SCIENCE

8 February 1963

Vol. 139, No. 3554

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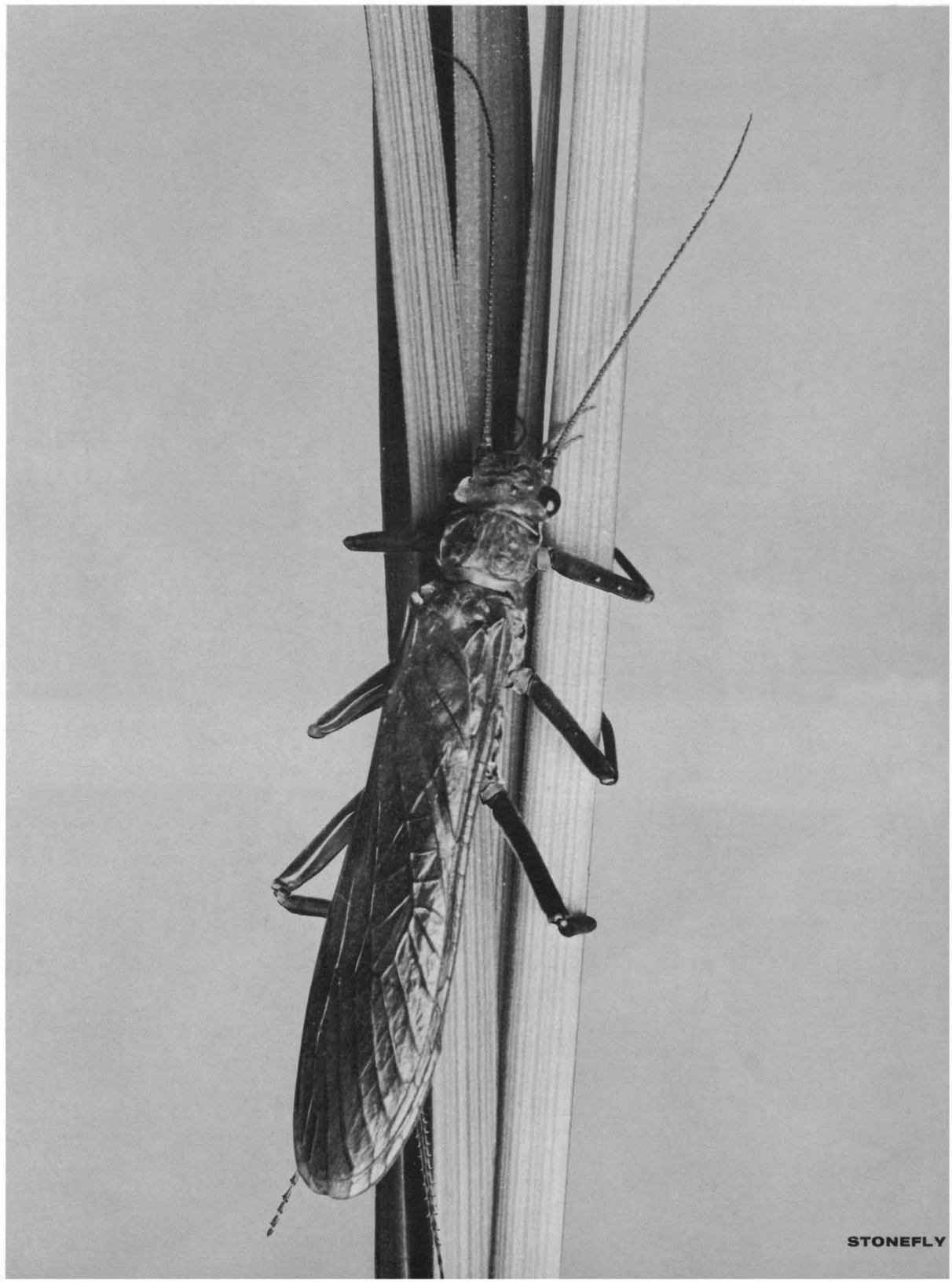

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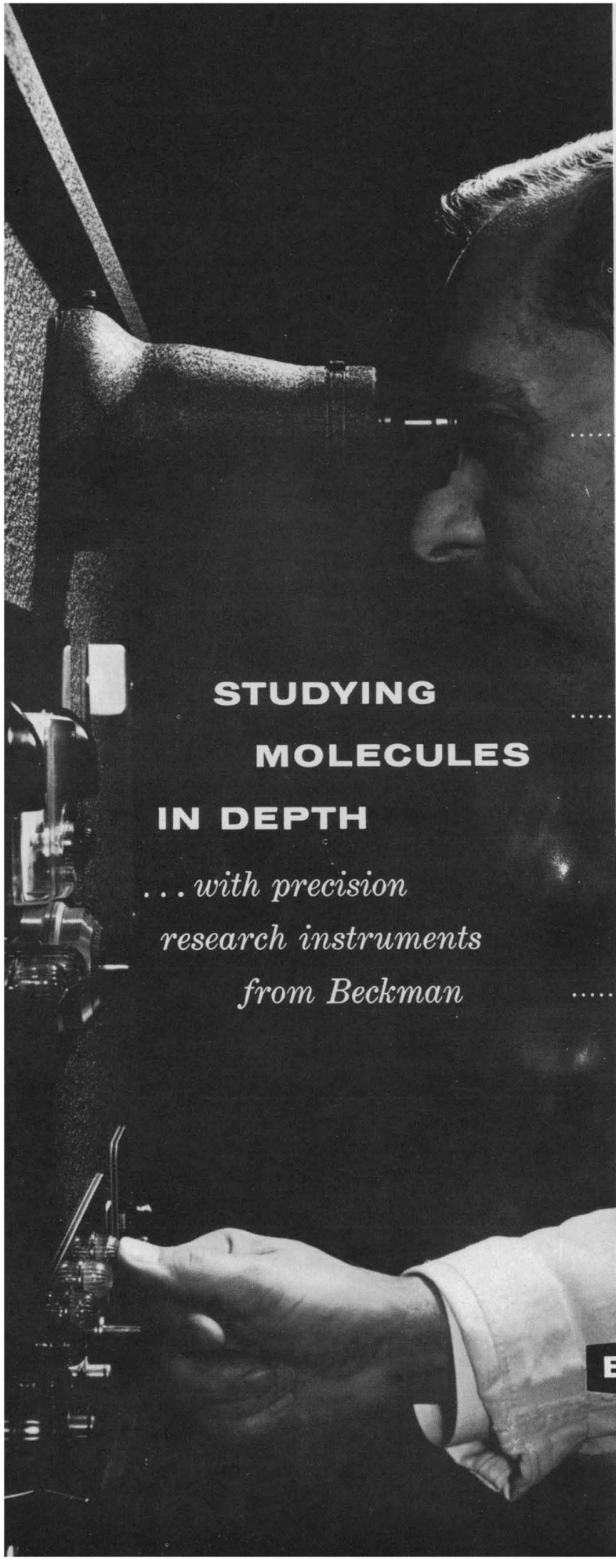

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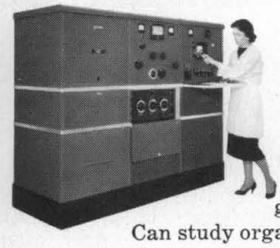

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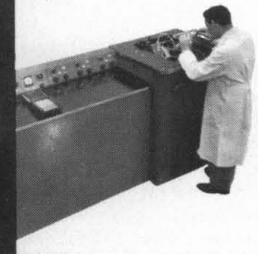

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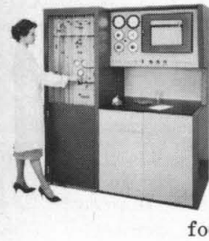

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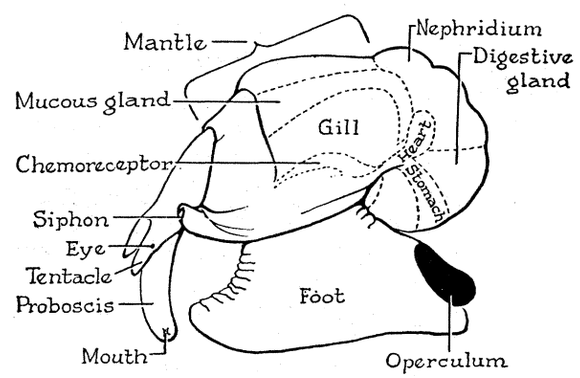

Figure 14.5. (A) Anatomy of Buscycon Canaliculatum—left side, showing external organs and internal organs visible through the integument.

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By ROBERT D. BARNES, Ph.D., Associate Professor of Biology, Gettysburg College, Pennsylvania. About 630 pages, 6" x 9¼", with about 436 illustrations. About $10.00. *New!—Just Ready!*

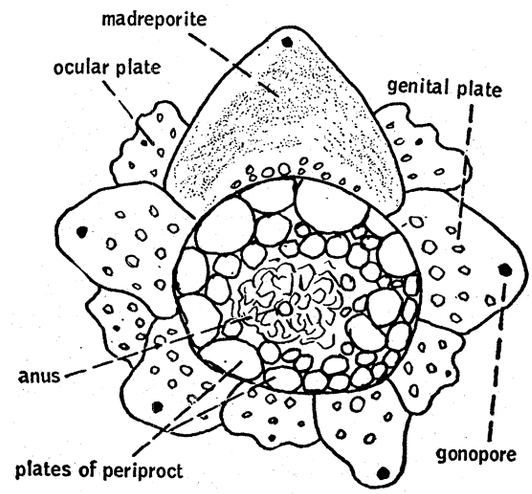

Figure 19-14. Periproct and Surround plates of the regular urchin, Strongylocentrotus.

Gladly Sent to Teachers on Approval

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Vol. 139, No. 3554

SCIENCE

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COVER

An adult stonefly (Plecoptera) recently emerged from the water is shown sitting on a grass blade. Its position is typical of the manner in which these insects cling to the blade. Stoneflies seldom travel far from the bodies of water in which they breed. Although they possess good wings, they are poor fliers and are slow to take off when they are disturbed. A report on an undescribed species of the genus *Capnia* appears on page 484 [E. S. Ross, California Academy of Sciences

News from Bell Telephone Laboratories

WE'RE "FINGERPRINTING" VOICES...TO FIND BETTER WAYS OF TRANSMITTING THEM

Acoustics scientists at Bell Telephone Laboratories study voices to learn how one voice differs from all others, what makes yours instantly recognizable to friends and family, and what the elements of a voice are that give it the elusive qualities of "naturalness."

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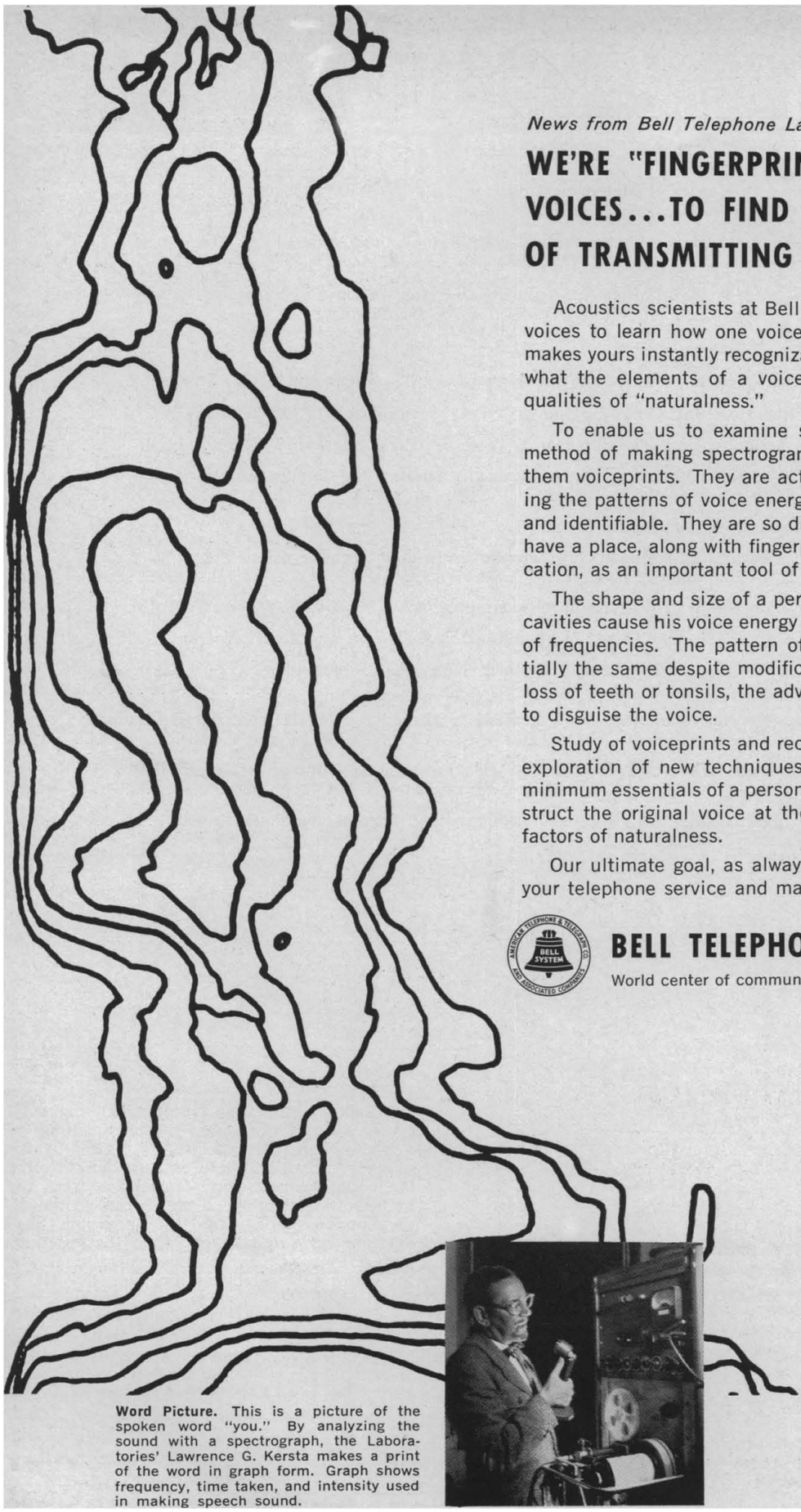
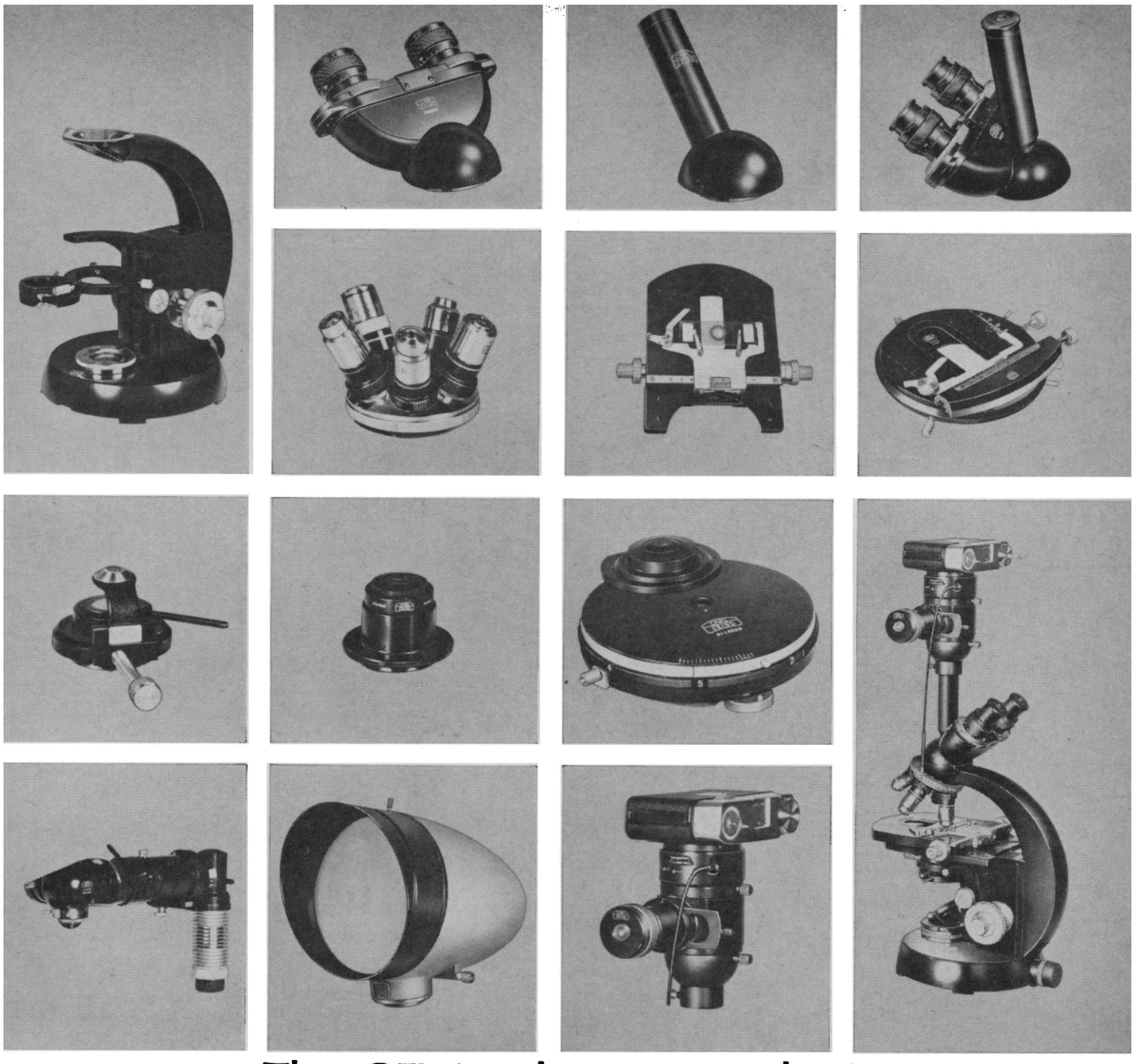


Word Picture. This is a picture of the spoken word "you." By analyzing the sound with a spectrograph, the Laboratories' Lawrence G. Kersta makes a print of the word in graph form. Graph shows frequency, time taken, and intensity used in making speech sound.



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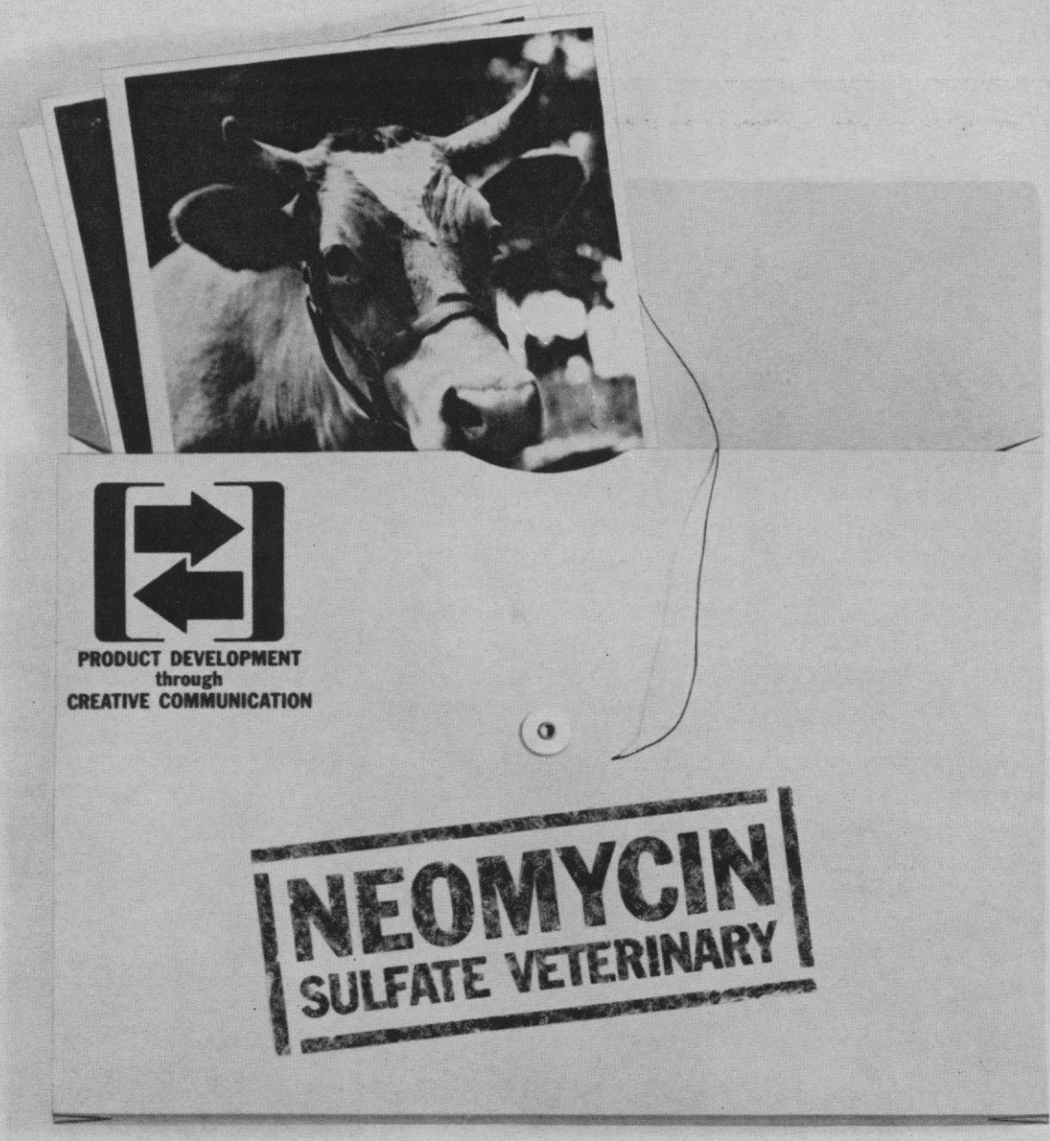

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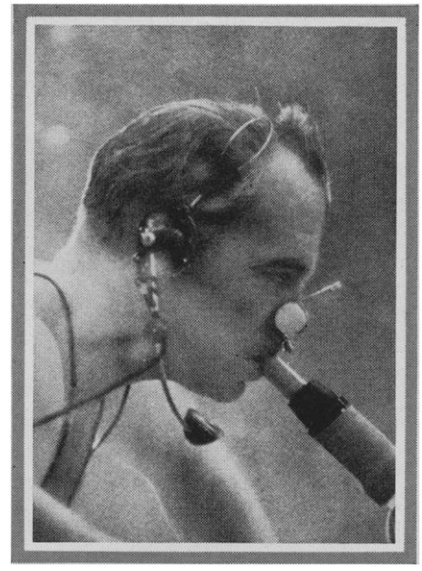
SOFTWARE

The hardware for space travel is coming along nicely. The software for space travel is people, about whom a great many issues are clear and some are not. Clear: a man can survive a few hours out there. (Nikolayev, 96½ hours, no known after-effects.) To be determined: can a man survive in space for weeks, or months? (On a round-trip to the moon, for example. Or in an orbiting space station.)

The most versatile and valuable component of any space system is man. His welfare out there is going to depend (in part) on the environment inside his vehicle. And the composition and pressure of that environment will depend on engineering requirements: weight, power, reliability. Suppose a pure oxygen, low-pressure environment were selected. How would our Astronauts function during a two-week mission?

NASA needs to know. They assigned us to find out. We're doing it right now.

The theory is simple enough. The procedure is not. It starts with our Environmental Test Chamber, a steel cylinder 30′ x 18′ in which we can produce various combinations of temperature, pressure, humidity, vibration and atmospheric composition. Inside, in groups of 6, go healthy young men to breathe pure oxygen for two weeks. For each group the pressure is changed. Pure oxygen at 5 psi for the first group, 7.4 psi for



the second and 3.8 psi for the third. A fourth group, breathing air at 14.7 psi, serves as control.

Outside the chamber are specialists in aerospace medicine, physiology, psychology, microbiology, biochemistry and environmental testing. During each two-week period this team performs 683 specific tests on each man (mental, sensory, motor, pulmonary, hematological and microbiological.) The group is assisted by instruments (polygraphs, oscillographs and the like) that automatically monitor and record each subject's reactions.

Probably the most significant oxygen pressure in the test program is 5 psi. That's the environment currently used for Project Mercury. It is also under consideration for Project Gemini, a planned two-week orbit for two Astronauts. Long before they go up, the "unknowns" of living in an oxygen environment will have become knowns. And the hazards thereof, if any, will have been pinned down, studied and eliminated.

This research, supported by NASA, is being carried on in our Space Environment and Life Sciences Laboratory, to determine the effects of space travel upon the software as well as the hardware.

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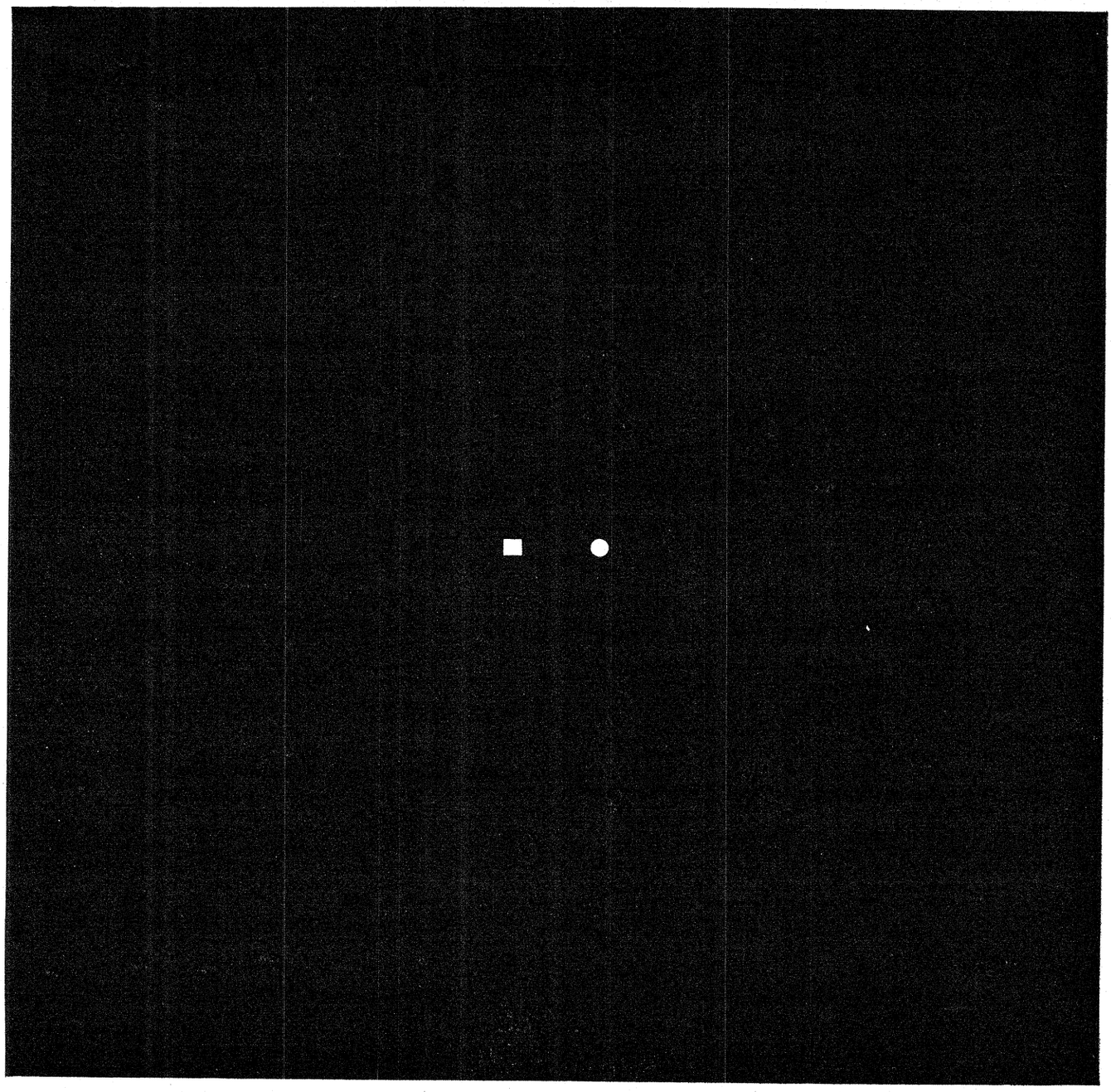

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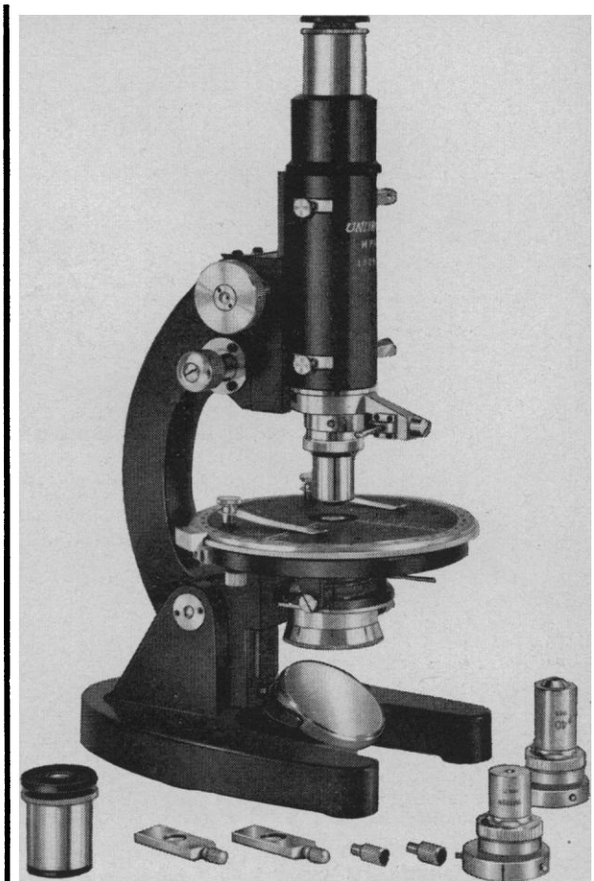

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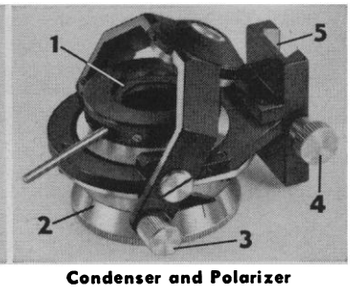

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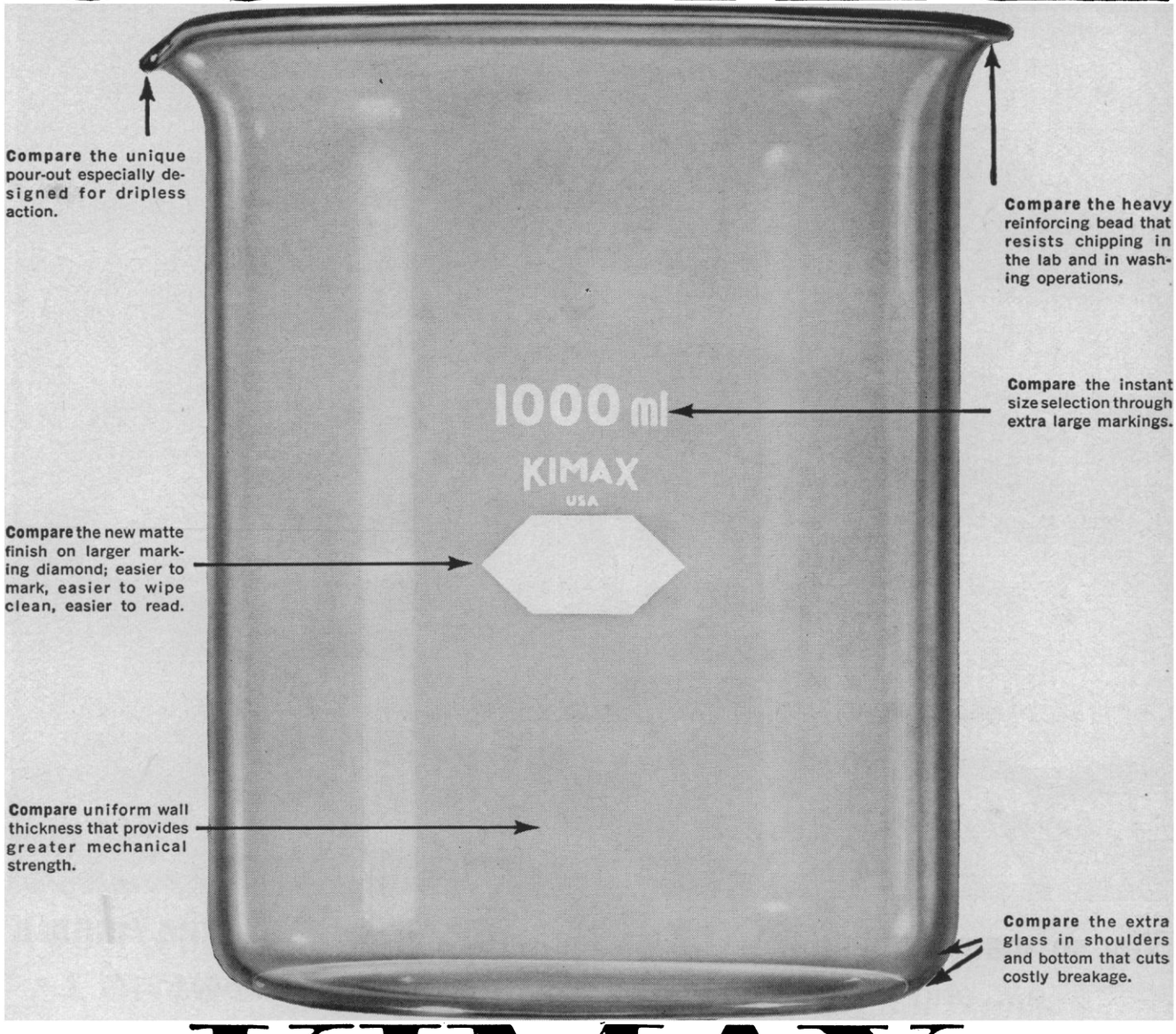

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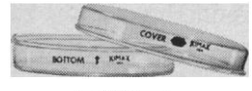

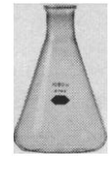

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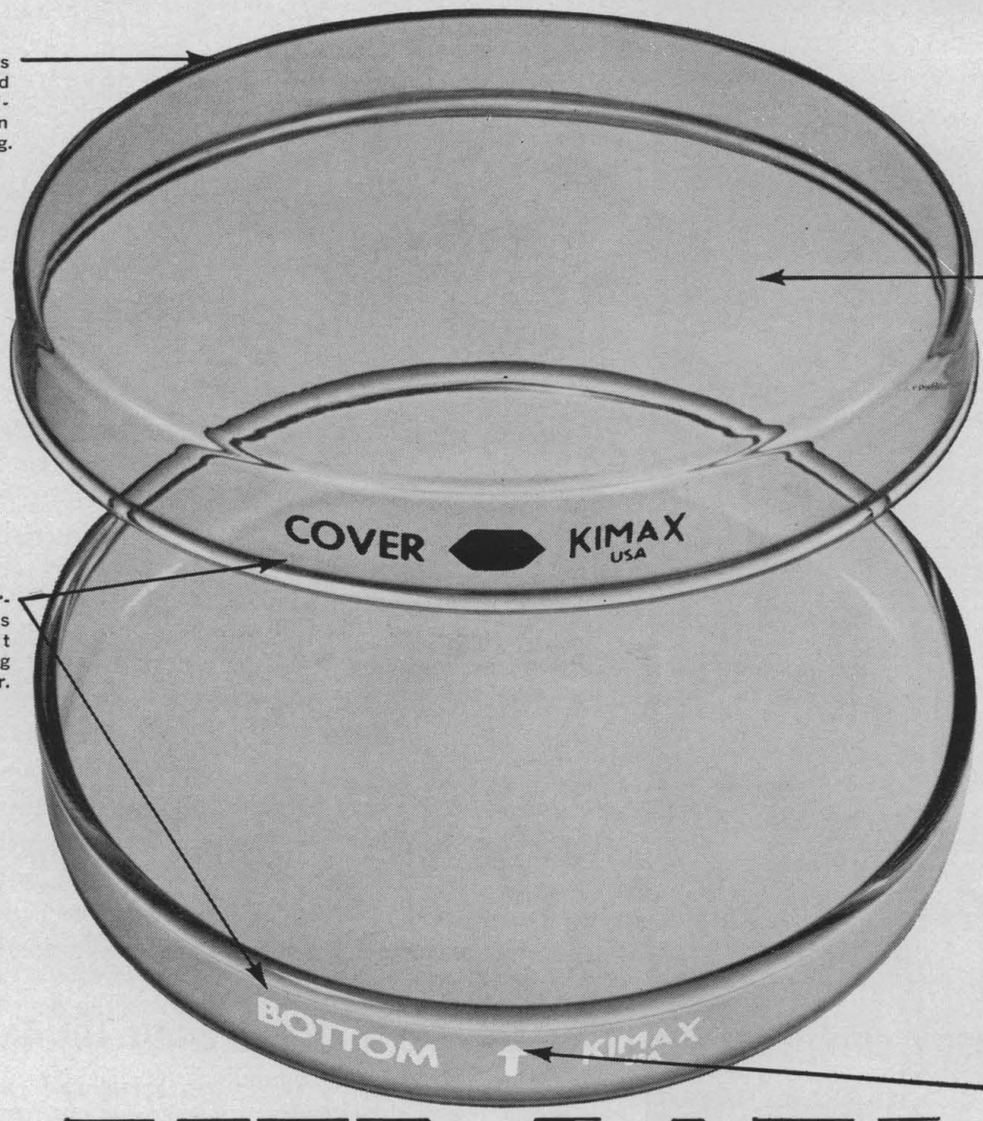

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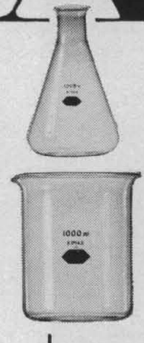

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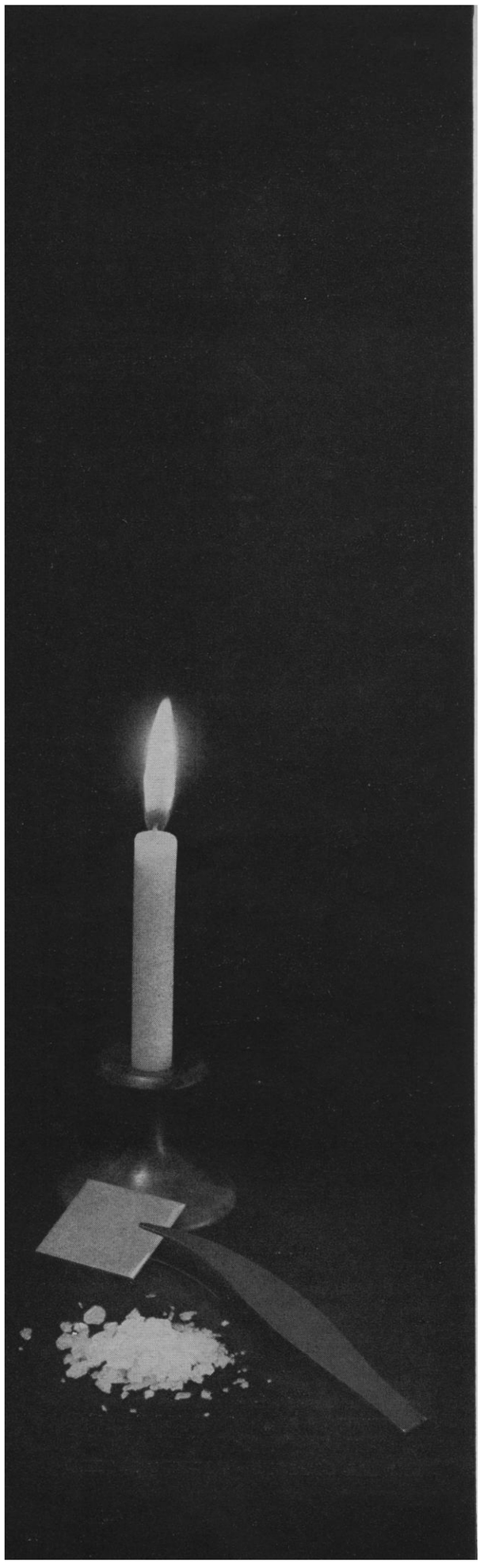

One of a series briefly describing GM's research in depth

Breakthrough in Ferroelectrics

The spirit of science is tentative, experimental, skeptical. Thus we have been cautioned by our research colleagues here at the Laboratories of the naiveté of pinning a "breakthrough" label on a discovery they made in ferroelectric materials. We're not convinced.

Ferroelectrics have remained on the scientist's workshelf as curious crystal analogs of ferromagnetic materials . . . as intriguing insulators whose dielectric "constant" isn't, but varies with changes in electric field intensity much in the hysteresis loop fashion of magnetic materials.

Recently, two members of our research staff reported they had observed ferroelectric behavior *at room temperature* in a polycrystalline form of ordinary saltpeter. Furthermore, this ferroelectric phase in potassium nitrate has nearly ideal electrical characteristics. Apparent true coercivity. Dielectric hysteresis loops that are really square (ratios of 600:1 and more). Here then is an inexpensive, easily prepared material that may perform the much sought after memory and switching functions in capacitive circuits—functions similar to those handled by their ferromagnetic brethren in inductive circuits.

This discovery is expected to stimulate the development of practical, compact electronic devices of interest to the computer, control, and communication sciences. It is only one of the avenues of science and engineering being opened by GM's research in depth.

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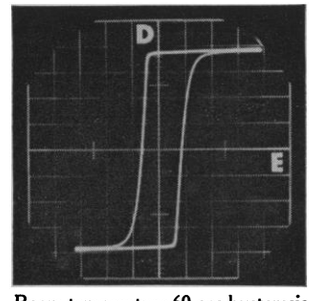
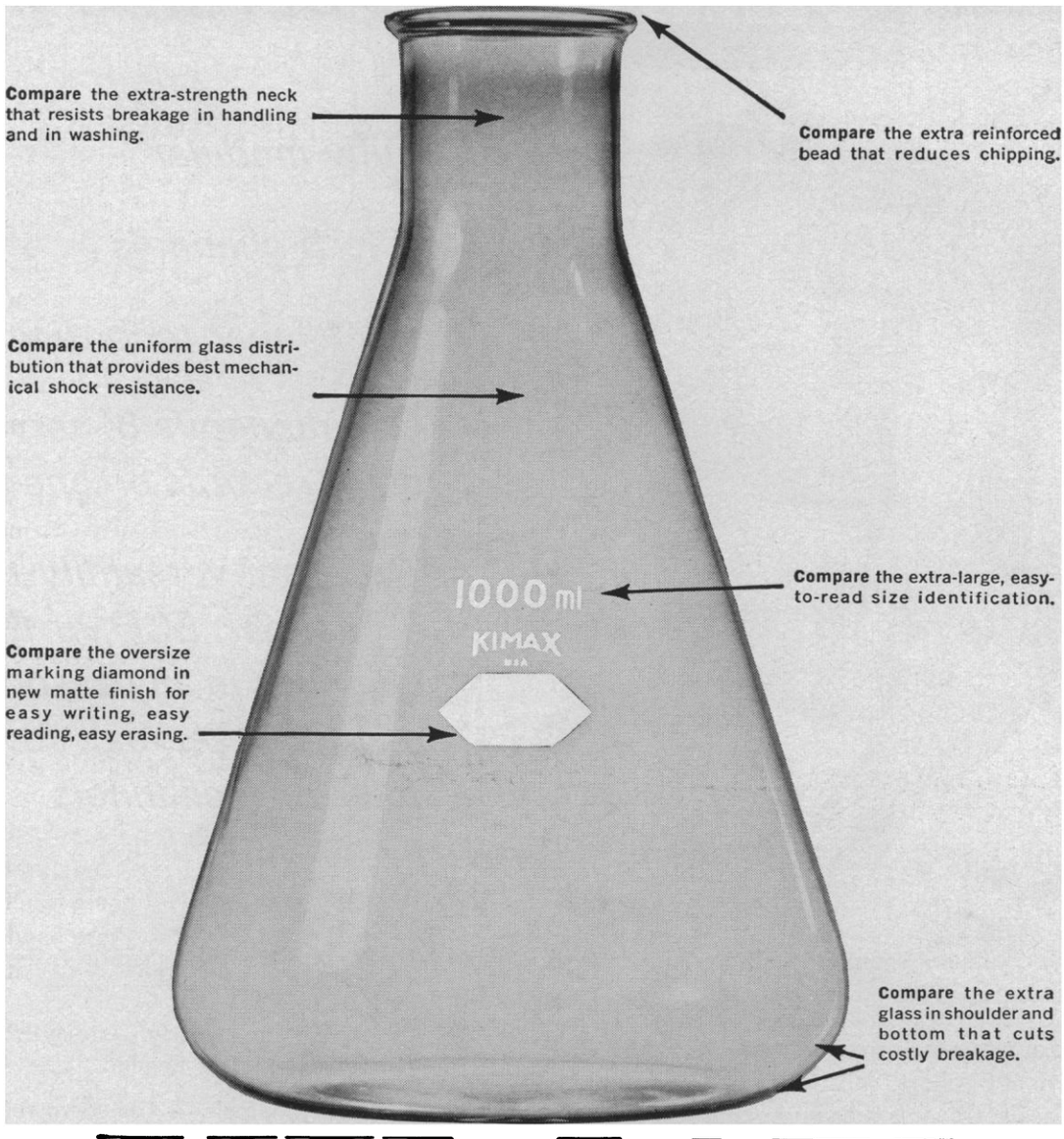


Room temperature 60-cps hysteresis loop (above) of KNO_3 melted on copper substrate with the simplest of tools (left).

COMPARE



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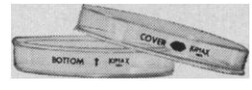

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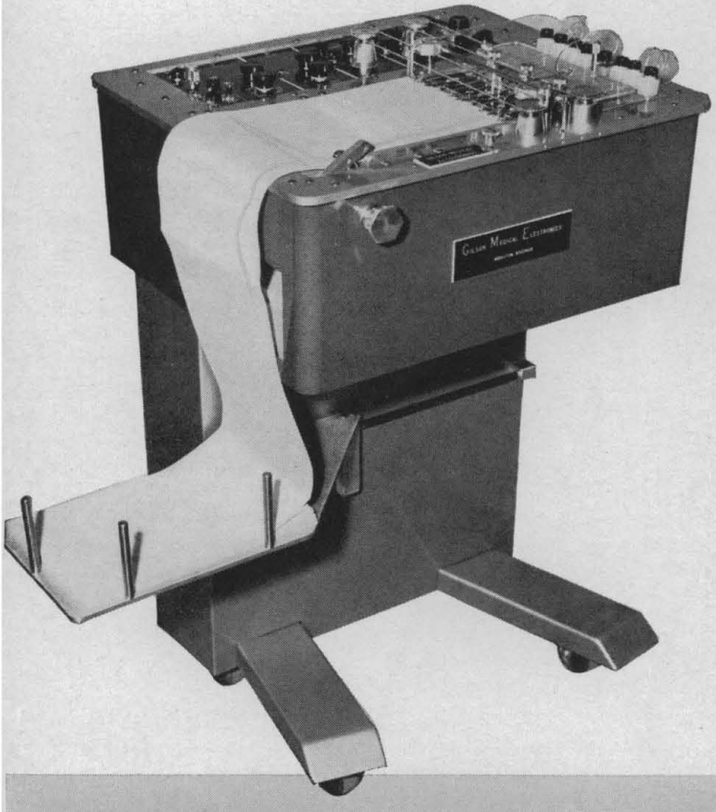

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- *Compact versatility—up to 4 chopper, ECG, or EEG channels in any assortment —up to 2 servos...for a total of 5 channels*

- Each channel a complete, self-contained interchangeable unit
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On Madison's West Beltline Highway

8 February 1963, Volume 139, Number 3554 **SCIENCE**

Biologists' Choice

On 26 January the Governing Board of the American Institute of Biological Sciences voted unanimously to repay in full the AIBS debt to the National Science Foundation (*Science*, 25 Jan. 1963, p. 317, and 1 Feb. 1963, p. 392). They hope to make a first payment of $100,000 very soon and to clear the rest of the debt in three annual installments. The proposal is an honorable one; we hope that the responsible authorities on the federal government side will accept it.

Now AIBS must raise the money, and raising it will require support from many biologists. This may be difficult, for most biologists have no reason to feel personally responsible for the AIBS's difficulties, and to many of them AIBS is a somewhat remote organization. Their immediate loyalty is to a more specialized society which is only one of many that make up the federation that is AIBS. But AIBS has been of service to biologists generally, through the Biological Sciences Curriculum Study, through the arrangement of meetings and conferences, in managing a portion of the National Roster, in representing the interests of biologists in Washington, and in a variety of other ways. AIBS can continue to provide such services only if biologists in large numbers are willing to support it.

The Governing Board plan involves three elements. A substantial portion—perhaps equal to the first payment of $100,000—can be expected from royalties or advances against royalties from the AIBS Film Series. Gifts and long-term, no-interest loans will be sought from individual biologists and other sources. And AIBS will start a strong drive to recruit individual members at $10 a year. Through these means, the Governing Board hopes not only to repay the debt to NSF but also to build up an operating fund to enable the organization to avoid in the future the kind of deficit financing and use of grant funds that got it into its present difficulties (see page 472).

If biologists come forward quickly with gifts, loans, and pledges of annual dues to AIBS, they will save AIBS; provide it with capital to allow it to go forward as a useful federation of biological societies; justify the faith the federal government has shown in withholding the severe measures that might have been imposed; and give new encouragement to the general policy on which most federal fund-granting agencies have worked—that of trusting a grantee instead of constantly policing him.

In contrast, if the Governing Board proposal is not sustained, AIBS will be bankrupt and will probably disappear; biologists will have disavowed responsibility for the past actions of their federation and the leadership of the Governing Board in attempting to resolve the difficulties; science in general and biology in particular will suffer a general loss of esteem; and the federal government will have been given an open invitation to replace the policy of trust in the grantee with one of rigid rules, red tape, and policing.

The issue that now faces biologists is whether to support the program advanced by the Governing Board or to fail to support it, and by this decision to endorse the consequences of one or the other course.—D.W.

Keyed to the needs of researchers in such diversified studies as Agricultural Chemistry, Biology, Geochemistry, Metallurgical and Historical Research, Organic Chemistry and Process Controls, the all-new TMC Activation Analysis Package offers the *first integrated system* for gamma radiation analysis.

Detection and measurement of trace amounts in samples is not only economical (a complete Ellison-TMC System for activation analysis costs less than most neutron guns alone), it is also time saving, and accurate to definitions as fine as one part in 1,000,000.

The Ellison Activatron-110 is available immediately from TMC, and priced as stated above. Depending on your application, TMC instrumentation for analysis can be tailored to your needs at equally modest cost. A TMC REPRESENTATIVE IS AS AVAILABLE AS YOUR PHONE. Call, wire or write for further information.

*Due to export and shipping, prices slightly higher overseas.

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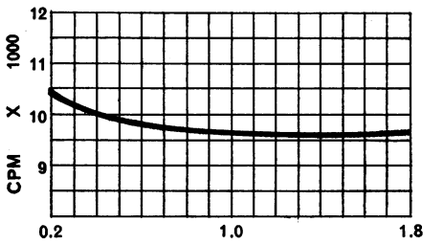
How to hold counting efficiency constant for gamma emitting samples of different volumes

Tobor's counting chamber eliminates the need to bring samples to a standard volume in order to maintain constant counting efficiency.

Tobor features a detection system with two vertically opposed, large-crystal scintillation detectors that compensate for a wide range of volume variation in samples of similar diameter. Because the pulses from each detector are summed, the count rate remains constant when a source is positioned at different points on the vertical axis between the two detectors. As a result, the total count rate of each sample can be directly compared to the count rate of a standard, measured in the same size beaker, permitting fast determination of uptake percentage.



Increasing sample volume, ml X 1000

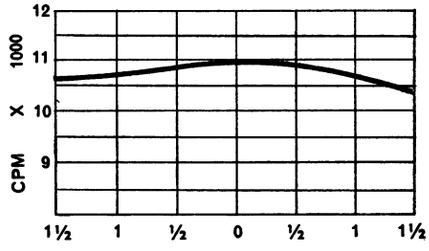
This chart illustrates Tobor's ability to maintain uniform counting efficiency over a wide range of sample volumes. The volume increase was accomplished by successive addition of water, in small increments, to original 200 ml sample. The counting errors associated with even the smallest variations in sample size and geometry are minimized.

How to perform gamma measurements in animals as large as monkeys or rabbits

Tobor's large capacity counting chamber will handle any animal, large or small, that can be placed in a cage or container seven inches in diameter and five inches high.

Minor variations in geometry caused by movement of the animal within the chamber have little or no effect on count rate reproducibility because Tobor can be fitted with scintillation crystals up to seven inches in diameter. Tobor normally uses three-inch by three-inch sodium iodide crystals. These crystals deliver maximum resolution and E^2/B (22% efficiency in a 10% Cs-137 window with 9% resolution and a background of less than 60 cpm).

Where good geometry for large area samples is desired at minimum cost, plastic scintillators up to seven inches in diameter can be specified. Maximum integral efficiency (50 kev to ∞) for two plastic crystals is 26%, with a background of only 1200 cpm. Resolution for ½ width of the Cs-137 Compton edge peak is 20% to 24%.



Horizontal movement of sample with respect to line through crystal centers, inches left and right

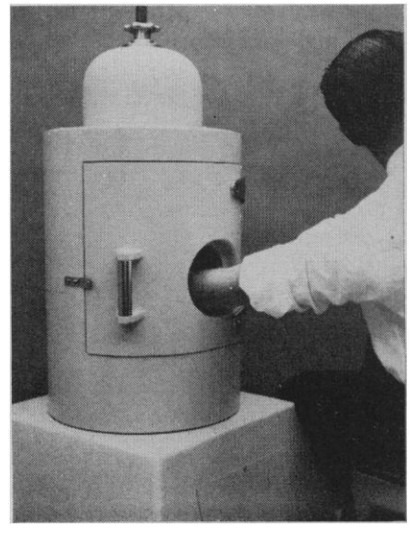
Tobor minimizes the need for precise positioning of the sample as shown in the chart above. Note the small change in count rate as the sample is shifted horizontally in the detecting chamber (three-inch by three-inch sodium iodide crystals).

How to assay gamma radioactivity circulating in the blood stream of the human arm

The patient's arm is positioned through the two horizontally opposed access ports in Tobor's detecting chamber. Continuous or repeated measurements are made without venapuncture. Tobor's large diameter crystals and optimum counting geometry insure reproducible results with minimum counting time.

Tobor's detecting chamber allows any part of the forearm, from wrist to elbow, to be counted with equal efficiency. Patients will experience no discomfort in placing an arm or leg in Tobor because of the convenient access ports in the chamber and the remote location of the electronics.

If you have a gamma counting problem that Tobor may be able to solve, please write or phone for more details.



Two six-inch diameter plugs can be removed from Tobor's detecting chamber to permit in-vivo measurement of human arms and legs. The "straight-through" construction of the access ports readily adapts Tobor for flow measurements.

NUC:B-2-280

Tobor is a totally new detector system capable of handling many of your gamma counting requirements conveniently and with accurate results. Tobor accepts samples ranging in volume from point sources to 10-liter bottles or large laboratory animals. It offers superior efficiency, resolution, and background radiation shielding.

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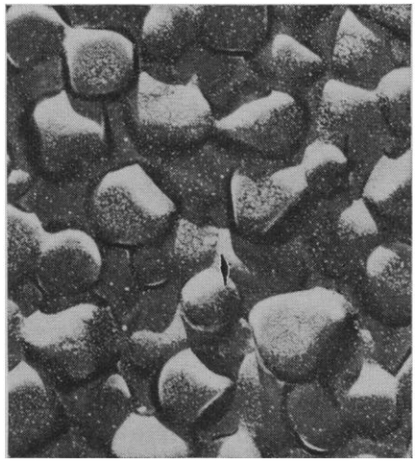
Kodak reports on:

how to look around in the tunnel . . . naked-eye colorimetry in paper chromatography . . . showing right from wrong

Cosmic film from France



The cobblestones seen in this electron micrograph are grains of silver halide sticking up out of a gelatin matrix. Very smart for extra-terrestrial use. Bear in mind the photographic conditions out there.

During the earthbound childhood of our race, we have been saying "ultraviolet" for radiation shorter in wavelength than what our particular natural-born sensing device happens to be tuned to. When at last we venture out from under the air blanket and note the ambience of the universe, we see what a special case is the life we have led. The color of the cosmos is not confined to an octave centered about the dominant hue of green cheese.

Even as we sing out in exultation, however, we must remind ourselves that all matter is opaque below about 2000Å and that the tunnel is long and dark all the way to x-rayland; for everything animal, vegetable, mineral, or gaseous is prone to electron transitions.

The light in your eyes, of course, goes out at around 3800Å, but any silver halide photographic material will get you down to 2500Å. The next 500Å is sticky: you spread a fluorescent oil over the emulsion to convert the energy to a wavelength long enough to penetrate the gelatin. Below 2000Å this stratagem poops out because even the oil robs you. At this point many years ago a spectroscopist named Victor Schumann had the bright idea of eroding gelatin away with H_2SO_4 to uncover the halide crystals. This worked fine. Schumann plates also proved useful for registering the focused ions in Aston's early mass spectrographs.

About 15 years ago we improved on Schumann plates by a technique that left only enough gelatin to keep the grains apart, as seen at left. We call the product KODAK SWR Plates and still recommend it unless you need high sensitivity so desperately that neither granularity nor price can stand in your way. In that event we can arrange to import for you some 180mm x 35mm strips of film from Kodak-Pathé. Our clever French cousins have developed a very tricky centrifugal coating technique that permits them to paste down much larger halide crystals than the SWR kind, resulting in *le film TYPE SC5 (environ 10 fois la sensibilité du film S.W.R. vers 1200Å).*

If $108 for 24 such strips is not out of scale with the magnitude of your thinking, get in touch on this matter with Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. If you need nothing more special than a new free booklet entitled "Kodak Materials for Emission Spectrography," same address still applies.

Delicious colors with sugars

No colorimeters, no spectrophotometers are required to do paper chromatography. A ruler is the only measuring instrument. Despite the unimposing contribution that paper chromatography can make to the size of one's capital budget, the technique grows ever more popular. Now a contemptible pittance—a ridiculous $4.65—buys 25 grams of *p-Anisidine Hydrochloride* (EASTMAN 8615) and permits the purchaser to let on that he uses colorimetry (naked-eye type) in his paper chromatography.

We were going to offer with our compliments a color photograph of such a chromatogram as it looks when wet and fresh. The thought to do so came after reading the account (*J. Chem. Soc., 1950,* 1702) of how p-anisidine hydrochloride turned up from a systematic hunt for a universal reagent that would yield a specific color with each particular class of sugar or methylated sugar. It said that aldohexoses give "green-brown," ketohexoses "brilliant lemon yellow," methyl aldopentoses "emerald green," uronic acids "cherry red"—all delicious colors like that.

We have decided not to do it. We fear that our photography would be blamed if the colors in the photograph seemed drabber than the verbal designations. Remember that the paper chromatographers' eager pursuit of color in their working lives leaves them more impressionable in this respect than other people. Let them better order a little bottle of EASTMAN 8615 and impress themselves privately.

We also have *Aniline Hydrogen Phthalate* (EASTMAN 8608), which is also well spoken of for the same general purpose. "Excellent colours" with the methylated sugars are mentioned, with detectability down to 1-5 μg.

We also have a new catalog, List No. 43, which tells about some 4,000 other EASTMAN Organic Chemicals obtainable from Distillation Products Industries, Rochester 3, N.Y. (Division of Eastman Kodak Company).

Suggestion for teachers

Overhead projectors are great. We don't make them.

We do make VERIFAX Copiers. They are great, too. Lots of other companies also make copiers, but a VERIFAX Copier gives the best-quality single copy and the lowest-cost extra copies.

The copies need not be on paper. They can now be made on VERIFAX Transparent Sheeting. The sheet has the proper surface for writing over the copied material in the overhead projector. Superfluous to belabor the possibilities for convenience in showing the class text, tables, or complicated diagrams from all sorts of sources, including the instructor's own den at home, where it is easier to think out and write out detailed material.

We have another pedagogical suggestion, which you may think good or bad. Take a paper turned in by a student in the class and copy it on VERIFAX Transparent Sheeting, omitting his name to avoid embarrassment or jealousy as the case may be. Project it and mark it up right then and there on the projector. Brings the difference between right and wrong close to home in a convincing manner.

Eastman Kodak Company, Business Photo Methods Division, Rochester 4, N. Y. can place VERIFAX Transparent Sheeting in your hands right away. If you don't even have a VERIFAX Copier, somebody ought to look it up under "Photocopy Machines" or "Duplicating Machines" in the Yellow Pages of the telephone directory.

Prices subject to change without notice.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

New Products

Cryogenic containers for liquid oxygen and nitrogen are built to prevent blowoffs due to heat buildup in the base of the container. The inner and outer spheres are built of copper and the double walls are separated by a vacuum of 10^{-5} mm-Hg. A gas-adsorbent chemical is contained in a copper compartment in the bottom of the container. Steel, shock-absorbing springs and steel outer case give the unit strength. Uses include blood preservation, fast freezing of biological fluids, and other low-temperature medical and industrial applications. Capacities from 5 to 200 liters available.—R.L.B. (Sulfrian Cryogenics, Inc., Dept. S604, 1290 Central Ave., Hillside, N.J.)

Direct counting converter (model 740A) consists of a 100 Mcy/sec prescaler that includes the input amplifier and shaper, an octad time-base divider, and a self-contained power supply. Used with an electronic counter having a frequency range of 12.5 Mcy/sec or higher, the instrument will provide direct digital readout to 100 Mcy/sec. For use with counter of lower frequency ranges, the converter has provision for extending the normal scaling factor of 8 to 80 or 800. Input frequency range is 500 kcy to 100 Mcy/sec and output frequency range is 1/8 the input frequency. Sensitivity is said to be better than 0.2 volt r.m.s. No special installation is required.—J.S. (Computer Measurements Co., Dept. S610, 12970 Bradley Ave., San Fernando, Calif.)

Gallium arsenide infrared source diode (model SNX-100) is designed to operate as a forward biased diode to emit light of a relatively narrow spectral width in the near infrared. The output can be modulated linearly with the forward-bias current. Successful modulation at frequencies from d-c through 900 Mcy/sec is reported. Quantum efficiency is said to be typically 0.3 percent at liquid nitrogen temperatures and 0.03 percent at room temperature. The wavelength of peak emission is 0.90 μ at 25°C case temperature and 0.84 μ at −195°C. The diode is available in a hermetically sealed package with a glass window at the top of the can. Temperature range is −195°C to +125°C. For a current of 100 ma, typical forward voltage drop is 1.2 at 25°C and 1.55 at −195°C. Power dissipation of 1.5 watts produces a junction temperature rise of 100°C.—J.S. (Texas Instruments Inc., Dept. S599, P.O. Box 5012, Dallas 22, Tex.)

Neutron generator (model A-1000) ionizes deuterium and accelerates it into a target containing adsorbed tritium to produce neutrons and helium. The neutrons available can be utilized to induce normal elements to become radioactive, so they can be quantified by means of the usual counting techniques. Biological materials containing only a few metals are especially suitable for activation analysis. The generator consists of a portable acceleration assembly, mobile remote control assembly, and a mobile high-voltage power supply. The high flux of both 14 Mev and thermal neutrons produced by the neutron generator, together with its capability to be operated under either pulsed or continuous conditions, makes it useful in neutron activation analysis, neutron radiography, neutron dosimetry, and in positive ion acceleration applications.—R.L.B. (Kaman Nuclear, Dept. S602, Garden of the Gods Rd., Colorado Springs, Colo.)

Environmental testing unit (model ES-100) provides for simulation of space environments encountered up to 500 miles above the earth's surface. The unit will attain a pressure of 2×10^{-9} torr or less within 4 hours. A horizontal main chamber provides a working space of more than 2 ft^3. The evacuation system consists of a 7-inch oil diffusion pump and a 5-ft^3/min mechanical pump. Baffling is provided by a liquid-nitrogen trap and a water-cooled baffle. Effective speed is said to be 400 lit/sec in the chamber and 400 lit/sec for condensable gases. Two 4-inch sight ports are provided for visual observation. Insulated heaters are provided to raise the surface temperature of the chamber to over 200°C. —J.S. (Jarrell-Ash Co., Dept. S557, 26 Farwell St., Newtonville 60, Mass.)

Vector vacuum-tube voltmeter (model 300A) measures in-phase, quadrature, and r.m.s. voltage. An electronic multiplier is used to drive a phase-sensitive instrument with characteristics similar to an electrodynamometer wattmeter. The instrument responds only to the fundamental input frequency of a complex signal when the reference terminals have a sine wave of that frequency applied to them. The in-phase meter deflection associated with the wattmeter is transformed into a quadrature meter deflection by the inclusion of a self-calibrated 90-deg phase shifter. By using the electronic multiplier as a squaring device, r.m.s. readings are obtained. An internal calibrating voltage can be used to check accuracy of the instrument. Voltage range is 1 mv to 300 volts. Accuracy is said to be ±2 percent of full scale. Frequency range is 15 cy to 30 kcy/sec. Signal input impedance is 2 megohms and reference input impedance is 1 megohm. Reference voltage may be 0.25 to 220 volts.—J.S. (Industrial Test Equipment Co., Dept. S553, 55 E. 11th St., New York 3)

Silicon semiconductor strain-gage **load cell** (type 210) is used in measuring and monitoring tension of equipment used in a variety of underseas applications. The cells are available for force ranges from 0 to 100 to 0 to 100,000 lb. Piezoresistive transducers used are provided with temperature compensation and are designed to provide output levels of 250 mv to drive indicators and recorders directly without amplification.—J.S. (Braincon Corp., Dept. S566, Box 312, Marion, Mass.)

The material in this section is prepared by the following contributing writers:

Robert L. Bowman (R.L.B.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

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Address inquiries to the manufacturer, mentioning *Science* and the department number.

(Continued from page 475)

The Atomic Energy Commission expects to maintain its graduate fellowship program in EMP students in its field at about 350 in all years of graduate study.

Not to be overlooked in surveying support for graduate students are research assistantships financed through research project grants made to universities by federal agencies. Figures on scientific and technical manpower in general are astonishingly defective, and nowhere is the picture less clear than in respect to research assistantships. But it is estimated that if the President's EMP proposals are put into effect, the number of students holding research assistantships in the EMP fields would climb from about 9000 this year to 11,000 in 1964.

A congressional staff study on federal activities in education, made at the behest of the Education and Labor Committee, is nearing publication, and another by the National Academy of Sciences is in the works, but the current figures, even of number of graduate students getting federal assistance, have to be taken as approximations.

Allowing generously for error, government sources estimate that without the proposed new EMP program, total full-time graduate enrollment in EMP fields in 1964 would be 44,000, with 18,000 of these receiving federal support, 17,000 others getting other types of support, and some 9000 on their own. The presidential panel recommended, as a "reasonable" goal for 1964, an increase of 10,000 in the number of graduate students getting federal support. Present proposals for increasing the number of fellowships, training grants, and research assistantships would provide very nearly that number. Asked by the panel, but not requested by the administration, were funds to take over support of 5000 students already enrolled, many of them part-time students or those eligible for federal assistance for whom no funds have been available.

Estimated cost of the EMP program for 1964 would be upward of $130 million for student support and allowances to institutions and some $80 to $90 million a year in matching funds for universities to use in construction of EMP facilities.

Objections have been raised to the recommendations of the President's Science Advisory Committee (PSAC) on the grounds that expansion of graduate enrollment in the EMP fields would be achieved only at the cost of diluting quality (*Science*, 1 February 1962), and the debate is likely to be carried on in Congress when the EMP proposals are taken up.

The basic administration argument for the program is that the federal government is a major consumer of man-power in the EMP fields and has an obligation to see that its own needs for defense and space programs are met and that other sectors of the society are not denied the professionals they require. The argument continues that unless a major federal effort is undertaken now, shortages in EMP fields can only go from bad to worse.

There is a feeling in Congress this year that many, at least, of the President's education proposals will succumb to the economy knives or the fires of the church-state issue. Politically, however, the EMP proposals have two main advantages over most other parts of the bill. Federal aid to graduate education has been little beset with controversy. The appeal to national security and prestige, Congress finds persuasive.
—JOHN WALSH

Announcements

The National Science Foundation is seeking a physician to serve as ship's doctor aboard its **Antarctic research** vessel *Eltanin*. The doctor will have the opportunity to perform his own research, although this will not be required. His tour of duty will be 9 months to 1 year, with an option for renewal if desired. The cruises last about 2 months, with 10-day stops at South American ports.

The *Eltanin* will carry a crew of about 45 men, plus 38 scientists in various biological and physical disciplines. (Robert Hinchcliffe, Office of Antarctic Programs, NSF, Washington 25)

Courses

Applications are being accepted for a 1-year advanced course in the theory and techniques of **steroid biochemistry,** offered by the University of Minnesota. The program is sponsored by the National Cancer Institute, and is open to

recent graduates with an M.D. or Ph.D. degree. The course will start in September. (Steroid Training Program, Department of Physiological Chemistry, University of Minnesota, Minneapolis 14)

St. John's University, New York, is offering a **research participation program in biological sciences** for high school science teachers, 1 July to 23 August. The program is sponsored by the National Science Foundation. Applicants should have a master's degree or the academic background to qualify them for candidacy for such a degree, in biological sciences. Recipients will receive stipends of $75 per week, plus $15 weekly for up to four dependents. Noncommuting participants will receive a travel allowance of four cents per mile, to a maximum of $80, for one round trip. The university will not charge tuition or fees. Stipends will be awarded about 15 March. (Paul T. Medici, Director of Research Program, St. Johns University, Jamaica 32, N.Y.)

New Journals

Bibliography of Reproduction, vol. 1, No. 1, January, 1963. D. Casey, Ed. Reproduction Research Information Service, 8 Jesus Lane, Cambridge, England. $17.50 per year. Monthly.

Mechanical Engineering Education, vol. 1, No. 1, Sept. 1962. J. H. Lamble and J. Parker, Eds. Pergamon Press, 122 E. 55 St., New York 22, N.Y. $10 per year. Semiannual.

SIAM Journal on Control, vol. 1, No. 1, Sept. 1962. J. E. Bertram, Ed. Society for Industrial and Applied Mathematics, P. O. Box 7541, Philadelphia 1, Pa.

Acta Oncológica, vol. 1, No. 1, Jan.–June 1962 (in Spanish). 45 Londres, Madrid 2, Spain. Semiannual. $15 per year.

Malacologia, vol. 1, No. 1, Sept. 1962. (J. B. Burch, Institute of Malacology, 2415 S. Circle Dr., Ann Arbor, Mich.). Irregular. $5 per vol.

Bulletin of the Regional Research Laboratory, Jammu, vol. 1, No. 1, July 1962. (Regional Research Laboratory, Jammu-Tawi, India). Biannual.

Publications

Recent Russian **studies of aging** are described in a 24-page English translation of a paper, "Aging of the Organism at the Molecular Level." The paper, by Zh. A. Medvadev, of the Timiriasev Agricultural Academy, Moscow, was originally read at the fifth international congress on gerontology, in San Francisco, 1960. The translation was released last month by the National Institutes of Health. Topics covered include the character of age changes of proteins and nucleic acid, the accumulation of molecular changes, and possibilities of controlling their rate. (Center for Aging Research, Division of General Medical Sciences, NIH, Bethesda 14, Md.)

The **1963 Catalog of American Standards** is available from the American Standards Association. The 84-page book contains approximately 2000 American standards, plus recommendations from the International Organization for Standardization and the International Electrochemical Commission. Also included is a cross-index which carries the designations of about 35 organizations. The book is available without charge. (ASA, Dept. P 349, 10 E. 40 St., New York 16)

Scientists in the News

Three U.S. biochemists last month received $1000 awards from the American Chemical Society at its general assembly:

Mildred Cohn, of the University of Pennsylvania; the Garvan Medal for her research on the process by which the body stores and uses the energy in food.

William P. Jencks, of Brandeis University; the ACS Award in Biological Chemistry, for research on proteins, nucleic acids, and enzymes.

Charles Gilvarg, of the New York University School of Medicine; the Paul-Lewis Laboratories Award in Enzyme Chemistry, for studies of the synthesis of lysine by bacteria.

George C. Green, former director of the radioisotope department at Fitkin Memorial Hospital, Neptune, N.J., has been named professor of radiobiology in the school of medicine, West Virginia University.

Howard S. Coleman, former vice president of research and engineering at Bausch and Lomb, has been named head of physics research of Melpar, Inc., Washington, D.C.

William R. Marshall, associate dean of the University of Wisconsin College of Engineering, has been elected president of the American Institute of Chemical Engineers.

Carl H. Pottenger has become vice president and director of research at Koppers Co., Pittsburgh. He formerly was vice president and assistant general manager of the plastics division.

E. A. Guggenheim, professor of inorganic chemistry, the University, Reading, England, will be George F. Baker lecturer in chemistry at Cornell University 2 April to 9 May.

David Weinman, associate microbiology professor at Yale University, has been granted a 2-year leave of absence to serve as visiting professor of microbiology in the University of Saigon Medical School, South Vietnam.

George A. Westlund, a former group manager with Technical Operations, Inc., has been named chief of the computer section of the Operations Evaluation Group of the Center for Naval Analyses, Arlington, Va.