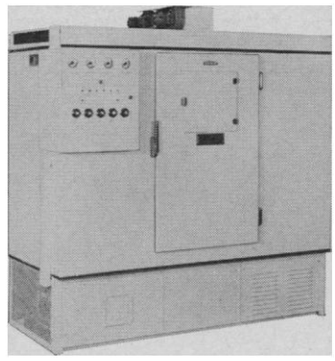

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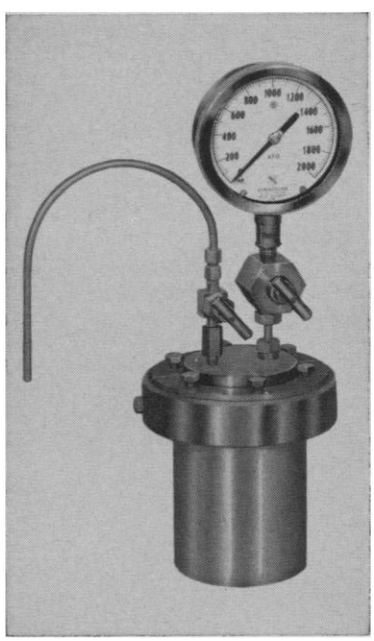

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quium, Madrid, Spain. (Secretary, XV Colloquium Spectroscopium Internationale, Serrano 119, Madrid-6)

27–31. International Assoc. of **Thalassotherapy**, 14th, Eforie Nord, Roumania (Prof. Binculescu, Strada Transilvaniei 47, Bucharest, Roumania)

27–1. German Congr. for **Medical Continuation Studies**, 18th, Berlin. (Kongressgesellschaft fur Artliche Fortbildung, Klingsortstr. 21, Berlin 41)

28–7. **Pro Aqua** Congr., 4th, Basel, Switzerland. (O. Jaag, % Secretariat Pro Aqua, Basel 21)

29–3. International Assoc. for **Accident and Traffic Medicine**, 3rd, New York, N.Y. (M. Helpern, % Office of Chief Medical Examiner, 520 First Ave., New York 10016)

29–19. General Assembly of Pan-American Inst. of **Geography and History**, Washington, D.C. (C. A. Forray Rojas, Ex-Arzobispado 29, Mexico, D.F. Mexico)

June

1–12. Symposium on **Non-Destructive Testing of Concrete and Timber**, London, England. (Institution of Civil Engineers, Great George St., London, S.W.1)

2–6. International Symp. on **Yeasts**, Delft and The Hague, Netherlands. (L. Rodrigues de Miranda, Organizing Committee, Julianalaan 67A, Delft)

3–13. International Conf. on **Arid Lands in a Changing World**, Tucson, Ariz. (International Arid Lands Conf., % Dept. of Geochronology, Univ. of Arizona, Tucson 85721)

4–6. **Automated Analysis**, intern. congr., Chicago, Ill. (J. E. Golin, Technicon Corp., Ardsley, N.Y. 10502)

4–7. Union of Textile **Chemists and Colorists**, 21st congr., Baden-Baden, Germany. (Rohrbacherstr. 78, Heidelberg, Germany)

5. European Federation of Intern. College of **Surgeons**, London, England. (F. P. Fitzgerald, 129 Harley St., London, W.1)

5–7. **Mineralogical** Assoc. of Canada, Montreal, P.Q. (J. Beland, Dept. of Geology, Univ. of Montreal, Montreal)

5–11. **Forensic Sciences**, 5th intern., Toronto, Ont., Canada. (L. Ball, Center of Forensic Sciences, Dept. of Attorney General, 8 Jarvis Street, Toronto 2)

6–9. Canadian **Pediatric** Soc., Montreal, P.Q. (J. H. V., Marchessault, 14 Green Ave., St. Lambert, Quebec City, P.Q.)

8–14. Canadian **Medical** Assoc., 102nd, Toronto, Ont., Canada. (The Association, 170 St. George Street, Toronto)

9–11. International **Communications** Conf., Boulder, Colo. (M. Nesenbergs, Environmental Science Services Administration, Inst. for Telecommunication Sciences, R614, Boulder 80302)

9–12. International **Food** Congr. and Exhibition, 7th, Madrid, Spain. (L. Naranon, % Federacion Nacional de Almacenistas de Alimentacion, Paseo del Prado 18–20, Planta 11, Madrid)

9–13. **Clean Air** Congr. and Exhibition, Dusseldorf, Germany. (V. Deutscher, Postfach 1139, 4 Dusseldorf 1)

9–14. Canadian Assoc. of **Pathologists**, Toronto, Ont., Canada. (D. W. Penner, Winnipeg General Hospital, Winnipeg 3, Manitoba)

BOOKS RECEIVED

(Continued from page 1115)

$14.50. Reprint, with a new introduction by Lloyd G. Stevenson, of the 1855 edition.

The Behavioral Sciences and the Federal Government. National Academy of Sciences, Washington, D.C., 1968. xviii + 110 pp. Paper, $3.25. NAS Publication 1680.

Beyond Economics. Essays on Society, Religion, and Ethics. Kenneth E. Boulding. University of Michigan Press, Ann Arbor, 1968. x + 306 pp. $9.50.

Biochemistry of Bacterial Growth. Joel Mandelstam and K. McQuillen, Eds. Wiley, New York, 1968. x + 540 pp., illus. $11.

The Biological Effects of Oil Pollution on Littoral Communities. Proceedings of a symposium, Pembroke, Wales, Feb. 1968. J. D. Carthy and Don R. Arthur, Eds. Field Studies Council, London, 1968. viii + 198 pp., illus. Paper, 45 s. Supplement to vol. 2 of Field Studies.

Biology. Behavior, and Emergence Rhythm of Two Species of Fannia (Diptera: Muscidae). Maurice J. Tauber. University of California Press, Berkeley, 1968. v + 86 pp., illus. Paper, $3.50.

Biology of Gestation. N. S. Assali, Ed. Vol. 2, The Fetus and Neonate. Academic Press, New York, 1968. xvi + 408 pp., illus. $23.

The Biology of the Cockroach. D. M. Guthrie and A. R. Tindall. St. Martin's, New York, 1968. viii + 408 pp., illus. $19.

Biology of the Mouth. A symposium presented at the Washington meeting of the American Association for the Advancement of Science, Dec. 1966. Philip Person, Ed. AAAS, Washington, D.C., 1968. x + 309 pp., illus. $10; AAAS members' cash orders, $8.75. AAAS Publication No. 89.

Brain Puzzler's Delight. E. R. Emmet. Emerson, New York, 1968. x + 254 pp., illus. $4.95.

The Bronx Zoo Book of Wild Animals. A Guide to Mammals, Birds, Reptiles and Amphibians of the World. William Bridges. New York Zoological Society and Golden Press, New York, 1968. 304 pp., illus. $5.95.

Bullying the Moqui. Charles F. Lummis. Robert Easton and Mackenzie Brown, Eds. Prescott College Press, Prescott, Ariz., 1968. xii + 132 pp., illus. $7.50.

The Cambridge History of Iran. Vol. 1, The Land of Iran; W. B. Fisher, Ed.; xx + 784 pp., illus.; $12.50. Vol. 5, The Saljuq and Mongol Periods; J. A. Boyle, Ed.; xvi + 768 pp., illus.; $12.50. Cambridge University Press, New York, 1968.

Cancer Cells in Culture. Proceedings of an international conference, Tokyo, Oct. 1966. Hajim Katsuta, Ed. University of Tokyo Press, Tokyo; University Park Press, Baltimore, 1968. xxii + 401 pp., illus. $18.50.

The Cancer Ward. Aleksandr I. Solzhenitsyn. Translated from the Russian by Rebecca Frank. Dial, New York, 1968. xxii + 618 pp. $8.50.

The Central Nervous System and Fish Behavior. A symposium, Chicago, 1967. David Ingle, Ed. University of Chicago Press, Chicago, 1968. x + 278 pp., illus. $15.

Chemical Applications of Mössbauer Spectroscopy. V. I. Goldanskii and R. H. Herber, Eds. Academic Press, New York, 1968. xiv + 701 pp., illus. $29.

Chemistry and Physics of Carbon. A Series of Advances. Vol. 4. Philip L. Walker, Jr., Ed. Dekker, New York, 1968. xii + 399 pp., illus. $20.75.

The Chemistry of Titanium and Vanadium. An Introduction to the Chemistry of the Early Transition Elements. R. J. H. Clark. Elsevier, New York, 1968. xii + 327 pp., illus. $23.50.

The China Cloud. America's Tragic Blunder and China's Rise to Nuclear Power. William L. Ryan and Sam Summerlin. Little, Brown, Boston, 1968. xiv + 309 pp. $7.95.

The Chromosome Theory of Inheritance. Classic Papers in Development and Heredity. Bruce R. Voeller, Ed. Appleton-Century-Crofts, New York, 1968. xx + 236 pp., illus. Paper.

Classics in Coordination Chemistry. Part 1, The Selected Papers of Alfred Werner. Translated from the German and edited by George B. Kauffman. Dover, New York, 1968. xvi + 207 pp., illus. Paper, $2.50. Classics of Science, vol. 4.

Clay in Engineering Geology. Jack E. Gillott. Elsevier, New York, 1968. xvi + 296 pp., illus. $21.50.

Clinical Serology. Clois W. Bennett. Thomas, Springfield, Ill., 1968. xiv + 290 pp., illus. $10. Revised second printing.

Collected Works of Count Rumford. Sanborn C. Brown, Ed. Vol. 1, The Nature of Heat. Belknap Press of Harvard University Press, Cambridge, Mass., 1968. xiii + 507 pp., illus. $10.

Comparison and Oscillation Theory of Linear Differential Equations. C. A. Swanson. Academic Press, New York, 1968. viii + 229 pp., illus. $13.50. Mathematics in Science and Engineering, vol. 48.

Comprehensive Biochemistry. Marcel Florkin and Elmer H. Stotz, Eds. Vol. 20, Metabolism of Cyclic Compounds. Elsevier, New York, 1968. xvi + 534 pp., illus. $27.

Comprehensive Revision of a Worldwide Collection of Freshwater Sponges (Porifera: Spongillidae). J. T. Penney and A. A. Racek. Smithsonian Institution Press, Washington, D.C., 1968 (available from the Superintendent of Documents, Washington, D.C.). vi + 186 pp. + 15 plates. Paper, $1.50. U.S. National Museum Bulletin 272.

Computer-Assisted Instruction. Stanford's 1965–66 Arithmetic Program. Patrick Suppes, Max Jerman, and Dow Brian, in collaboration with Diana Axelsen, Guy Groen, Lester Hyman, and Brian Tolliver. Academic Press, New York, 1968. xviii + 385 pp., illus. $7.50.

The Computer in Polymer Science. American Chemical Society Symposium, Atlantic City, N.J., 1967. Jack B. Kinsinger, Ed. Interscience (Wiley), New York, 1968. vi + 198 pp., illus. Paper, $7. *Journal of Polymer Science*, Part C: Polymer Symposia, No. 25.

Computing Methods for Scientists and Engineers. L. Fox and D. F. Mayers. Oxford University Press, New York, 1968. xiv + 258 pp. $6.25. Monographs on Numerical Analysis.

Continuing Education in Action. Residential Centers for Lifelong Learning.

Harold J. Alford, for the W. K. Kellogg Foundation. Wiley, New York, 1968. x + 158 pp., illus. $5.95.

The Digital Differential Analyser. T. R. H. Sizer, Ed. Chapman and Hall, London, 1968 (U.S. distributor, Barnes and Noble, New York). xii + 204 pp., illus. $7.25.

The Diplomatic Persuaders. New Role of the Mass Media in International Relations. John Lee, Ed. Wiley, New York, 1968. xviii + 205 pp. $8.50. Wiley Series on Government and Communication.

Distribution-Free Statistical Tests. James V. Bradley. Prentice-Hall, Englewood Cliffs, N.J., 1968. xii + 388 pp., illus. $11.50.

Dynamical Systems in the Plane. Otomar Hájek. Academic Press, New York, 1968. viii + 236 pp., illus. $9.50.

Economic Development of Tropical Agriculture. Theory, Policy, Strategy, and Organization. A series of seminars, University of Florida, 1966. W. W. McPherson, Ed. University of Florida Press, Gainesville, 1968. xvi + 328 pp., illus. $8.50.

The Economics of the Major Private Universities. William G. Bowen. Carnegie Commission on Higher Education, 1947 Center Street, Berkeley, Calif., 1968. x + 66 pp., illus. Paper, $1.25.

Effective Catalogs. John D. Haughney. Wiley, New York, 1968. xii + 132 pp., illus. $5.95.

The Effects of Sociodramatic Play on Disadvantaged Preschool Children. Sara Smilansky. Wiley, New York, 1968. xii + 164 pp. $7.50.

Einstein on Peace. Otto Nathan and Heinz Norden, Eds. Schocken, New York, 1968. xviii + 708 pp. Paper, $2.95, Reprint of the 1960 edition.

Electron Fractography. A symposium, Boston, June 1967. American Society for Testing and Materials, Philadelphia, 1968. viii + 230 pp., illus. $11; 20 percent discount to members. ASTM Special Technical Publication No. 436.

Electron Paramagnetic Resonance. Techniques and Applications. Raymond S. Alger. Illustrated by Ichiro Hayashi. Interscience (Wiley), New York, 1968. xviii + 580 pp. $15.95.

Elements of Marine Ecology. An Introductory Course. R. V. Tait. Plenum, New York; Butterworths, London, 1968. viii + 272 pp., illus. $12.50.

Encyclopaedia of Cybernetics. Translated from the German edition (Hamburg, 1964) by G. Gilbertson. Manchester University Press, Manchester; Barnes and Nobles, New York, 1968. vii + 214 pp., illus. $9.50.

Encyclopedia of Industrial Chemical Analysis. Foster Dee Snell and Clifford L. Hilton, Eds. Vol. 6, Antifreezes to Benzaldehyde. Interscience (Wiley), New York, 1968. xii + 680 pp., illus. $45; by subscription, $35.

The Encyclopedia of the Chemical Elements. Clifford A. Hampel, Ed. Reinhold, New York, 1968. viii + 849 pp., illus. $27.50.

Eskimo Administration. V. Analysis and Reflections. Diamond Jenness. Arctic Institute of North America, Montreal, 1968. vi + 72 pp. Paper, $4; to members, $3. AINA Technical Paper No. 21.

Essentials of Chemistry in the Labora-

McGraw-Hill, New York, 1968. xiv + 382 pp., illus. $14.50.

Growth and Development of Mammals. Proceedings of the 14th Easter School in Agricultural Science, Nottingham, England, 1967. G. A. Lodge and G. E. Lamming, Eds. Plenum, New York; Butterworths, London, 1968. xii + 528 pp., illus. $32.

Growth of Crystals. Vols. 5A, 5B, 6A and 6B, proceedings of the third Moscow conference, Nov. 1963. N. N. Sheftal', Ed. Translated from the Russian by J. E. S. Bradley and George D. Fulford. Vol. 5A (x + 156 pp., illus. $17.50); vol. 5B (x + 199 pp., illus. $22.50); vol. 6A (x + 182 pp., illus. $20); vol. 6B (x + 193 pp., illus. $20). The set, $72. Consultants Bureau, New York, 1968.

The Individual, Marriage, and the Family. Lloyd Saxton. Wadsworth, Belmont, Calif., 1968. xiv + 516 pp., illus. $8.50.

Indo-Pacific Mollusca. Monographs of the Marine Mollusks of the Tropical Western Pacific and Indian Oceans. Vol. 2. R. Tucker Abbott, Ed. Department of Mollusks, Academy of Natural Sciences of Philadelphia, Philadelphia, 1968. 202 pp., illus. Paper, $14.14.

Information Hungary. Ferenc Erdei, Ed. Pergamon, New York, 1968. xvi + 1144 pp., illus. $30. Countries of the World Information Series, vol. 2.

Insect Resistance in Crop Plants. Reginald H. Painter. University Press of Kansas, Lawrence, 1968. xii + 522 pp., illus. Paper, $4.75. Reprint of the 1951 edition.

Introduction to Human Embryology. James Blake Thomas. Lea and Febiger, Philadelphia, 1968. x + 350 pp., illus. $12.50.

An Introduction to Marine Geology. M. J. Keen. Pergamon, New York, 1968. x + 218 pp., illus. Cloth, $7; paper, $5. Commonwealth and International Library: Geophysics Division.

Introduction to Operations Research. A. Kaufmann and R. Faure. Translated from the French edition (Paris, 1965) by Henry C. Sneyd. Academic Press, New York, 1968. xiv + 304 pp., illus. $14.50.

An Introduction to Physical Electronics. A. H. W. Beck and H. Ahmed. Elsevier, New York, 1968. xvi + 360 pp., illus. $11.75.

An Introduction to the Philosophy of Science. D. W. Theobald. Methuen, London, 1968 (U.S. distributor, Barnes and Noble, New York). xiv + 146 pp. Cloth, $5; paper, $1.75.

Laboratory Manual for Food Microbiology. W. C. Frazier, E. H. Marth, and R. H. Deibel. Burgess, Minneapolis, ed. 4, 1968. viii + 124 pp. Spiral bound, $4.

Landforms of Australia. Vincent Serventy. Elsevier, New York, 1968. 132 pp., illus. $7.50.

Large Scale Provisioning Systems. Proceedings of a conference, Athens, 1967. J. Ferrier, Ed. Elsevier, New York, 1968. x + 534 pp., illus. $22.50.

Lessons on Rings, Modules, and Multiplicities. D. G. Northcott. Cambridge University Press, New York, 1968. xiv + 444 pp. $14.50.

Light and Sound for Engineers. R. C. Stanley. Hart, New York, 1968. viii + 344 pp., illus. $12.

Light, Colour and Vision. Yves Le Grand. Second English edition, translated from the French by R. W. G. Hunt, J. W. T. Walsh, and F. R. W. Hunt. Chapman and Hall, London, 1968 (U.S. distributor, Barnes and Noble, New York). xiv + 566 pp., illus. $11.25.

Membrane Models and the Formation of Biological Membranes. Proceedings of a conference (NATO Advanced Study Institute), Frascati, Italy, 1967. Liana Bolis and B. A. Pethica, Eds. North-Holland, Amsterdam; Interscience (Wiley), New York, 1968. xvi + 340 pp., illus. $14.75.

Mendel Centenary. Genetics, Development and Evolution. Proceedings of a symposium, Washington, D.C., 1965. Roland M. Nardone, Ed. Catholic University of America Press, Washington, D.C., 1968. vi + 174 pp., illus. Cloth, $6.50; paper, $3.95.

Methods in Computational Physics. Advances in Research and Applications. Berni Alder, Sidney Fernbach, and Manuel Rotenberg, Eds. Vol. 8, Energy Bands of Solids. Academic Press, New York, 1968. xvi + 304 pp., illus. $16.

Methods of Science. A Laboratory Manual for the Physical Science Course. Robert Ray Haun. Brown, Dubuque, Iowa, ed. 4, 1967. xii + 336 pp., illus. $5.75.

Microstructures of Surfaces. Using Interferometry. S. Tolansky. Elsevier, New York, 1968. vi + 66 pp., illus. $8.

Migmatites and the Origin of Granitic Rocks. K. R. Mehnert. Elsevier, New York, 1968. x + 393 pp., illus. $26.

Miscellaneous ASTM Standards for Petroleum Products. Methods of Testing Specifications Definitions. American Society for Testing and Materials, Philadelphia, ed. 8, 1968. xviii + 960 pp., illus. $16; 20 percent discount to members.

Modern Genetics. Vol. 3. J. A. Serra. Academic Press, New York, 1968. xii + 793 pp., illus.

Modern Materials. Advances in Development and Applications. Vol. 6. Bruce W. Gonser, Ed. Academic Press, New York, 1968. xvi + 382 pp., illus. $18.

Mysteries of the Solar System. R. A. Lyttleton. Clarendon (Oxford University Press), New York, 1968. x + 261 pp., illus. $7.

The Nature of Solids. Alan Holden. Columbia University Press, New York, 1968. x + 244 pp., illus. Paper, $2.75. Reprint of the 1965 edition.

Neuroscience Research. Vol. 1. S. Ephrenpreis and Othmar C. Solnitzky, Eds. Academic Press, New York, 1968. xii + 372 pp., illus. $17.50.

The New Brahmins. Scientific Life in America. Spencer Klaw. Morrow, New York, 1968. xiv + 315 pp. $6.50.

A New Dictionary of Chemistry. L. Mackenzie Miall and D. W. A. Sharp, Eds. Wiley, New York, ed. 4, 1968. x + 638 pp., illus. $14.

New Think. The Use of Lateral Thinking in the Generation of New Ideas. Edward de Bono. Basic Books, New York, 1968. x + 156 pp., illus. $5.95.

The New Universe. Bernard Lovell. Rand McNally, New York, 1968. 128 pp., illus. $8.95.

The New Utopians. A Study of System Design and Social Change. Robert Boguslaw. Prentice-Hall, Englewood Cliffs, N.J.,

1968. x + 214 pp., illus. Paper, $2.45. Reprint of the 1965 edition.

Nondestructive Testing of Nuclear Graphite. A symposium, Boston, June 1967. American Society for Testing and Materials, Philadelphia, 1968. vi + 108 pp., illus. Paper, $8; 20 percent discount to members. ASTM Special Technical Publication No. 439.

Nuclear Proliferation. Walter B. Wentz. Public Affairs Press, Washington, D.C., 1968. viii + 216 pp. $6.

Nucleus and Cytoplasm. Henry Harris. Clarendon (Oxford University Press), New York, 1968. xvi + 142 pp., illus. $7.

Observation in Modern Astronomy. David S. Evans. Elsevier, New York, 1968. xiv + 274 pp., illus., + plates. $14.

Paradoxes in the Theory of Relativity. Yakov P. Terletskii. Translated, with revisions by author, from the Russian edition (Moscow, 1966). Plenum, New York, 1968. xii + 120 pp., illus.

Paraffins. Chemistry and Technology. F. Asinger. Translated from the German edition (Berlin, 1962), with revisions by the author, by B. J. Hazzard. H. M. E. Steiner, Ed. Pergamon, New York, 1968. xxiv + 896 pp., illus. $25.

Particles and Fields. David Lurié. Interscience (Wiley), New York, 1968. xii + 508 pp., illus. $15.

Peptides and Proteins. D. T. Elmore. Cambridge University Press, New York, 1968. xii + 154 pp., illus. Cloth, $6; paper, $2.75. Cambridge Chemistry Texts.

The Person in the Womb. N. J. Berrill. Dodd, Mead, New York, 1968. xii + 179 pp. $5.

Philosophy of Science. A Formal Approach. Henry E. Kyburg, Jr. Macmillan, New York; Collier-Macmillan, London, 1968. xiv + 336 pp., illus. $7.95.

Photoluminescence of Solutions. With Applications to Photochemistry and Analytical Chemistry. C. A. Parker. Elsevier, New York, 1968. xvi + 544 pp., illus. $30.

Physical Properties of Graphite. W. N. Reynolds. Elsevier, New York, 1968. xii + 194 pp., illus. $11. Elsevier Materials Science Series.

Physical Properties of Steroid Conjugates. Seymour Bernstein, John P. Dusza, and Joseph P. Joseph. Springer-Verlag, New York, 1968. xii + 212 pp., illus. $12.

Physics Literature. A Reference Manual. Robert H. Whitford. Scarecrow, Metuchen, N.J., ed. 2, 1968. 272 pp. $8.50.

Physics of Negative Viscosity Phenomena. Victor P. Starr. McGraw-Hill, New York, 1968. xvi + 256 pp., illus. $9.95. Earth and Planetary Science Series.

Physiology and Pathology of Membrane Digestion. Aleksandr M. Ugolev. Translated from the Russian edition (Leningrad, 1967) by Jacob A. Stekol. Plenum, New York, 1968. xvi + 226 pp., illus. $10.

The Political Theory of John Dewey. A. H. Somjee. Teachers College Press, Columbia University, New York, 1968. xvi + 208 pp. $7.50.

Polymer Chemistry of Synthetic Elastomers. Part 1. Joseph P. Kennedy and Erik G. M. Törnqvist, Eds. Interscience (Wiley), New York, 1968. xiv + 490 pp., illus. $25. High Polymers, vol. 23.

Practical Heterocyclic Chemistry. A. O.

Fitton and R. K. Smalley. Academic Press, New York, 1968. xx + 146 pp., illus.

The Prehistory of Nubia. Final reports on research conducted by the Combined Prehistoric Expedition to Nubia. Fred Wendorf, Ed. Fort Burgwin Research Center and Southern Methodist University Press, Dallas, Texas, 1968. 2 vols., xiv + 1084 pp., illus., 38 loose figures and tables, boxed. $37.50.

Proceedings of the Symposium on Groundwater Hydrology. San Francisco, 1967. Miguel A. Mariño, Ed. American Water Resources Association, Urbana, Ill., 1967. 356 pp. Paper, $6.50. Proceedings Series No. 4.

Proceedings of the Third Annual American Water Resources Conference. San Francisco, 1967. Martha N. Francisco, Ed. American Water Resources Association, Urbana, Ill., 1967. 670 pp., illus. Paper; to members, $5.50; to nonmembers, $6.50. AWRA Proceedings Series, No. 3.

Proceedings of 23rd National Conference, Association for Computing Machinery, 1968. Brandon/Systems, Princeton, N.J., 1968. xviii + 834 pp., illus. $25.

Progress, Coexistence, and Intellectual Freedom. Andrei D. Sakharov. Translated from the Russian by the New York *Times*. Harrison E. Salisbury, Ed. Norton, New York, 1968. 160 pp. $3.95.

Progress in Inorganic Chemistry. Vol. 10. F. Albert Cotton, Ed. Interscience (Wiley), New York, 1968. vi + 522 pp., illus. $17.50.

Psychoanalysis and American Medicine: 1894–1918. Medicine, Science, and Culture. John Chynoweth Burnham. International Universities Press, New York, 1967. vi + 250 pp. Paper, $5. Psychological Issues, Vol. 5, No. 4.

Psychology. A Concise Introduction to the Fundamentals of Behavior. Charles W. Telford and James M. Sawrey. Brooks/Cole, Belmont, Calif., 1968. xviii + 438 pp., illus.

Quantum Mechanics. An Introduction. Herbert L. Strauss. Prentice-Hall, Englewood Cliffs, N.J., 1968. xvi + 192 pp., illus. $7.95. Fundamental Topics in Physical Chemistry.

The Quest for Arthur's Britain. Geoffrey Ashe, Ed. Praeger, New York, 1968. xii + 284 pp., illus. $12.50.

Race, Culture, and Evolution. Essays in the History of Anthropology. George W. Stocking, Jr. Free Press, New York; Collier-Macmillan, London, 1968. xx + 380 pp. $10.

Radar Detection. J. V. DiFranco and W. L. Rubin. Prentice-Hall, Englewood Cliffs, N.J., 1968. xvi + 654 pp., illus. $18.95. Prentice-Hall Electrical Engineering Series.

Radioisotopes in Medicine: In Vitro Studies. Proceedings of a Symposium, Oak Ridge, Tenn., Nov. 1967. Raymond L. Hayes, Francis A. Goswitz, Beverley E. Pearson Murphy, and Elizabeth B. Anderson, Eds. U.S. Atomic Energy Commission, Washington, D.C., 1968 (available as CONF-671111 from Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). xiv + 753 pp., illus. Paper, $3. AEC Symposium Series No. 13.

Radiometric Dating for Geologists. E. I. Hamilton and R. M. Farquhar, Eds. Inter-

science (Wiley), New York, 1968. viii + 508 pp., illus. $19.50.

R & D and Small-Company Growth. A Statistical Review and Company Case Studies. William J. J. Smith and Daniel Creamer. National Industrial Conference Board, New York, 1968. xii + 164 pp. Paper, $3. Studies in Business Economics, No. 102.

The Range of Choice in Water Management. A Study of Dissolved Oxygen in the Potomac Estuary. Robert K. Davis. With contributions by Robert M. Steinberg, Leo J. Hetling, and Nicholas C. Matalas. Published for Resources for the Future by Johns Hopkins Press, Baltimore, 1968. xviii + 206 pp., illus. $7.

Rapid Excavation. Significance, Needs, Opportunities. National Academy of Sciences, Washington, D.C., 1968. x + 54 pp., illus. Paper, $2.50. NAS Publication No. 1690.

Readings in Mathematical Social Science. Paul F. Lazarsfeld and Neil W. Henry, Eds. M.I.T. Press, Cambridge, Mass., 1968. viii + 371 pp., illus. Paper, $3.45. Reprint of the 1966 edition.

Recent Advances in Phytochemistry. Vol. 1. Proceedings of the 6th annual symposium of the Phytochemical Society of North America, Austin, Texas, April 1966. T. J. Mabry, R. E. Alston, and V. C. Runeckles, Eds. Appleton-Century-Crofts, New York, 1968. xiv + 437 pp., illus. $16.50.

Recent Aspects of Nitrogen Metabolism in Plants. Proceedings of a symposium, Bristol, England, 1967. E. J. Hewitt and C. V. Cutting, Eds. Academic Press, New York, 1968. xviii + 280 pp., illus. $11.50.

The Regulation of Behaviour. E. A. Lunzer. Elsevier, New York, 1968. xx + 392 pp., illus. $10.50. Development in Learning, vol. 1.

Relationships in the Charadrii (Shorebirds). A Taxonomic Study Based on Color Patterns of the Downy Young. Joseph R. Jehl, Jr. San Diego Society of Natural History, San Diego, Calif., 1968. 56 pp., illus. Paper, $3.50. SDSNH Memoir No. 3.

Relativity and Cosmology. H. P. Robertson and Thomas W. Noonan. Saunders, Philadelphia, 1968. xxxiv + 460 pp., illus. $16.50. Saunders Physics Books.

Reports on Progress in Physics. Vol. 31 (1968), part 1. C. I. Pedersen and R. A. Cook, Eds. Published by the Institute of Physics and the Physical Society, London, 1968. iv + 420 pp., illus. £5 15s; to members, £2 2s.

Rheology of the Circulation. R. L. Whitmore. Pergamon, New York, 1968. xii + 196 pp., illus. $9.

Rock Mechanics in Engineering Practice. K. G. Stagg and O. C. Zienkiewicz, Eds. Wiley, New York, 1968. xiv + 442 pp., illus. $14.50.

Routine Surveillance for Radionuclides in Air and Water. World Health Organization, Geneva, 1968 (U.S. distributor, American Public Health Association, New York). 64 pp., illus. Paper, $2.75.

The Schoolhouse in the City. A conference, Stanford, Calif., 1967. Alvin Toffler, Ed. Published in cooperation with Educational Facilities Laboratories by Praeger, New York, 1968. viii + 256 pp., illus. Cloth, $5.95; paper, $2.50.

Science for Better Living. The Yearbook of Agriculture, 1968. U.S. Department of