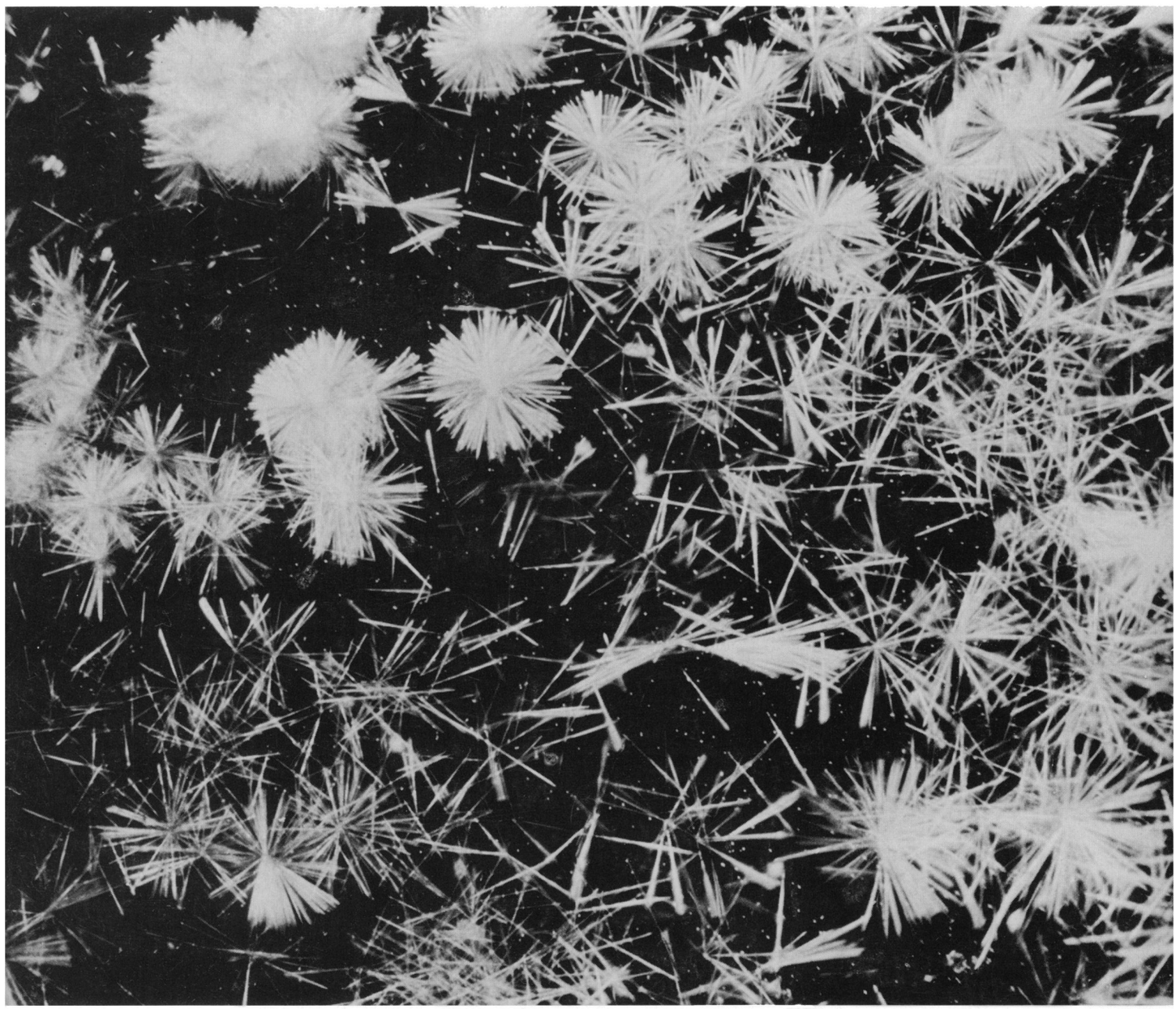
SCIENCE

21 April 1961

Vol. 133, No. 3460

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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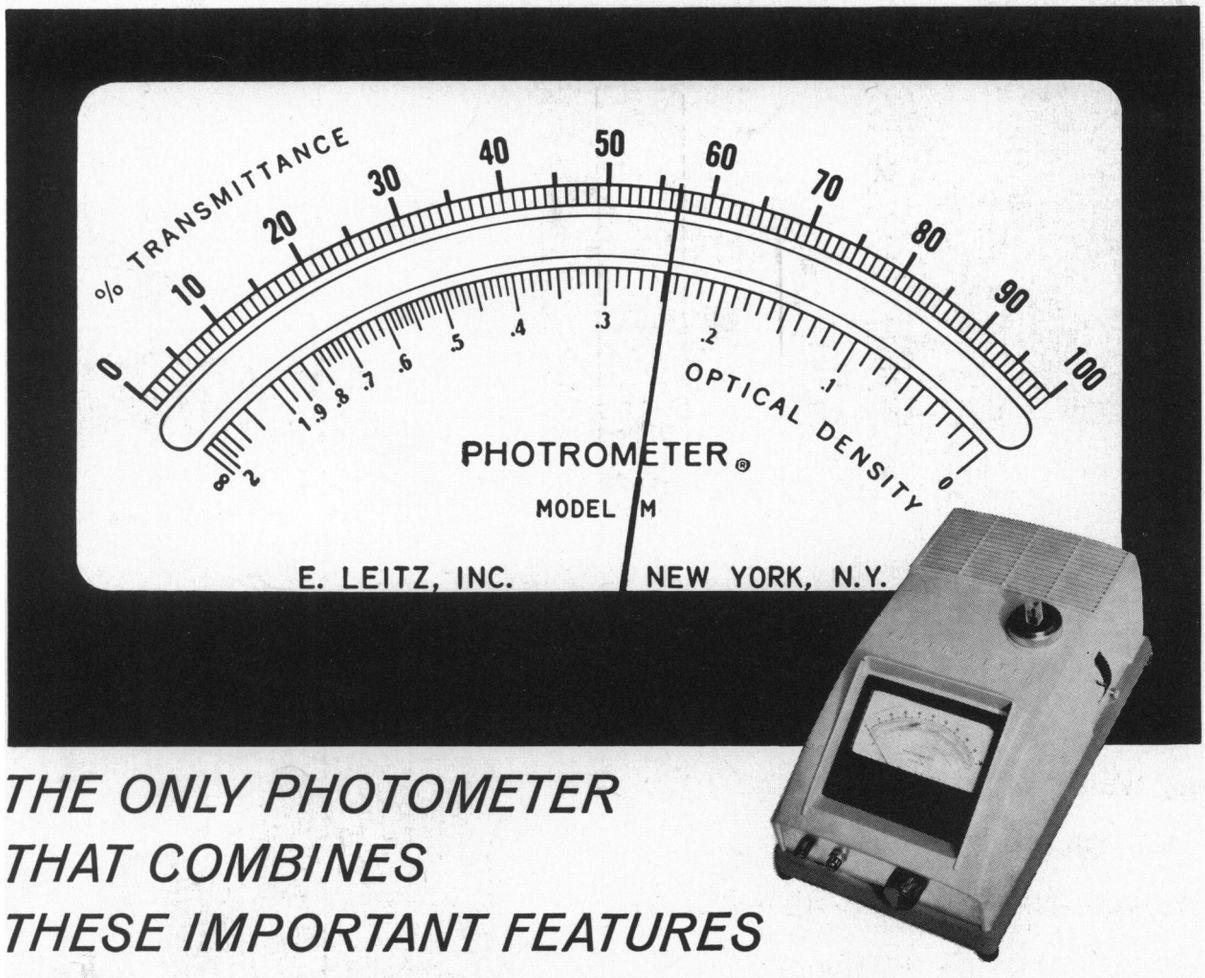

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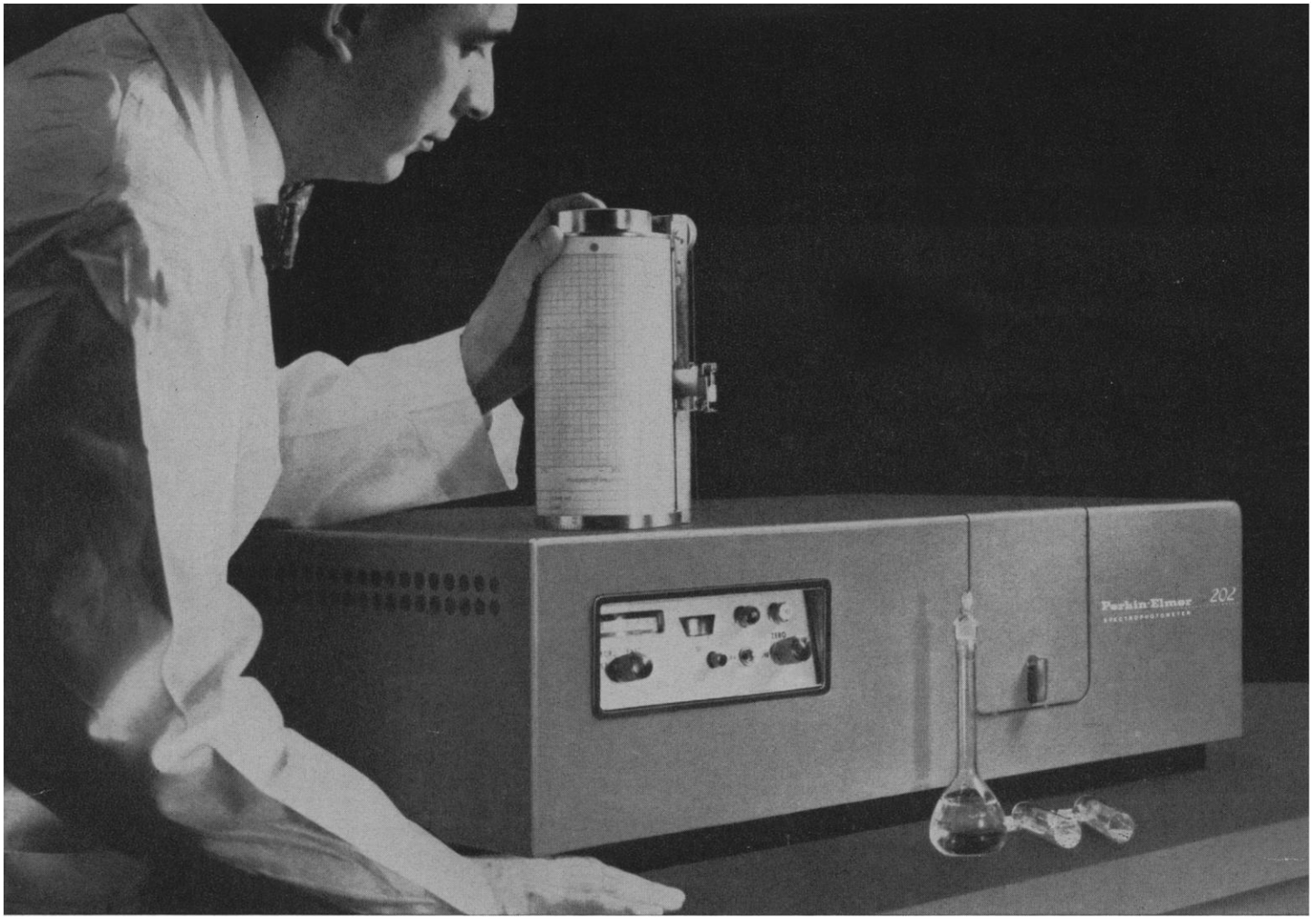

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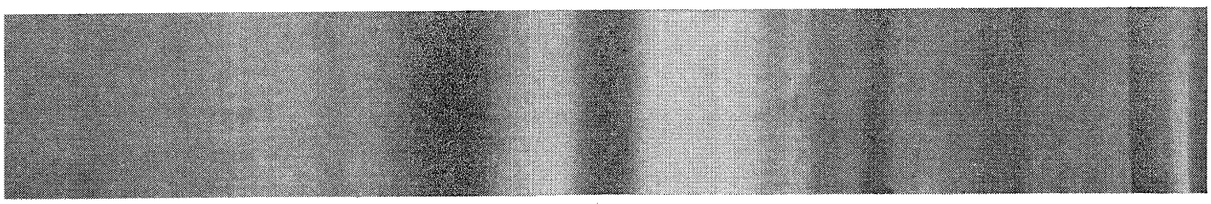
21 April 1961, Volume 133, Number 3460

SCIENCE

Cover

Strontium chromate, taken in reflected light during microanalytical studies of the crystallization of strontium. The minimum detectable amount is 0.8 to 1.0 μg ($\times$ 160). [E. Leitz, Inc., New York]



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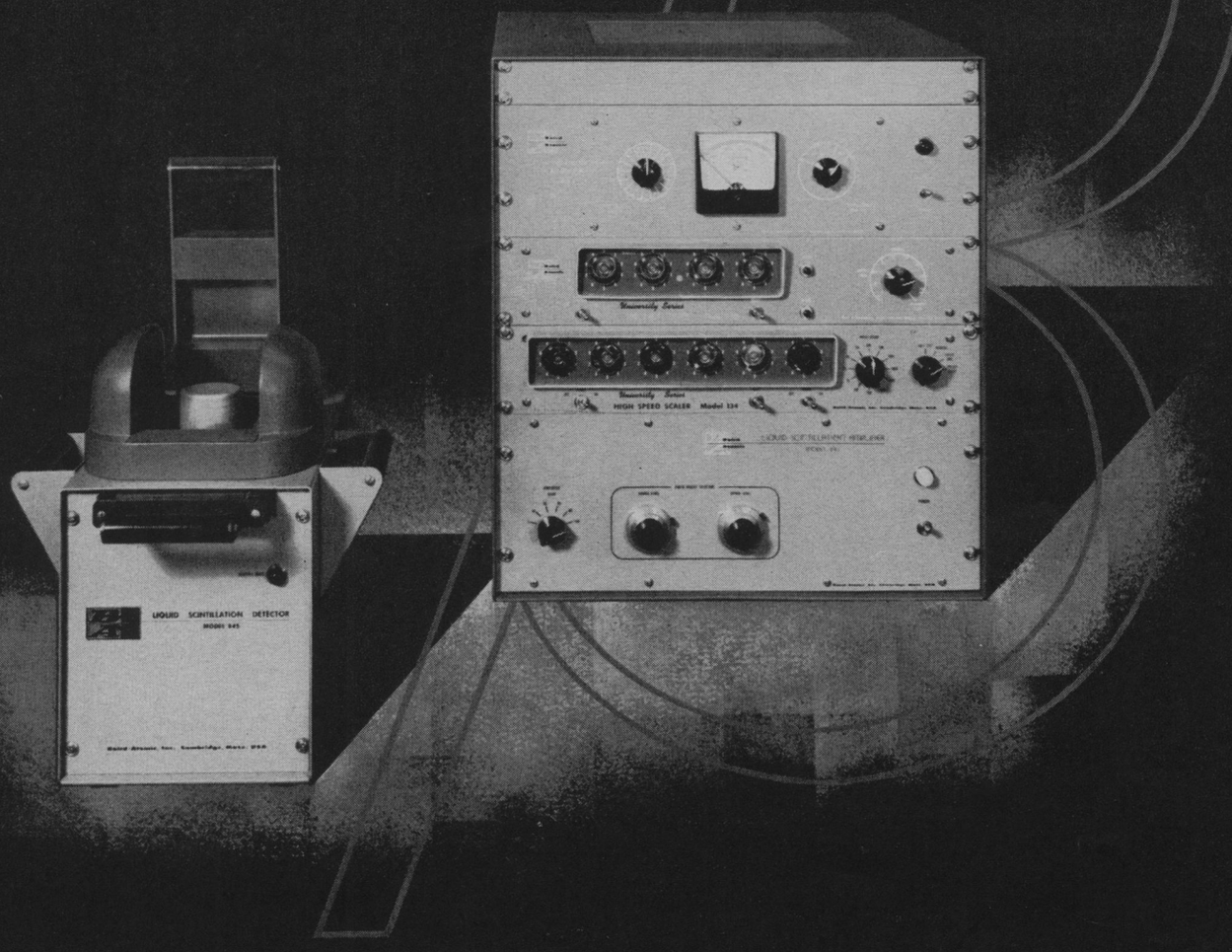

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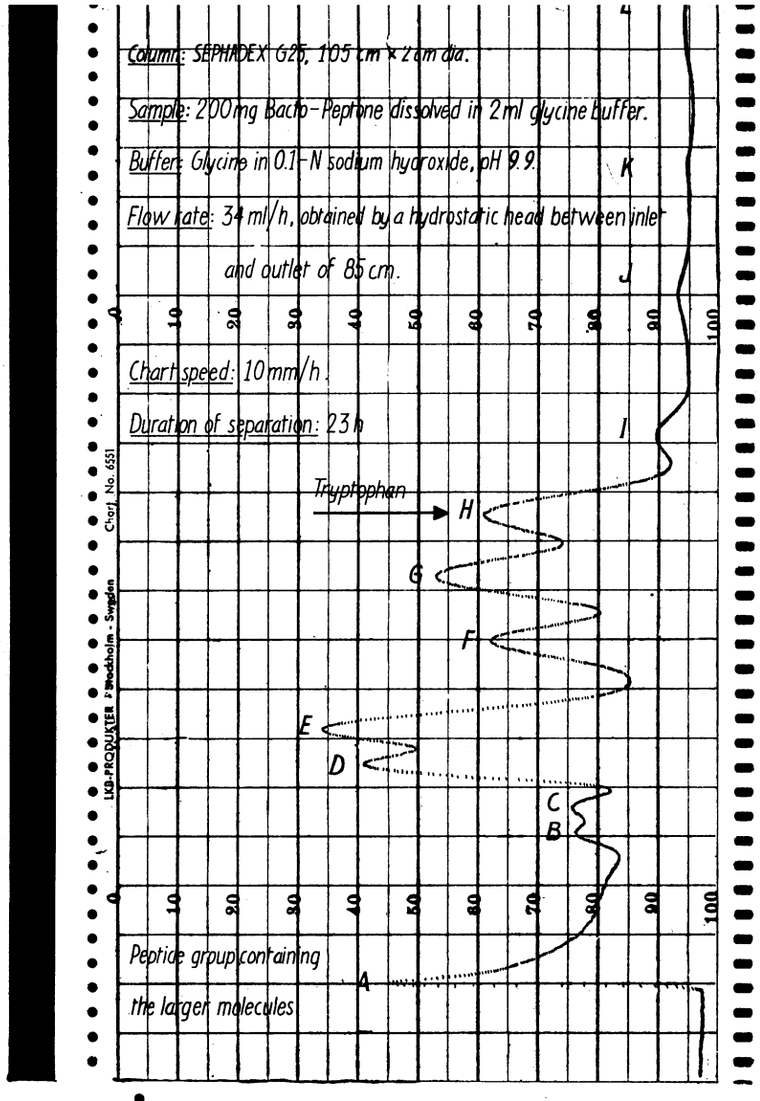

THIS CHART SHOWS

the UV-absorption curve of the eluate obtained during a model experiment carried out by B. Lindqvist, Mjölkcentralen, Stockholm. The sample investigated was the complex mixture of polypeptides present in Bacto-Peptone.* Nine peaks, **A-L**, representing groups of polypeptides, have been clearly distinguished by the UVICORD after molecular sieving through a column of SEPHADEX G25.** The components leave the column more or less in order of descending molecular size. Thus peak **A** indicates comparatively large molecules. Peak **H** represents tryptophan.

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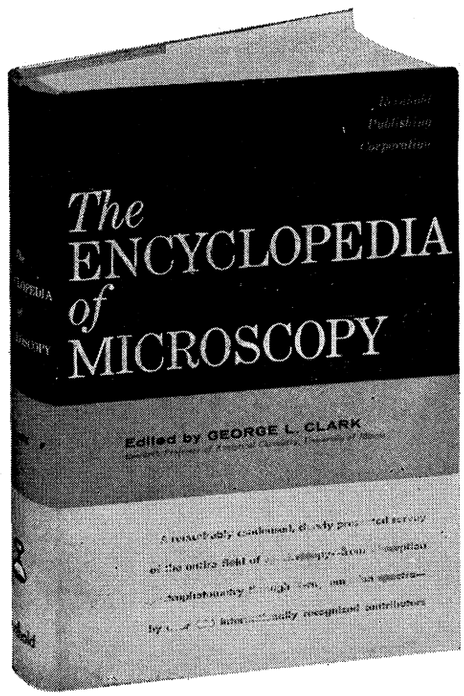

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The use of linear programmed temperature gas chromatography, however, enables analysis of such complex mixtures in a single run and also facilitates both qualitative and quantitative analysis. The chromatogram at the left illustrates this for the analysis of a 17-component mixture of aromatic hydrocarbons ranging from xylene (b.p. 139°C) to chrysene (b.p. 448°C). The accuracy of the analysis is shown in the following table.

QUANTITATIVE ANALYSIS

Compound	Added, %		Found, %
Xylene	5.9		5.5
Mesitylene	5.9		6.4
Pseudocumene	2.9		2.9
Hemimellitene	8.8	14.7	14.0
Indan	5.9		
Napthalene	8.8		9.7
Diphenyl	2.9		3.5
1,2-Demethylnaphthalene	5.9		5.9
Acenaphthene	8.8		9.6
Diphenylene oxide	5.7		6.0
Fluorene	2.9		3.3
Phenanthrene	8.8	13.2	11.9
Carbazole	4.4		
Fluoranthene	5.9		6.5
Pyrene	8.8		9.7
1,2-Benzafluorene	1.4		1.1
Chrysene	5.9		4.9

The last column lists the amounts of each compound determined by simple peak area summation. The excellent results are attributed largely to the good separation and the sharp peaks obtained by temperature programming a well-conditioned Apiezon L column.

This analysis was made on a Model 500 Linear Programmed High Temperature Gas Chromatograph[2]. This unit uses stable, hot-wire thermal conductivity detection for operation to 500°C. Separate and independent temperature controls for the column, detector, and injection port are also featured.

LITERATURE CITED

(1.) Dupire, F., *Z. Anal. Chem.*, **170**, 317-326 (1959).

(2.) *Martin, A. J., Bennett, C. E., and Martinez, F. W. Jr., "Linear Programmed Temperature Gas Chromatography," presented at the Cleveland ACS Meeting, April 1960.

(3.) Ta-Chuang Lo Chang, and Karr, C., *Anal. Chim. Acta*, **21**, 474-490 (1959).

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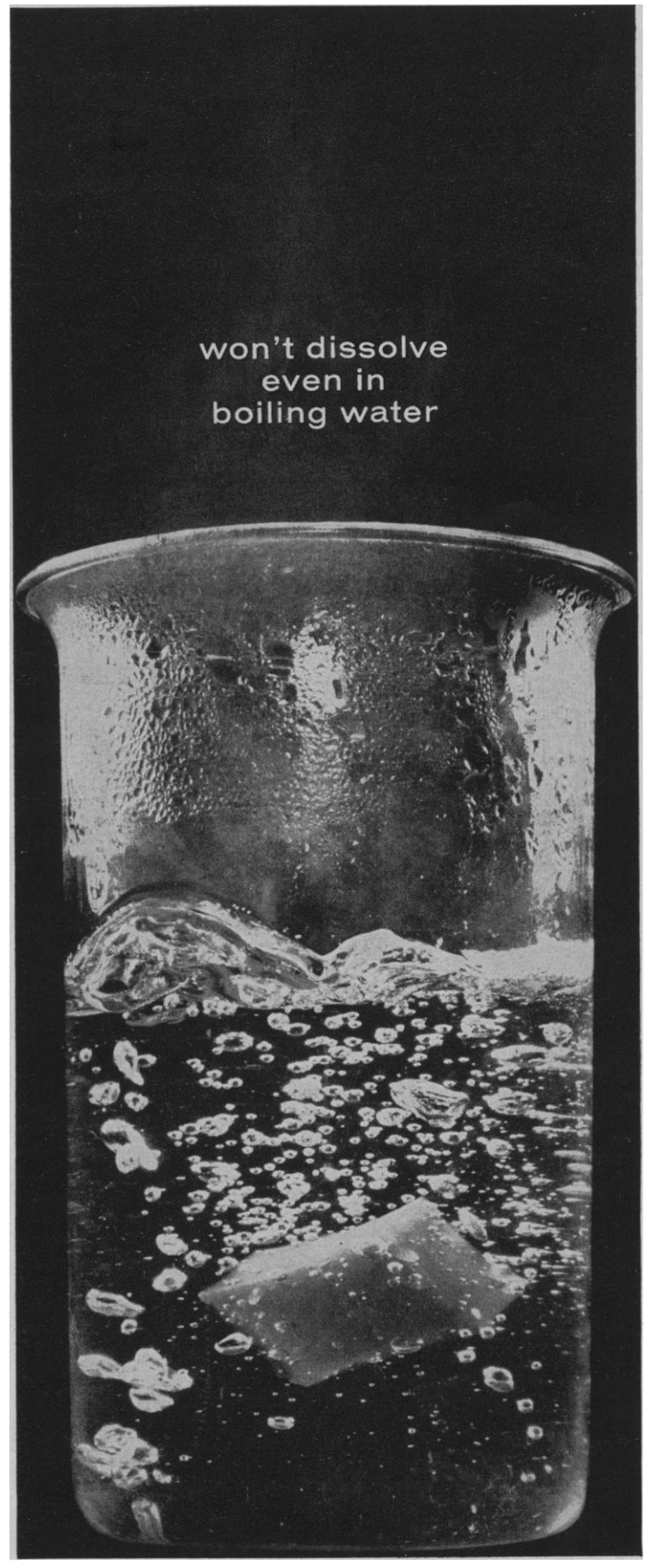

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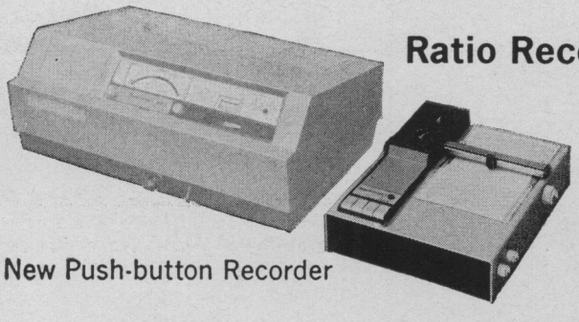

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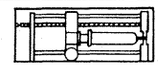
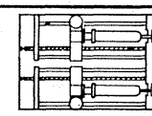
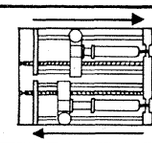
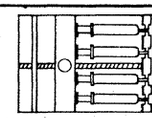
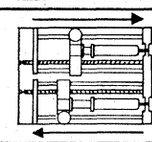
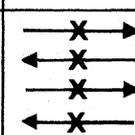
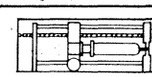
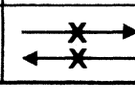
600-900			
600-910			
600-920			
600-930			
600-950			
600-960			

BASIC PUMP MECHANISM

This unit consists of a movable carriage driven by a half-nut resting on a precision-cut lead screw. As the carriage can be lifted from the lead screw and moved to any position, loading can be accomplished in seconds. A small ramp can be locked to the side rail in any position. The ramp will raise the carriage from the lead screw, thus stopping the pumping action at a pre-set point. The adjustable syringe clamp will hold standard B-D Luer Lok syringes from 2 cc. to 50 cc. size. In order to achieve greater versatility, many pumps utilize more than one basic pumping mechanism.

DRIVING MECHANISMS

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1. *Multi-speed transmission driven by synchronous reversible instrument motor.* This mechanism will produce 12 separate speeds over a 5000 to 1 range, reproducible to within ±0.01%. Pumping rates are determined by syringe size used. (600 Series)
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3. *Fixed-speed synchronous reversible motor.* Depending on the syringe size, six pumping rates can be obtained. (900-S Series)
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A pump equipped with a servo motor and servo electronic amplifier can achieve a rate of injection that is a direct function of any variable that can be translated into an electrical signal.

All infusion-withdrawal pumps will provide quality, reliability and ease of maintenance at the lowest possible cost. The various standard models are designed to meet differing use and accuracy requirements. Units to meet special requirements can be made to order. Inquiries are invited.

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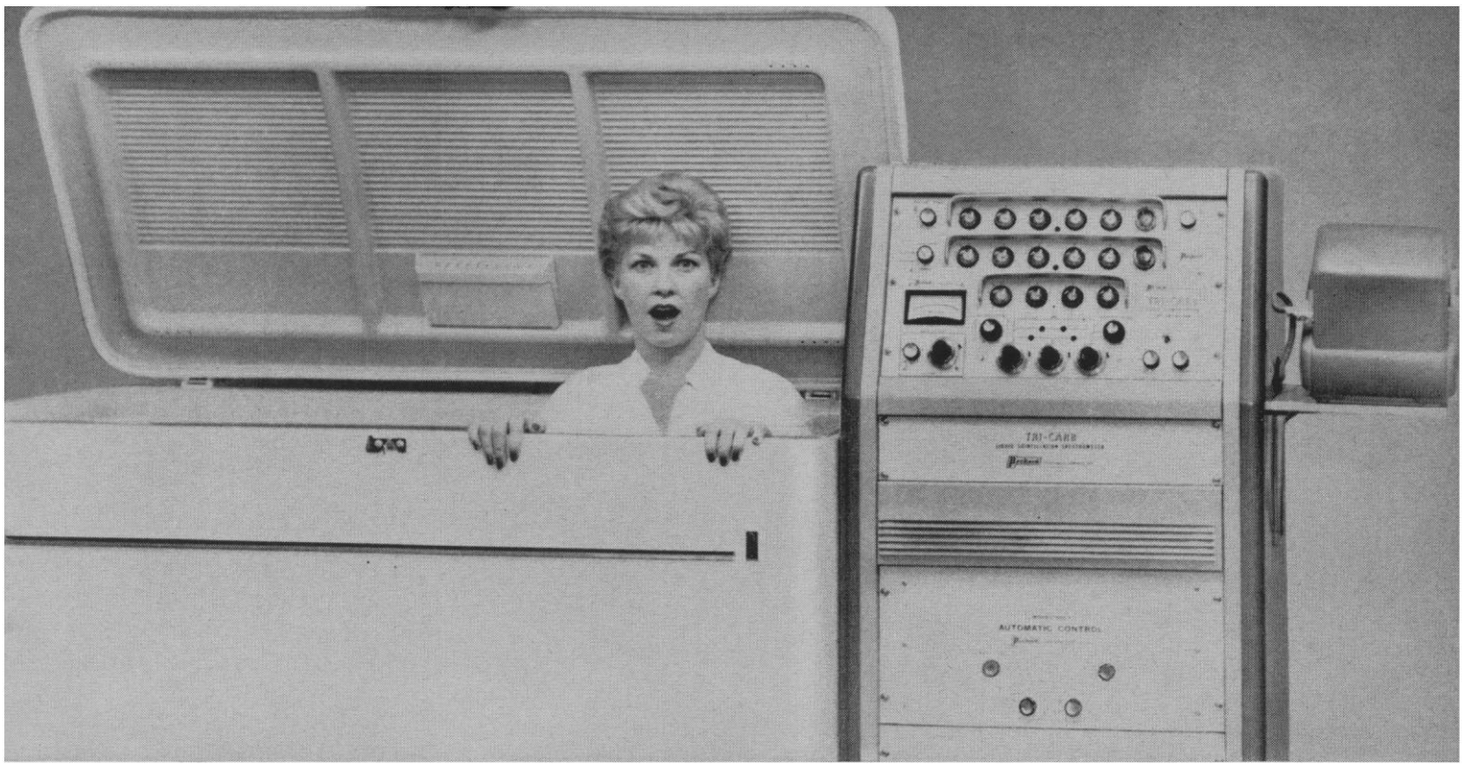

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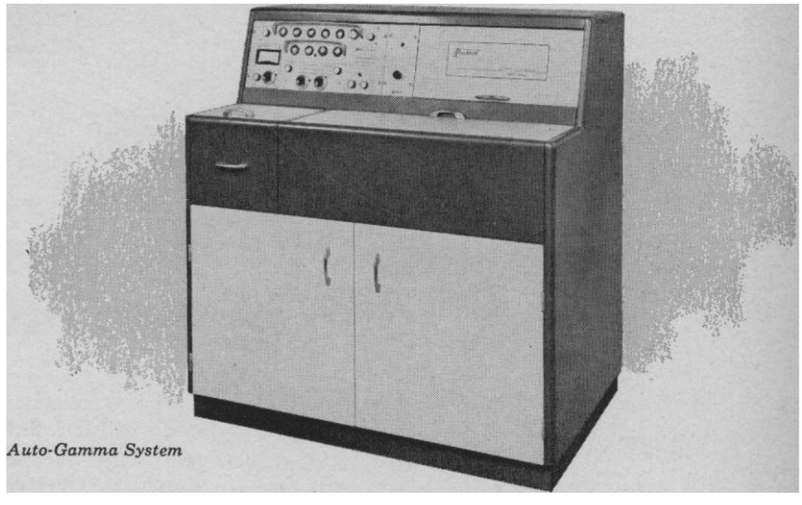

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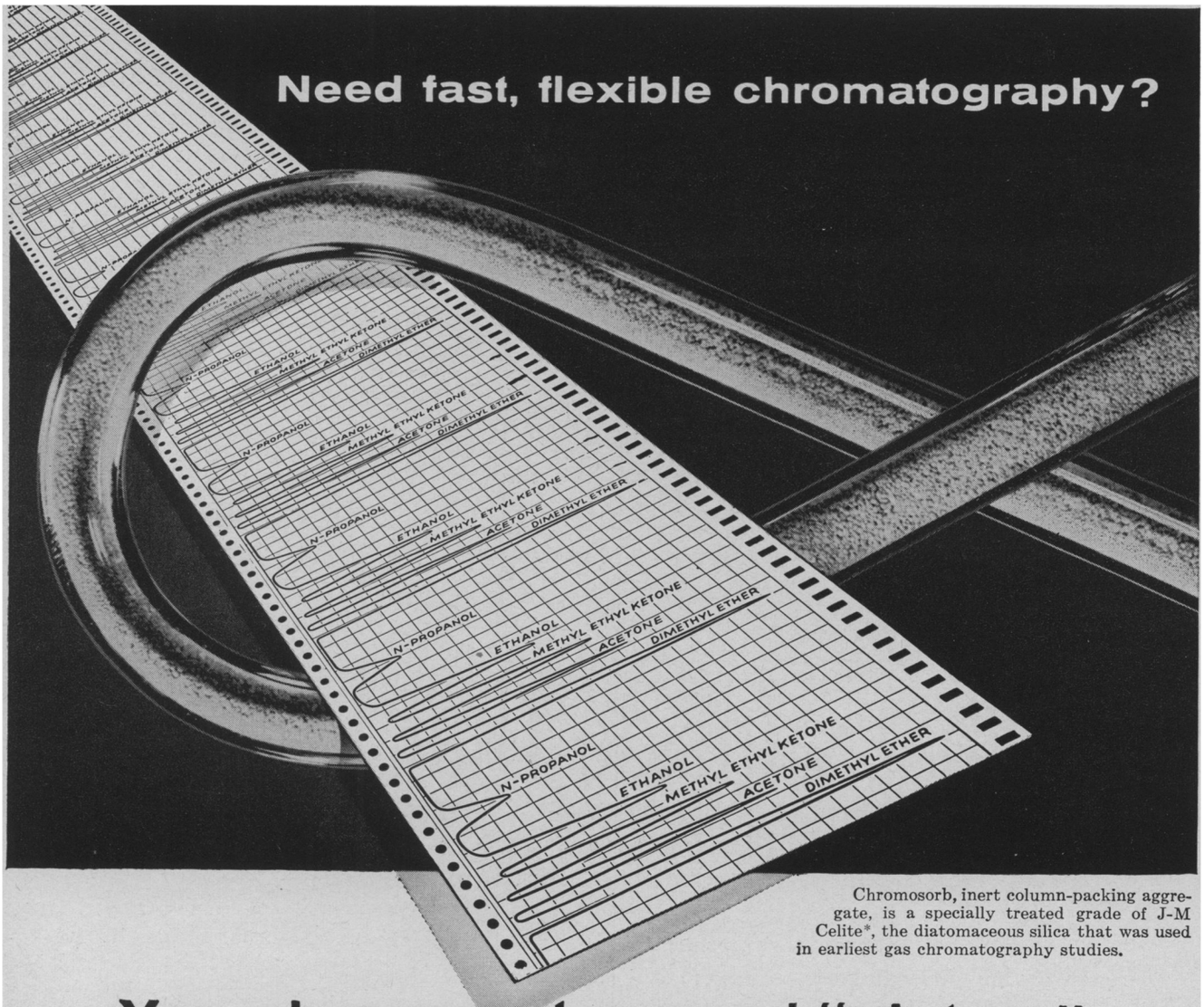

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As an aggregate in gas-liquid partition chromatography, J-M Chromosorb® gives high partitioning effect with maximum number of theoretical plates. Good resolution is obtained because it is chemically inert and won't adsorb components being passed through. You get uniform results, optimum reproducibility, and good flow of carrier gas without excessive pressure drop.

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*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

For gas phase chromatography or where inertness is needed... Chromosorb

Typical Properties

Calcined diatomaceous earth aggregate.

Color	light pink
Free Fall Density—lbs./cu. ft. (avg.)	20-23
Specific Gravity—true	2.15
Water Absorption—cc./gr. (avg.)	2.4
Moisture—% by weight, maximum	1.0
pH (avg.)	6-7
Surface Area—sq. m./gm. (avg.)	3-5

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Typical Properties

Flux calcined diatomaceous earth aggregate.

Color	white
Free Fall Density—lbs./cu. ft. (avg.)	15-16
Specific Gravity—true	2.30
Water Absorption—cc./gr. (avg.)	4.0-5.0
Moisture—% by weight, maximum	1.0
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Surface Area (BET Method)—sq. m./gr. (avg.)	3-4

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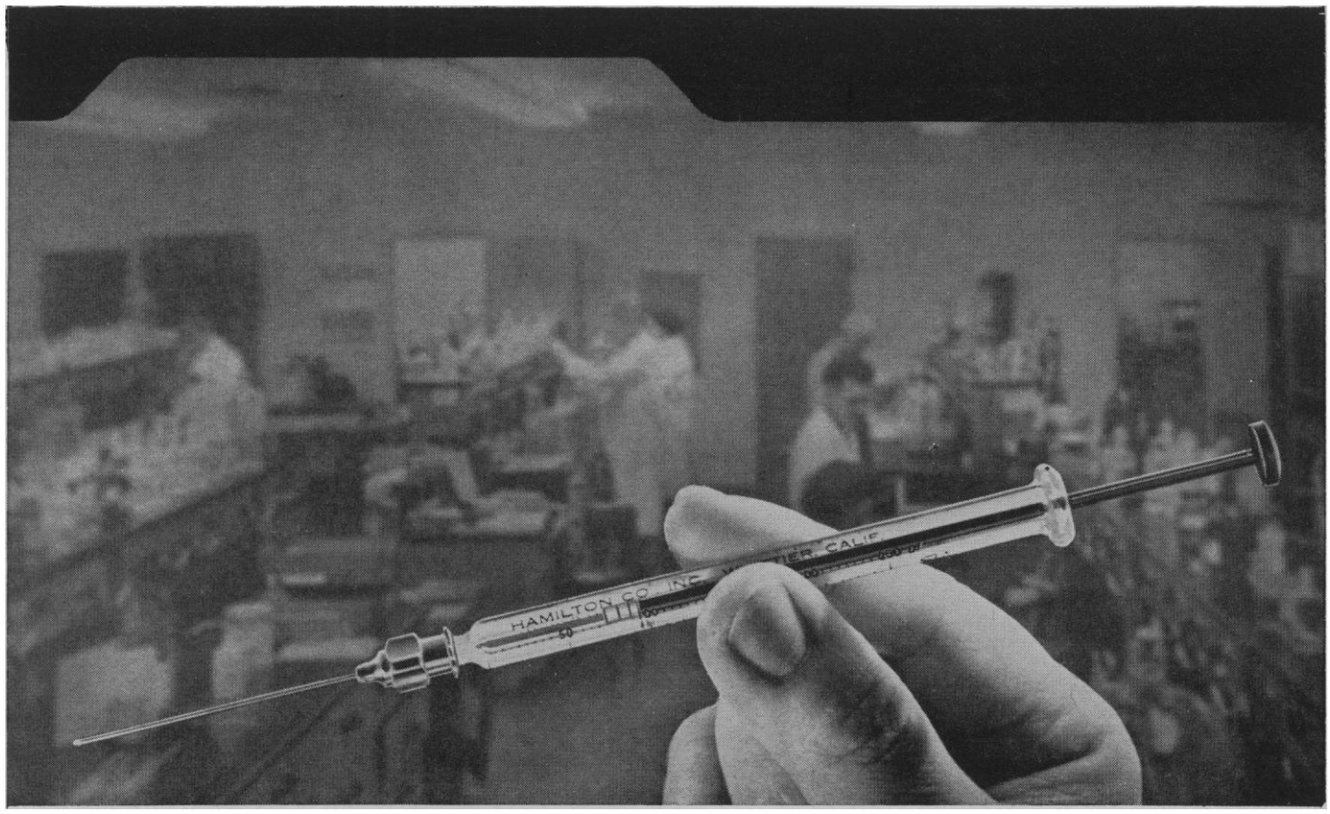

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- **Graduation of scale accurate to ±1%**
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- **Plungers interchangeable**
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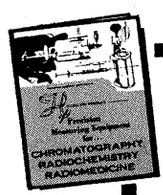

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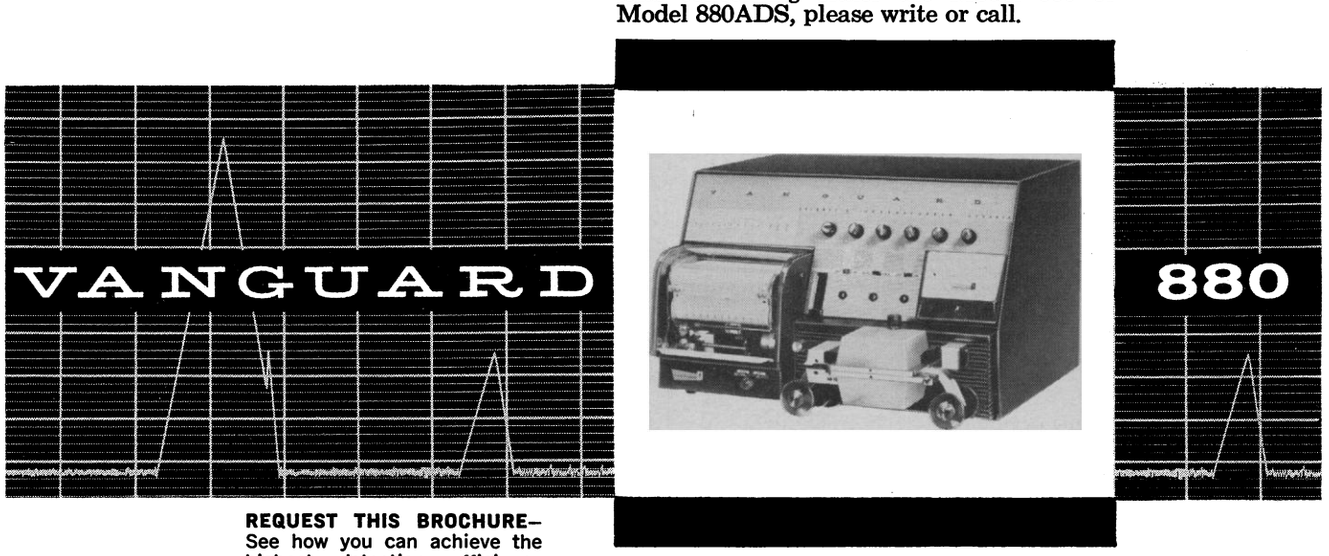
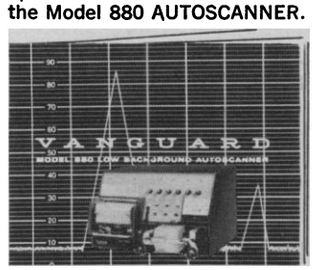
Vanguard's new, completely transistorized Model 880 Low Background AUTOSCANNER revolutionizes chromatogram scanning of low-energy, beta-emitting radioisotopes. Specially designed to meet the exacting requirements of medical, agricultural and pharmaceutical research, the AUTOSCANNER utilizes the most advanced electronic and mechanical design, integrated into a compact, one-piece console. With the Model 880, analyses can be performed with the highest possible degree of sensitivity—even when counting tritium, carbon-14 and sulphur-35.

NEW STANDARD ACCESSORY, TOO! Also available is the new, exclusive Vanguard Model 880ADS, a completely automatic system for quantitative integration and digital presentation of radioactive zones. For complete details concerning either the Model 880 or Model 880ADS, please write or call.



REQUEST THIS BROCHURE— See how you can achieve the highest detection efficiency available for chromatogram scanning. Booklet outlines distinctive features and lists all operational characteristics of the Model 880 AUTOSCANNER.



- Features 4 pi scanning—counts radiation on both sides of strip simultaneously
- Reduces background to less than 10 cpm.
- Completely transistorized for longer, more reliable performance
- Handles chromatograms 1½ to 4 cm. wide in lengths to 100 ft.
- Gas and power shut off automatically at end of scanning period
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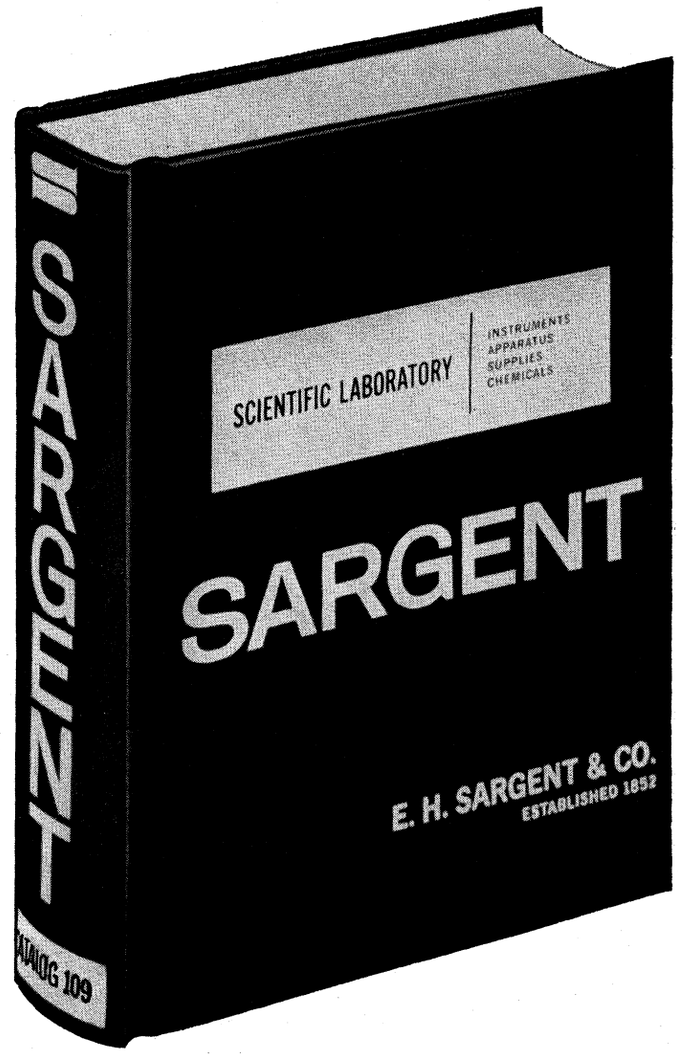

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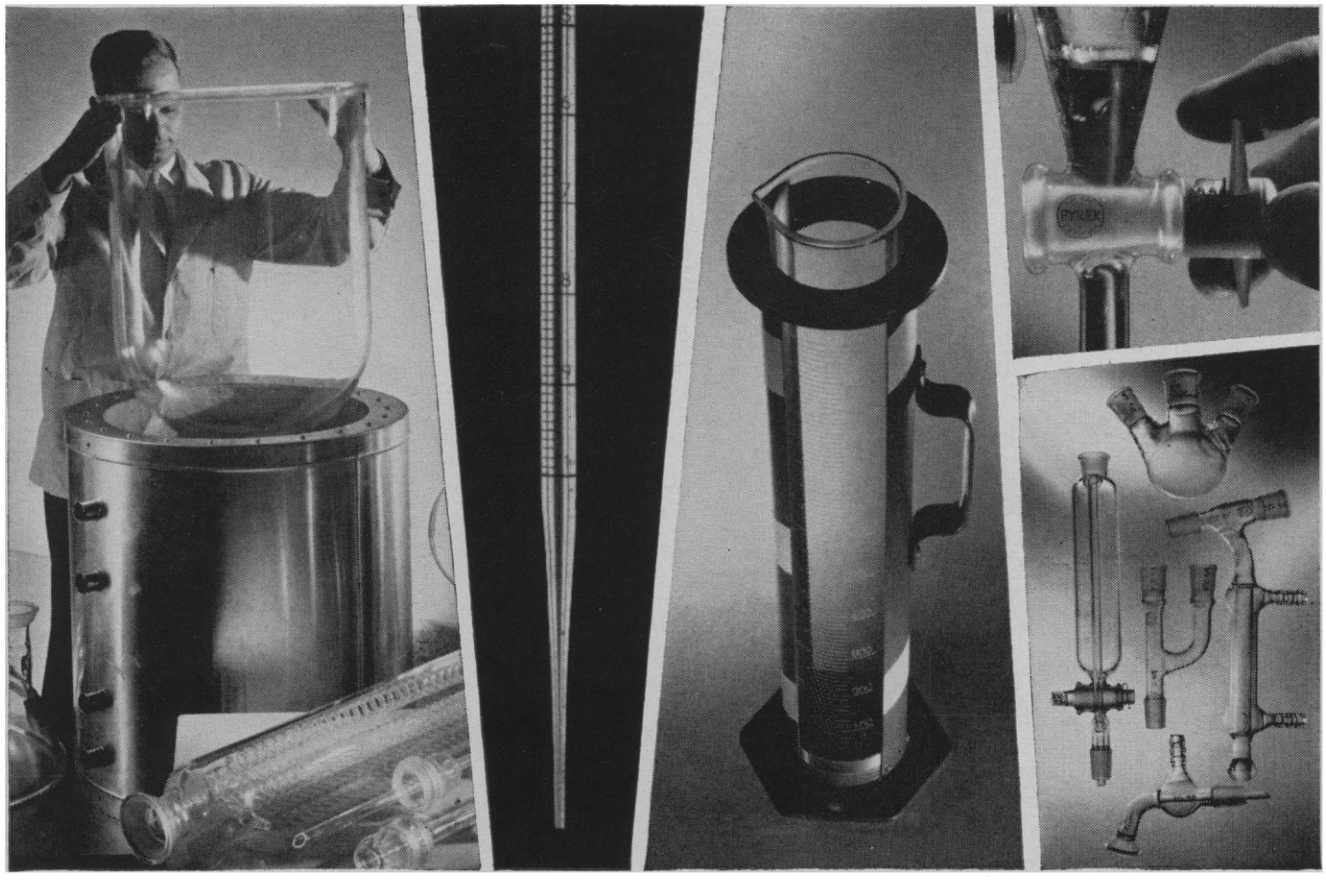

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Run an analysis and you'll find that PYREX No. 7740 glass hasn't changed one-tenth of a whit in twenty-five years.

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PYREX labware itself *has* changed a lot in those years. The order of the day every day in our labware department is: Design. Redesign. Refine. Find out what the customers want and give it to them.

Teflon* stopcocks, for example. It won't be long before everyone makes a Teflon stopcock. We went at it with a difference, though. Our men decided to look at the stopcock itself afresh.

They came up with the *reverse-taper* stopcock, a completely new concept. Reverse the taper and you have a stopcock that's under constant tension and needs no adjustment to form a seal. It adjusts itself automatically without the aid of locknuts or other devices. It works freely and dismantles in a jiffy.

All this, *plus* the advantages of Teflon.

Ware for the Lilliputians. When the needs of the micro-chemists became known, we introduced a line of ware made to classical proportions but made to hold drops at a time. It includes not only flasks and beakers and the other usuals, but all the accessories you could want.

Wholly macro. Then there are the men who want to work big, who want gallons of something without going to the expense or bother of a pilot plant. A few tremendous puffs and we have a line of macro ware; giant reaction flasks of 5, 10 and 20-gallon capacity, all with covers and such accessories as inlet tubes, condensers, thermometer wells and the like.

What can you do with a pipet? A pipet seems a simple enough device, but hardly a year goes by that we don't offer an improvement of some sort.

A new way of marking called Accured, for example. Instead of laying the marks *on* the glass with stencils or filled etchings, we invented a way of putting the marks *into* the glass, making them an integral part of the pipet, that will last as long as the glass. Again, a completely new approach to an old problem.

As soon as we found there was a need, we designed a pipet with a long, narrow tip for insertion into confined areas such as the neck of a micro flask.

We made another with an extra-large hole in the tip to make suction and delivery easier and faster.

Some years back we came up with the idea of stoning *two* bevels on the tips of pipets to make them smooth enough to avoid a snag, strong enough to resist chipping.

Shielded cylinders. Some ideas are one-shots. We heard that labmen were having trouble with the cylinders which they used when going about the plant to gather production samples. We looked the problem over and came up with a metal shield for the cylinder, a shield with a built-on carrying handle. Now the cylinders can take some knocking around without being broken or dropped.

Check LG-2. These and a lot of other new items are listed in the latest edition of the PYREX Laboratory Ware Catalog, LG-2. Write, if you don't have a copy.

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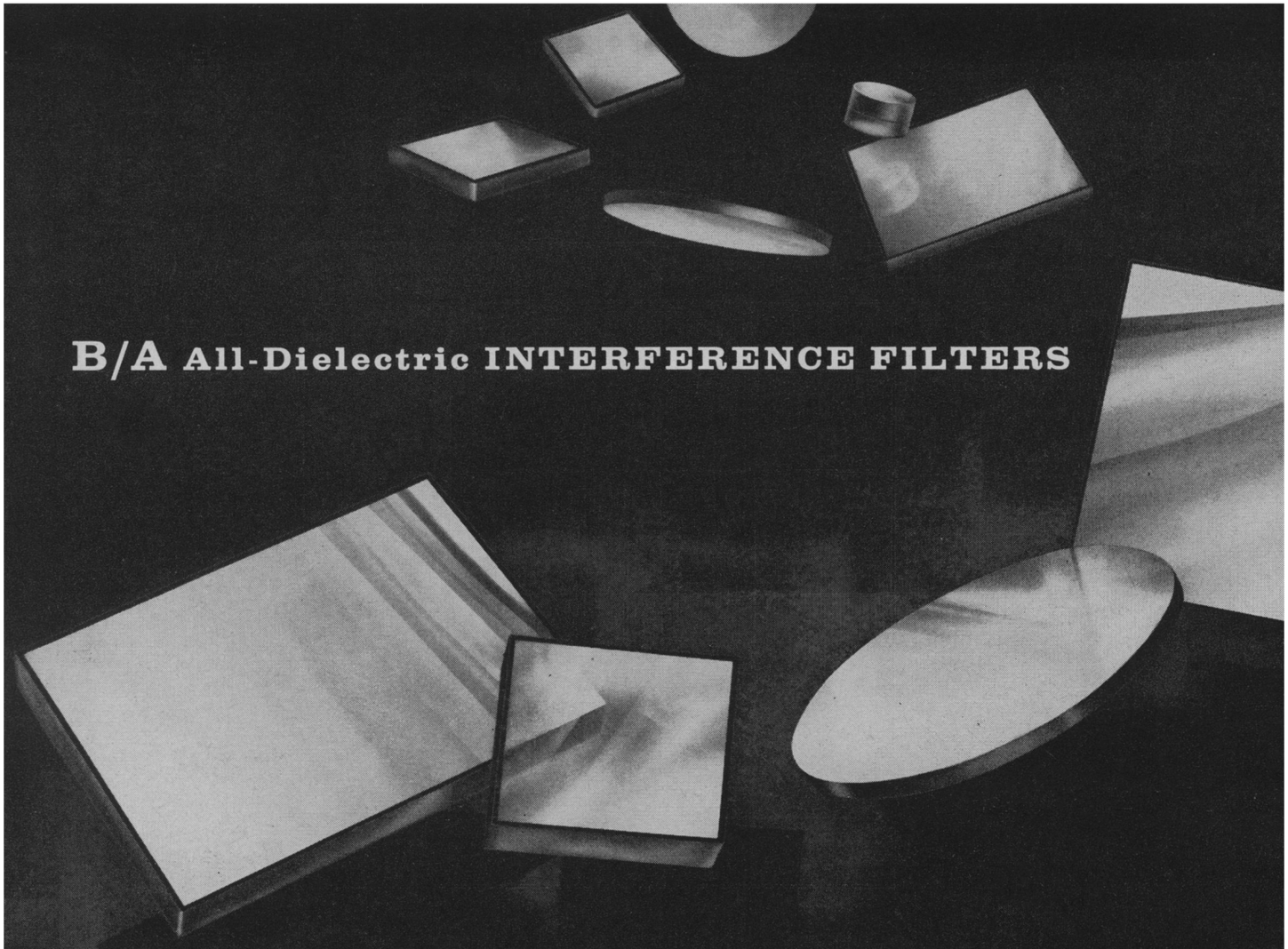

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The new 'block shape' ⎍ passband in the Visible Spectrum Filters enables the user to obtain the greatest degree of spectral purity.

If the filter you require is not available in stock, normal delivery time is within thirty to thirty-five days.

Standard filter sizes are 1″ x 1″ and 2″ x 2″; other sizes and shapes are available on special order. Write for your copy of our new filter brochure.

Engineers and scientists — investigate challenging opportunities with Baird-Atomic. Write Industrial Relations Department.

Visible Spectrum

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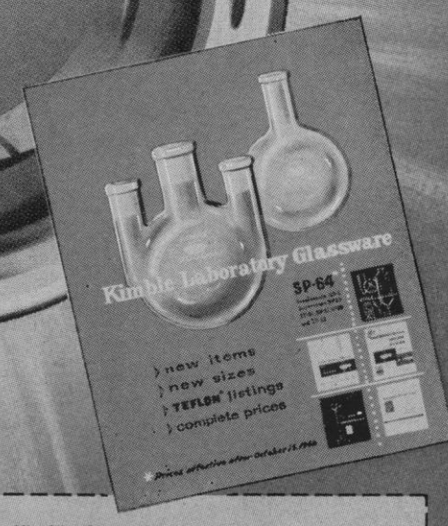

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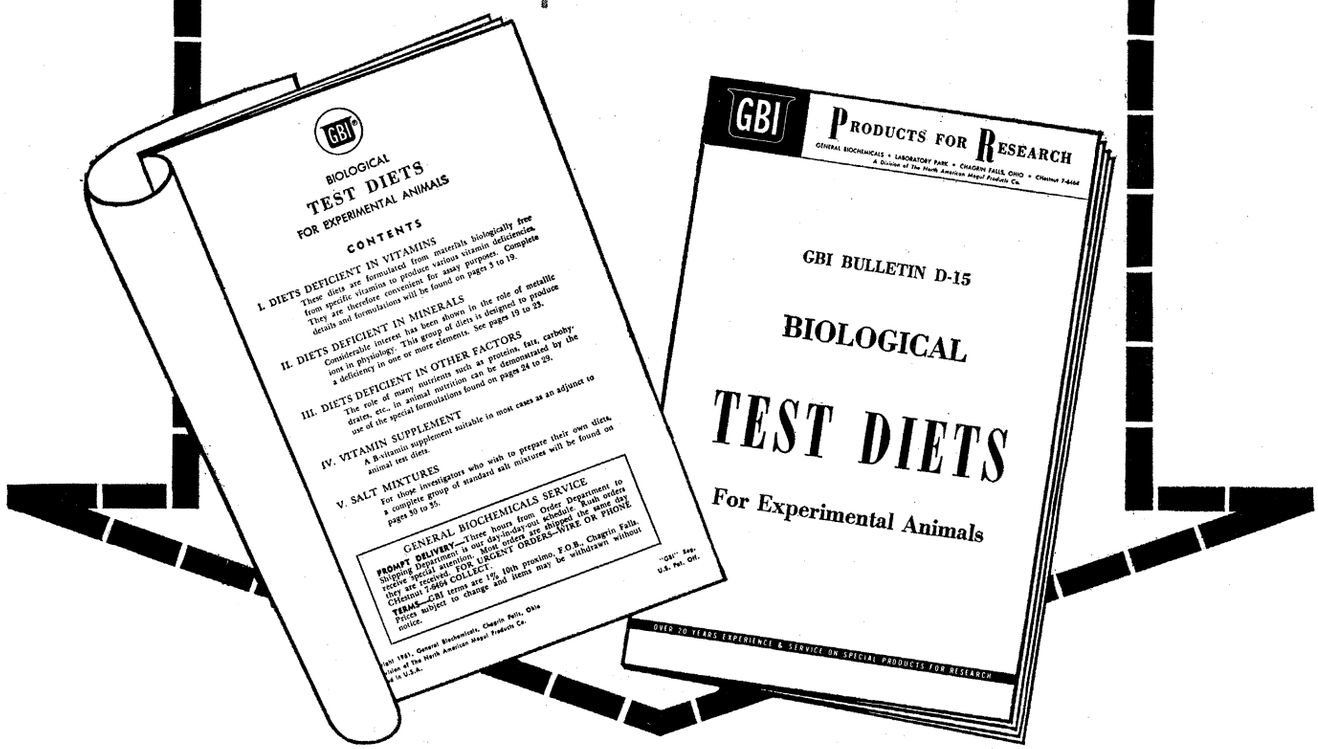

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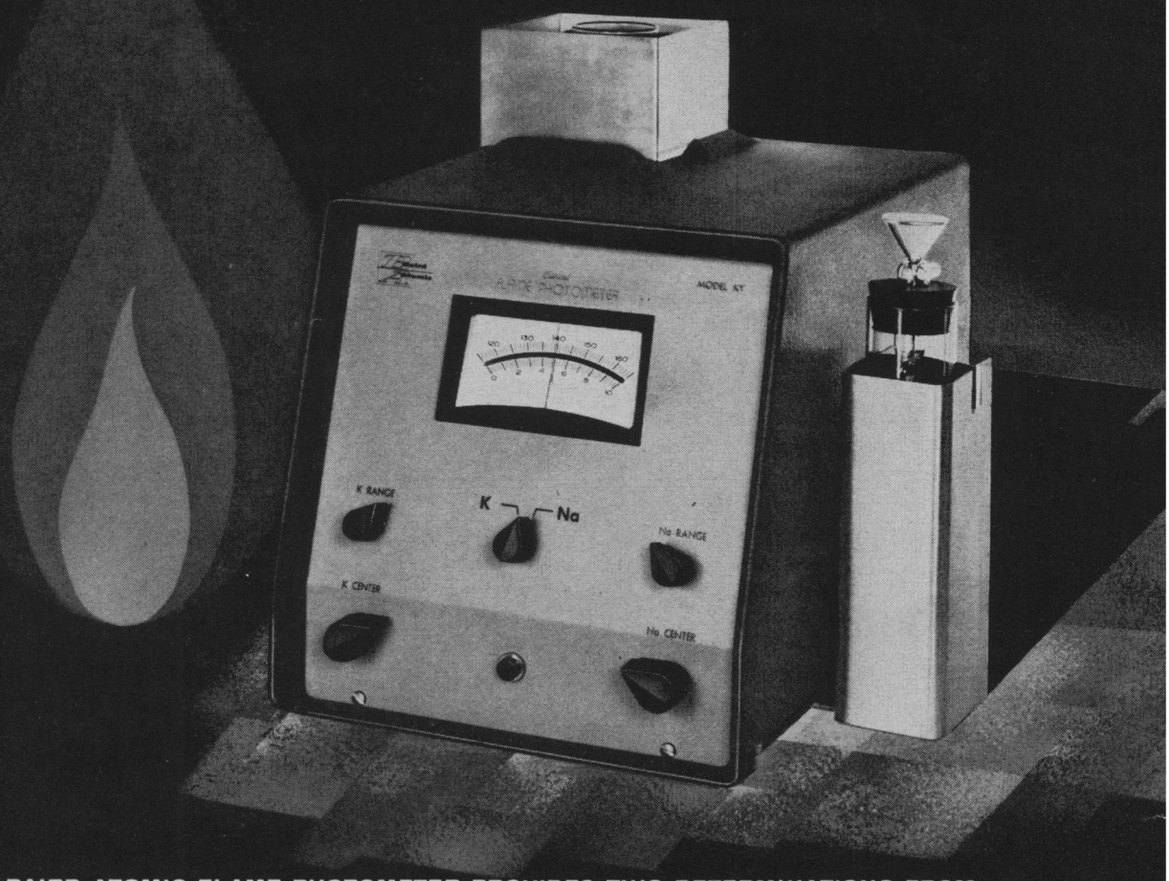

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Only the Baird-Atomic Flame Photometer offers you the combined advantages of:

- **Instantaneous meq/liter readout**
- **Double beam instrument accuracy**
- **Simultaneous single-sample determinations**

B/A Flame Photometer Condensed Specifications. Metals Analyzed and Guaranteed Sensitivity (1% of full scale):

Metal	meq/l	mg%	ppm
Na	0.001	0.002	0.02
K	0.0025	0.001	0.01
Li	0.028	0.02	0.02

Reproducibility: ±0.5% av. Size: 15″ x 17″ x 16″
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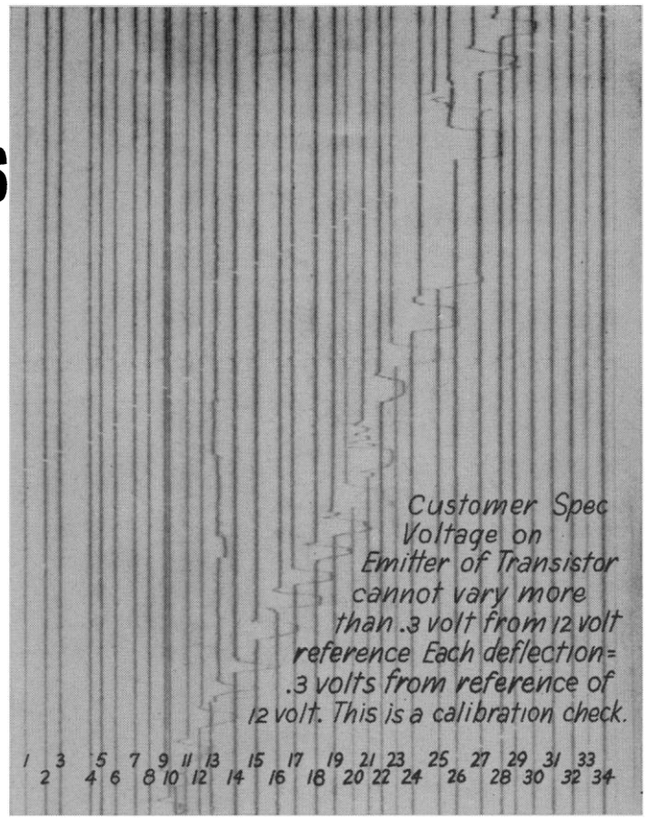
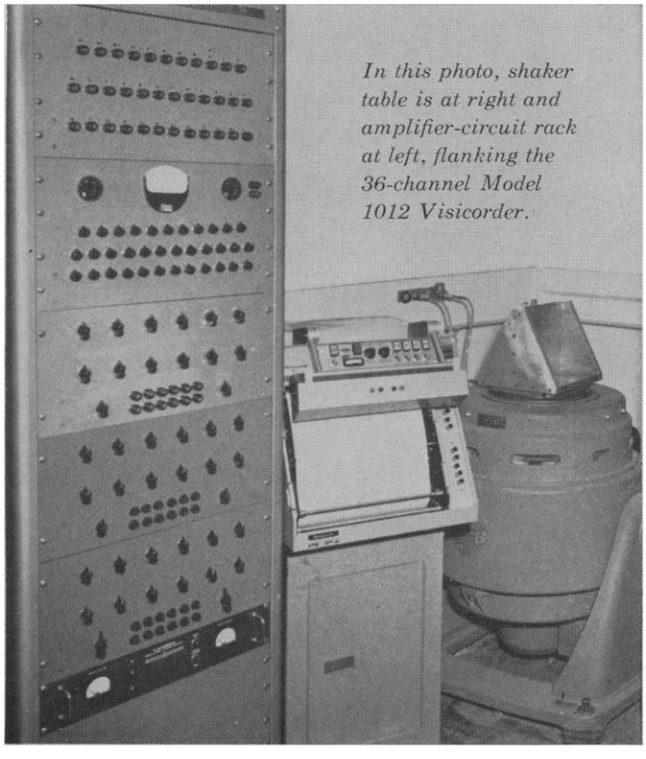
The VISICORDER records transistor torture

Transistors often have to work under incredibly severe environmental conditions. Production-testing them gave engineers at Honeywell's Semiconductor Division a chance to exploit the great versatility of the 36-channel Visicorder oscillograph Model 1012.

A certain order of transistors had to withstand vibrations of 10G at 10 to 2,000 cps without failing during the test or as a result of it. A standard test had been to measure the transistor's performance, next subject it to non-active vibration (not in any circuit), and then re-measure. This approach was obviously deficient as it did not reveal *operating* characteristics during test, nor did it disclose *intermittent*-type failures.



Unretouched record of vibration test on 36 transistors, each active in its own circuit during test.



In this photo, shaker table is at right and amplifier-circuit rack at left, flanking the 36-channel Model 1012 Visicorder.

The customer's quality requirements were stringent (AQL = .4%) and the large test sample required ruled out the use of an oscilloscope. The 3-hour test would have made a battery of scopes and operators necessary; transient defects would be missed due to eyestrain, fatigue, etc.

The Model 1012 Visicorder was chosen for the task as it simultaneously measures and records 36 channels of test information throughout the test period. The Visicorder instantly and directly records transients, no matter how random.

A Visicorder record like this is always a welcome supplement to your test data—your customer will be able to read it quickly and with full understanding. And it is a *permanent* record which *he* can show to *his* customer, if necessary.

For further information on how Visicorders can help to solve your instrumentation problems, contact your nearest Honeywell sales office without delay. Or write for Catalogs HC 906, 1012, 1108 and 1406, to:

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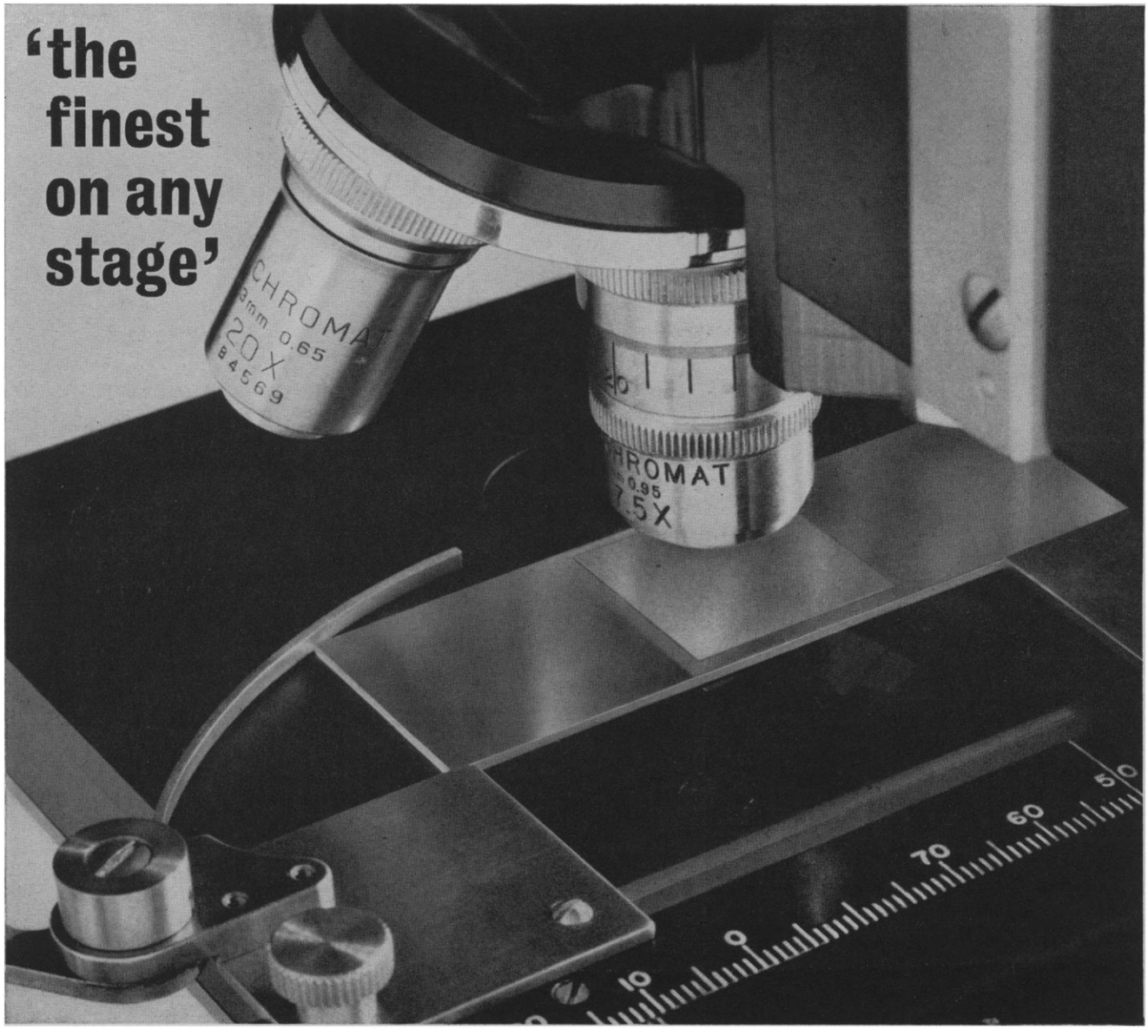

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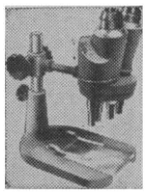

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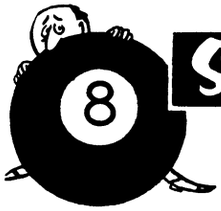

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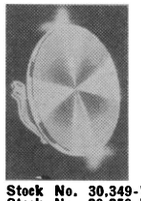

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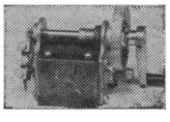

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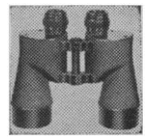

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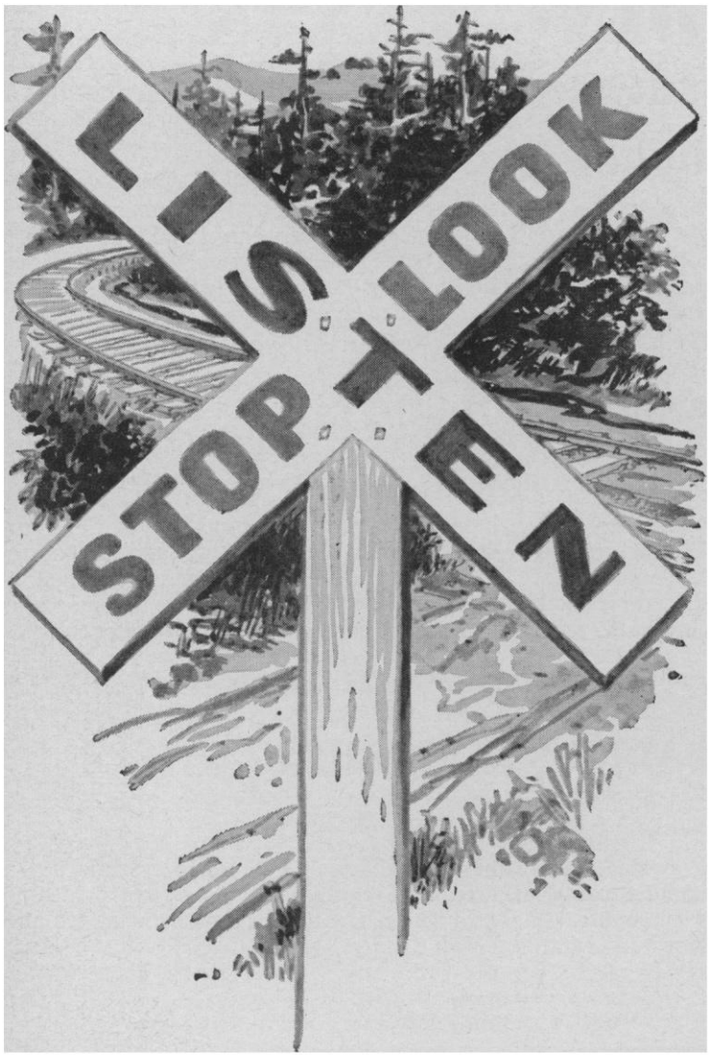

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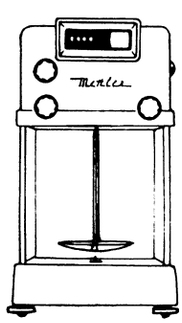

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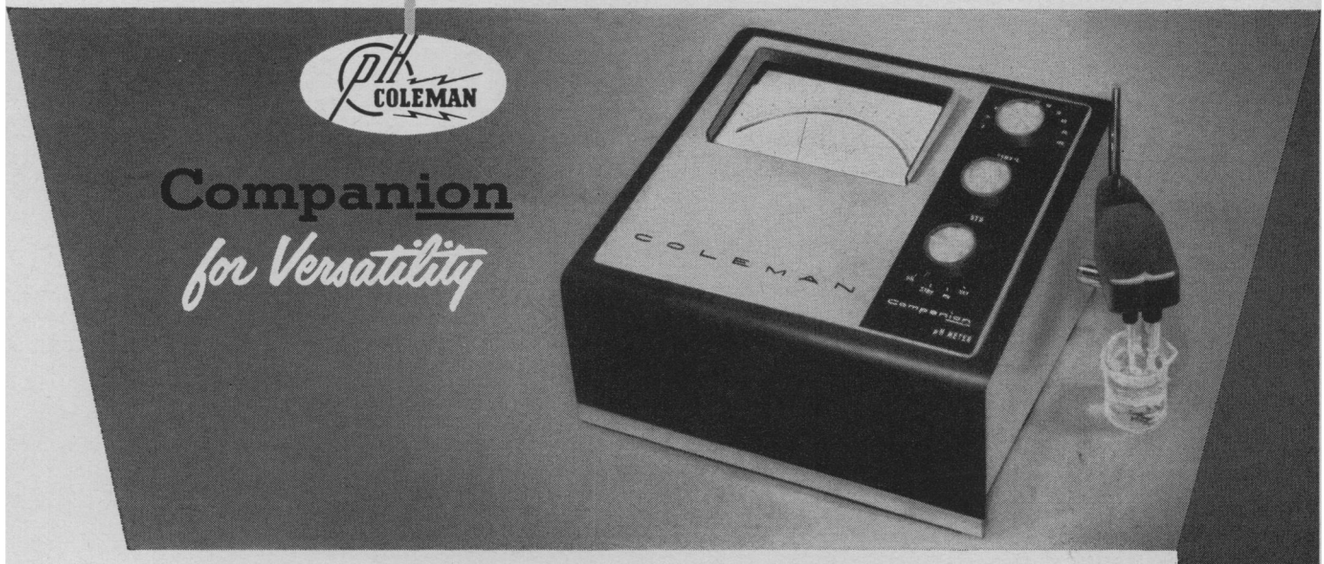

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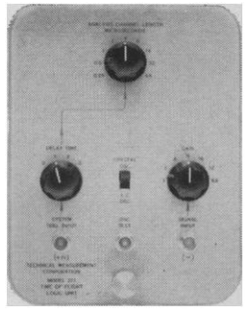

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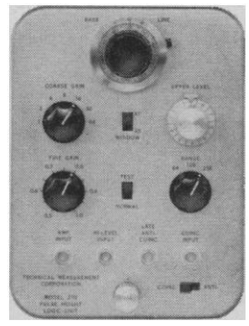

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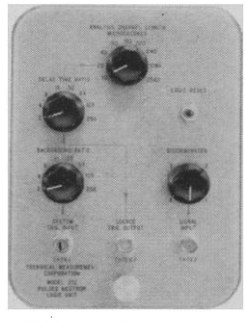

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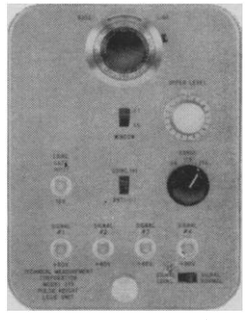

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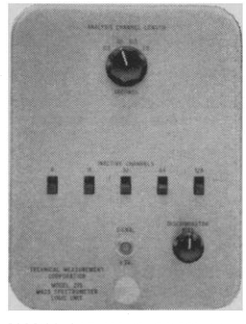

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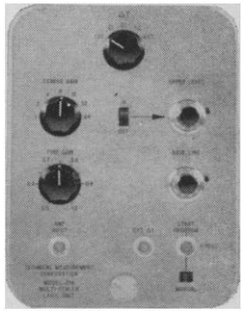

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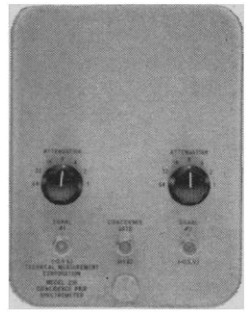

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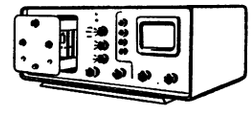

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What Laymen Can Ask of Scientists

In one of the essays in his last volume, *Resistance, Rebellion, and Death*, Albert Camus considers the question of what unbelievers like himself can ask of Christians, and his answer is relevant to the question of what laymen can expect of scientists. Camus warns first against a certain kind of hypocrisy, the hypocrisy of the man who does not accept the Christian truth but who, nevertheless, expects more of Christians than he does of himself. Christians have many obligations, according to the essay, but it is not the province of the unbeliever to recall them for the believer. Camus concludes, however, that he may permit himself to demand certain responsibilities of Christians—he has in mind, among other points, the failure of Rome to speak out immediately and clearly against political executions in Spain—but these responsibilities can only be those that must be required today of everyone.

The relevance of Camus's question to the question of what laymen can ask of scientists begins with the presence of similar opportunities for hypocrisy. Here also persons who do not follow a certain pursuit have the chance to indulge themselves by expecting special things of persons who do. Laymen can persuade one another that it is a simple matter to be a scientist and, from the vantage point of no personal involvement, expect scientists to be more selfless and lofty of purpose than they themselves are. Scientists and former scientists, it is true, sometimes encourage such expectations by saying that such virtues play an essential role in the scientific enterprise. There is the claim, for example, that there is something moral in the very grain of science. Scientists rarely fake experiments, and the reason, so the argument runs, is not that they are afraid of being caught in a lie by other scientists who try to repeat their experiments, but that scientists cannot tell lies and still achieve their objective of getting answers to the questions they put to nature.

There is an opportunity, then, to regard scientists as just a bit more saintly than other men, and so to make special demands of them. At the same time, interestingly enough, there is also an opportunity to regard scientists as just slightly greater sinners than other men, and so to make the same demands again. Men who are not scientists expect special atonement by scientists for the role they have played in the creation of many of the ills that now beset us. They demand atonement especially for the creation of that Sword of Damocles that hangs over us all, the atom bomb and the missile to deliver it. And again scientists have encouraged such demands.

But let us not give one another opportunities to indulge in hypocrisy. On the one hand, scientists may practice truthfulness in their work as a welcome necessity, but this does not mean that they embrace truth with equal fervor when it comes to seeking funds and recognition. And, on the other hand, in the application of science to military technology, it was not scientists who invented the occupation to which their talents have been applied with such stunning effectiveness. Any group, it is granted, has the prerogative to hold itself accountable in special ways. To paraphrase Camus, if there is anyone who can make demands of the scientist, it is the scientist himself. But what can laymen ask of scientists? As in the answer Camus gives to his question, there are obligations laymen can require of scientists, but these can only be the obligations necessarily required of any human being today, scientist or not.—J. T.

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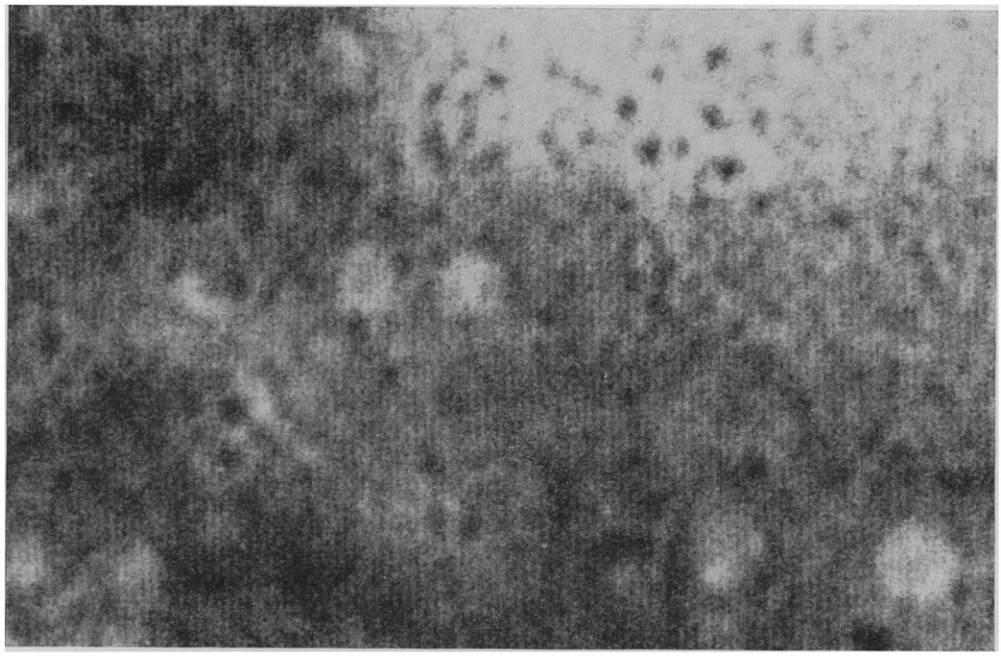

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scientist and a thoroughgoing scoundrel. Closer to our times, where was scientific honesty in F. Joliot's promotion of the germ-warfare fabrication in 1952? Didn't scientists participate in Nazi atrocity experiments or in Soviet brainwashing? On a more mundane level, I find scientists holding all manner of religious and antireligious beliefs, having all manner of political affiliations, just as do lawyers, doctors, and the rest. The ethical standards in scientific work are real (are they not also in other professions?), but that does not seem to keep us from having our full share of false prophets.

The supposition that particular technical knowledge possessed by scientists gives us a special claim to the role of leader (as opposed to technical adviser) I regard as silly, just as I regard parallel claims that generals and admirals should determine over-all war policy, that doctors and psychiatrists should decide on candidacy for sterlization or euthanasia, or that lawyers should rule on capital punishment.

I do believe that scientists should take active roles in community and national affairs, perhaps especially in areas where their technical knowledge and habit of open discussion is of help. Let this be done, however, with innate humility, with complete respect for other educated and intelligent people, and with no prior assumption that the measured opinions of the nonscientists are less worthy than those of the scientist.

I would not be so concerned with this first aspect of Sir Charles's address were it not for the second, and its implicit conclusion. In it I detect the not uncommon condition of 20/20 vision in viewing Nazi horrors and decided myopia with respect to Soviet ones. Should we not shudder as much at the slaughter of peasants as at the cremation of Jews? as much at the Hungarian massacre as at that of Lidici? Do we not deserve, even from an ex-scientist, as realistic and frank an appraisal of current evils as of past ones?

It is only realistic to see that, in test cessation negotiations, the horrible risk is that we will make nontrivial concessions and divorce the subject from general disarmament, giving an unretrievable military advantage to an undeniably hostile, amoral, and imperialistic regime. The consequences are ones the Hungarians, at least, well understand.

On the other hand, I find the so-called *N*-nation problem largely irrelevant. The current test moratorium did not prevent France and will not prevent Mainland China and other nations from scratching together some nuclear devices. Really, this is a minor hazard as compared to that of the large stockpile, the effective delivery system, and the freedom from moral restraint of the Soviets. In the meantime, the overblown concern with the *N*-nation, as well as with the fallout, problem is steadily deflecting us from a clear and resolute facing of what is actually the dominant danger to the world today: Soviet power and aggressive intent.

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I do not propose to reply piecemeal to comments on my article, certainly not to comments of this kind. When I am in the United States in April I shall probably take the occasion, in a lecture, to have a look at the problem in the light of what has been said since.

During that period there is going to appear an authoritative critical analysis of the kind of military review which I suspect Adamson supports. I would like this military analysis (which comes from a much more impressive source than mine) to be in the common pool before I have another go at the argument.

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Effective Use of Information

In the course of a study of the U.S. system for handling science and engineering information, the tremendous influence of the educational techniques employed in the training of U.S. scientists and engineers has become very apparent. Radical improvements in the information handling system are hamstrung by the educational system, which turns out a professional scientist or engineer accustomed to acquiring information by the complex, diffuse, and grossly inefficient techniques now in use. Habit patterns thus established in the schools are difficult to change.

The fruits of scientific and engineering discoveries (indeed, their very justification) lie in their application to mankind's daily problems, and the major stumbling blocks in the way of progress are human beings habituated to inefficient methods of acquiring, using, and disseminating information, floundering in an ever-growing morass of technical information. There seems little ground for hope that the flood of technical information will return quietly to its former, confined channels; the volume of published literature is doubling every decade or less. Piecemeal attempts to shore up the present information system will be helpful, but only for a short time. What is needed is a revolution in the training of scientists and engineers, so that their abilities to acquire information of a directly pertinent nature will be multiplied several-fold. I believe the average technically trained man could triple his productivity if he had a more efficient information system at his disposal, and if he were motivated and trained to use it.

It is true that some highly creative research workers on the frontiers of science are productive, even with the present inefficient information system. The numbers of people in these activities are, however, relatively small, and it is conceivable that even their creative productivity could be enhanced by better methods of acquiring and using available information. It is also true that groups of research scientists working with very large, expensive, experimental equipment such as linear accelerators probably know many workers engaged in similar research and exchange information with them informally. While this is true at one period in the history of any development, these frontier areas of science soon become like other well-established areas.

The incentive for a radical improvement in U.S. methods of handling technical information lies, of course, in the need for maximum utilization of the relatively few scientists and engi-

neers, in whose hands in large measure lies the national security. The extraordinary emphasis in the U.S.S.R. on training technicians to apply available information is well known. The emphasis which is given by the U.S.S.R. to technical information at the State Council of Ministers' level is also well known (even if it is not so well known that the centralized information structure is performing erratically). The United States was founded to give the individual room for maximum development, and its educational system is based on giving each person an opportunity to develop his or her talents to the maximum extent possible. The United States might well make a large national effort to discover and apply new and better techniques for training individuals in the most effective use of information, and then to devise an information system which can serve these better-developed citizens.

W. T. KNOX

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Style Manual for Biological Journals: Approval of Manuscripts

Researchers ordinarily submit manuscripts to their professional journals without prior approval by administrative officers of their institutions; at least this is true in universities. Do editors consider this an undesirable practice and one to be combatted?

The Committee on Form and Style of the Conference of Biological Editors has issued a little book entitled *Style Manual for Biological Journals*. Chapter 3 of this begins, "The author should obtain approval from the responsible official within his institution before submitting a manuscript, to safeguard the interests of all staff members against erroneous or premature publication."

It is true that erroneous and premature publication harms the author and makes his institution ridiculous, but that is a small matter compared with the good effects our present editorial system has on science in general. As a rule, the journals will consider a manuscript regardless of who the author is and will see that it is reviewed by experts. If these men think it is good, it will be published. If they think it is bad, and the author isn't convinced, he can get the manuscript back and try a different journal. It is surprising that editors should undervalue their own role in the scientific process and should seek to legitimize a veto power by presidents, deans, and department heads.

Where administrative censorship is

practiced it usually exists in combination with an authoritarian constitution under which the department chairman is appointed for life and already holds a veto over pay raises and promotions. If he alone also controls the department budget, makes assignments of office and laboratory space, and decides on teaching assignments, it is understandable that his remarks on manuscripts carry a lot of weight. Under these circumstances I have known of instances in which a department head (i) insisted on changing the title and thus minimized the article's legitimate claim to consideration; (ii) sat on the article; (iii) penciled his name on the title page and thus became co-author.

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Radiation from Solar Flares

We have read with some interest the article in *Science* [**133**, 312 (3 Feb. 1961)] entitled, "Limitations on space flights due to cosmic radiations," by Howard J. Curtis. The work discussed reported on the effect of concentrated doses, and the results represent an important finding, for they completely remove any doubt which may have remained about the ability of the galactic cosmic rays to cause radiation problems in space.

However, we are somewhat disturbed that an article on an important topic which is in a journal widely read by biologists should have omitted a discussion of the potentially most troublesome source of radiation. We refer to the frequent storms of solar cosmic rays originating in large flares.

These storms have been widely discussed at meetings of the American Physical Society and the American Geophysical Union. The literature abounds with papers on the subject, many of which point out the very serious radiation hazard to space flight outside the earth's magnetic field or in the polar regions. We are quite certain that every technical group considering space flight is well aware of this problem and has gone to considerable effort to examine the difficult problem of shielding against the solar cosmic rays. We have in our files many reports on the subject of shielding, as well as records of conferences with the space agency, the Radiation Research Society, the Air Force medical groups, and other organizations. All of the authors quoted in Curtis's article, we are sure, are also familiar with the solar cosmic rays and their potentially dangerous effect from the standpoint of radiation.

Great flares on 23 February 1956, in May 1959, and in July 1959 produced dangerous radiation levels and have been widely studied. The recent solar-flare eruptions in November of 1960 produced exposures, due to protons in the energy range 50 to 500 Mev, of 1 rad/hr in balloon instruments in the atmosphere. The free space radiation probably approached 100 rad/hr. This dosage represents a very large event, but the other strong events mentioned probably produced similar radiation levels. The total number of such events, of all sizes, was more than 35 during the last 3 years. For programs such as the Apollo program and others involving extended trips away from the earth, this radiation is a matter of serious concern and, at solar maximum, is difficult, if not impossible, to deal with.

JOHN R. WINCKLER
EDWARD P. NEY
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Winckler and Ney are quite correct in indicating that the solar-flare radiation is an important aspect of the radiation hazards of space flight. At the time my article was written, nearly a year ago, there had not been enough measurements in space for us to be able to assess the biological hazard, so I discussed the flares as a perturbation on the radiation belts. Now we know, largely through the excellent work of Winckler and Ney, that they constitute an additional hazard which will be very troublesome for some types of space travel. In such an active field, a review article may be out of date by the time it is published.

HOWARD J. CURTIS
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Meeting of Zoologists

A most unfortunate impression of the recent annual meeting of the American Society of Zoologists is created by your story [*Science* **133**, 89 (13 Jan. 1961)]. Although few in number, those present did devote much of the meeting to matters of professional concern to the members of the society, and it was only when adjournment appeared imminent that there was introduced the statement featured in your story. The subsequent discussion was hurried, and the action of the society on the many amendments and modifications of the statement you quote [recommending government implementation of programs for research and training in the

field of birth control] was extremely confused. My own recollection of our last action on this matter before the conclusion of the meeting leads me to consider your story seriously inaccurate.

In the course of the discussion there was raised a question of the ability of this small group to consider this matter within the limitations imposed by the new constitution of the society. Without a formal ruling on this question, the matter was put to a vote. Of approximately 60 members present, two or three more than 30 favored the proposal, and two or three less than 30 opposed. Regret at the narrow margin of voting was expressed by several speakers, including, I think, those who had introduced and seconded the original proposal. A number of modifications and amendments were then introduced and discussed. Finally, it was moved and seconded that the proposal should be submitted for rewriting to a committee to be appointed by the president of the society. This motion was passed by a clear vote, and the meeting was adjourned. It appeared to me, at that time, that such action required the submission of the rewritten proposal to a subsequent meeting, after proper consideration of the possible constitutional requirement for the submission of the question to the written vote of the entire membership.

In contrast, the action on Prosser's resolution of opposition to Senate Bill 3570 [on regulating the use of laboratory animals] was definite and strong. It was apparent to all that such legislation would present a serious threat to the professional activities of the members of the society, and that such a direct attack upon the chief concern of the society, the advancement of biological research, required the strongest action and fullest energies of the society. Such concerted action was inhibited by the second resolution, as was apparent to nearly half of those present. That this expectation has been fulfilled could scarcely have been demonstrated more effectively than it was by your story. Beyond the short introductory paragraph, you devote 36 lines to the proposal of divided interest and only 19 lines to opposition to a major threat to biology—a ratio of nearly 2 to 1 in the wrong direction.

I hope that those concerned about Senate Bill 3570 are exaggerating the danger. But discussions among people not concerned with biological research do not support that hope. Indeed, such conversations suggest that even Prosser and Wilbur, who have been particularly active in this campaign, may be underestimating the public support for this pernicious proposal. If such be the case, it appears particularly unfortunate that we should divide whatever slight influence may be exerted by the society and by the AAAS.

It is hoped that your future treatment of the actions of associated societies may reflect more accurately the intensity of the concern of the membership for proposals before the legislatures. Surely, no member of Senate or House could be blamed for concluding, after reading your report, that the American Society of Zoologists is only mildly interested in Senate Bill 3570. To me, at least, this did not appear to be the sense of the meeting.

PAUL FOLEY NACE

McMaster University,
Hamilton, Canada

As retiring secretary of the American Society of Zoologists, I wish to comment briefly on Nace's assertion that the society acted hastily, confusedly, and probably illegally in passing a resolution urging governmental support of research and the training of medical personnel in the field of birth control while acting at the same time in a strong, definite, and admirable manner in passing a resolution against Senate Bill 3570, the so-called Cooper bill to regulate the use of laboratory animals. I would also like to comment on the charges that *Science* was "seri-

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ously inaccurate" in reporting the annual meeting at which these resolutions were passed, and that it showed gross bias in devoting 36 lines to birth control and only 19 to animals for research.

As to the facts of the reporting, there hardly is any room for inaccuracy in the *Science* account since it consists merely of a very short paragraph stating that the two resolutions were passed and then quotes each of the resolutions. The reason why 36 lines are devoted to birth control and 19 to animals for research is very simple: the birth control resolution required 36 lines to print, the animals for research resolution, 19 lines. Everyone admits that both resolutions passed and that well over a quorum was present, even under the new constitution, which more than doubled the number required.

I have reread both the new and the old constitution and can find no suggestion, much less requirement, that motions passed by the members at the annual meeting should be sent to absent members for a mail vote.

How much confusion there really was is a debatable point. A motion was offered favoring governmental support for research and medical training in the field of birth control. Only two or three people spoke against it. I myself, perhaps unfortunately, then urged an amendment, but the majority felt it weakened the resolution, which passed in its original form, 39 to 25. Thus 61 percent favored the resolution in its "strong" form. Presidents of great nations more than once have been carried into office on far slimmer margins. Nevertheless, the matter was still further discussed, and it was finally agreed, almost, but not quite, unanimously to accept the motion but with the provision that it should be reworded by a committee before publication. This was done. I was appointed to the committee myself.

Of course it is possible to argue that the customarily small number of people who show up at annual business meetings is not a representative sample. However, there are good reasons, based on past experience, for believing that, at least in the American Society of Zoologists, the members who attend are, in fact, reasonably representative.

It is also possible to argue that to advocate research and free access to scientific knowledge in the field of birth control is wrong because a scientific organization should remain morally uncommitted. This is clearly not Nace's view, because he strongly favors society action against Senate Bill 3570.

GAIRDNER B. MOMENT

American Society of Zoologists, Goucher College, Baltimore, Maryland

Institutions and Scholars

The article "Personality and scholarship" [*Science* **133**, 362 (10 Feb. 1961)] by Paul Heist, T. R. McConnell, Frank Matsler, and Phoebe Williams, of the staff of the Center for the Study of Higher Education, University of California, Berkeley (except for Matsler, who is at Humboldt State College), contains the following incorrect statement (p. 363, col. 2): "The institutions are listed in the order of the Knapp and Greenbaum indices of productivity. It may be noted that about 70 percent of the 216 male students attended the ten most productive institutions." [As stated by the authors, the Knapp and Greenbaum index of productivity was the "number of students per thousand graduates from 1946 to 1951 who later received either (i) Ph.D. degrees, (ii) university fellowships, (iii) government fellowships, or (iv) private foundation fellowships exceeding $400 per year."] Table 1 in the article is not arranged in the "order of the Knapp and Greenbaum indices of productivity," as stated. It is arranged according to the ratio of

Table 1. Institutions listed according to production of scholars, as described in the definition of the Knapp and Greenbaum indices of productivity.

School	Scholars per 1000 graduates (*N*)
Males	
Swarthmore	61
Reed	53
University of Chicago	48
Oberlin	40
Haverford	40
California Institute of Technology	38
Carleton	35
Princeton	32
Antioch	32
Harvard	27
Yale	27
Queens	26
Grinnell	24
Wesleyan	22
Kenyon	22
Johns Hopkins	21
Massachusetts Institute of Technology	21
University of the South	20
Knox College	20
Cornell	20
Cooper Union	18
Beloit	18
Columbia	18
Pomona	17
Wooster	17
Augustana	17
DePauw	17
Females	
Bryn Mawr	40
Barnard	26
Radcliffe	20
Vassar	17
Cornell	16
University of Pennsylvania	16
McMurray	12
Mt. Holyoke	12
Smith	11
Sienna Heights	11
University of Chicago	11

National Merit Scholarship students per thousand students enrolled. The actual "order of the Knapp and Greenbaum indices of productivity" [R. H. Knapp and J. J. Greenbaum, *The Younger American Scholar* (Univ. of Chicago Press, Chicago, 1953), pp. 16, 70] is as shown here in Table 1.

Although in general there is a high degree of correlation between the two listings with respect to the schools included, comparison of the two tables will show that there are gross differences between the two in the rankings for individual schools, as would be expected. Moreover, a few of the schools that appear in the listing given here do not appear at all in Table 1 of the article—for example, Antioch, Queens, Kenyon, Cooper Union, Beloit, and Wooster for males and McMurray and Sienna Heights for females. On the other hand, the following schools listed in Table 1 of the article were not among the first 27 for males in the Knapp and Greenbaum index of productivity: Amherst, Williams, Brown, University of Pennsylvania, and Dartmouth. Swarthmore and Grinnell were not among the first 11 for females. It is obvious that this is due to the meager statistical significance of many of the data in Table 1 of the article. More than half of the schools listed in that table had four or fewer National Merit Scholarship students. The table should have indicated that the data were for one year only (1956), and that many of the individual listings were not statistically significant. (Or, obviously, data that were not statistically significant could have been left out, or the table could have included the eight schools mentioned above that were in the Knapp and Greenbaum indices for productivity but did not happen to have any National Merit Scholarship students in 1956.)

There is a critical lack of published information that can give an indication of the comparative qualities of various schools; it is desirable to have information published that can be used to help fill this need. But precisely because of the intensity of interest in this kind of information, because of the use to which any data such as these will be put, and because of the sensitivity of any such ranking as this (involving both productivity and ratio of National Merit Scholarship students), it was incumbent upon Heist *et al.* to make every effort to forestall inaccurate interpretations. In this instance, without knowledge of the Knapp and Greenbaum book, it would be very difficult for the average reader to obtain an accurate impression.

ROBERT T. JORDAN
Council on Library Resources, Inc., Washington, D.C.

We want to thank Robert T. Jordan for calling attention to the following incorrect statement in our article: "The institutions are listed in the order of the Knapp and Greenbaum indices of productivity." The title of our Table 1, however, is correct: "Distribution of male and female National Merit Scholarship students among institutions ranked high in the production of scientists and scholars." This table head indicates the basis for ordering the institutions.

The sentence immediately following the incorrect statement is accurate as it stands; the "70 percent of the 216 male students" refers to the number of the ten *most* productive institutions (California Institute of Technology excluded) listed in the Knapp and Greenbaum volume.

Needless to say, we would like to avoid giving the reader a basis for inaccurate interpretation, and we believe that the article does not imply that there are differences in quality among the institutions listed in Table 1. We avoided making any qualitative comparisons among these schools, since our purpose was simply to present differences between the students who entered a group of more productive institutions and the students who entered a group of less productive institutions.

There would be no point in computing the statistical significance of the differences in numbers or proportions of National Merit Scholarship students attending the institutions listed in our Table 1. This would obviously be irrelevant.

For the purpose of simplicity, we included in our Table 1 only those of the 50 highest-ranking institutions in the Knapp-Greenbaum list in which one or more of the 1956 National Merit Scholarship students happened to be enrolled. We see no reason why a careful reader would find any implication concerning the relative quality of institutions in this table.

Knapp and Greenbaum did not include Swarthmore and Grinnell in their final list for females because the two institutions did not have 400 graduates over the period of the study. We included these two colleges in our Table 1 for the following reasons: (i) the number of graduates from these institutions approached the Knapp-Greenbaum criterion figure of 400 (397 for Swarthmore and 372 for Grinnell) and far exceeded the figure for most of the other institutions; (ii) the Knapp-Greenbaum indices of the number of female scholars per 1000 graduates [Knapp and Greenbaum, *The Younger American Scholar* (1953), appendix 1, p. 103] placed these two institutions second and third, respectively, following only Bryn Mawr in order of rank; (iii) both institutions ranked high on the indices for male graduates.

We believe that the text made it clear that the data were for one year only, since it was stated that "the sample . . . consisted of all the winners and a 10-percent sample of those who received certificates of merit (the near-winners) from the National Merit Scholarship Corporation in the spring of 1956."

PAUL A. HEIST
T. R. MCCONNELL
Center for the Study of Higher Education, University of California, Berkeley

Salivary and Motor Conditioning

I was greatly astonished when reading a report by Martin M. Shapiro published in *Science* under the title "Respondent salivary conditioning during operant lever pressing in dogs" (*1*). The result obtained by the author, as formulated in the abstract, runs as follows: "Respondent salivary conditioning was found to occur during operant

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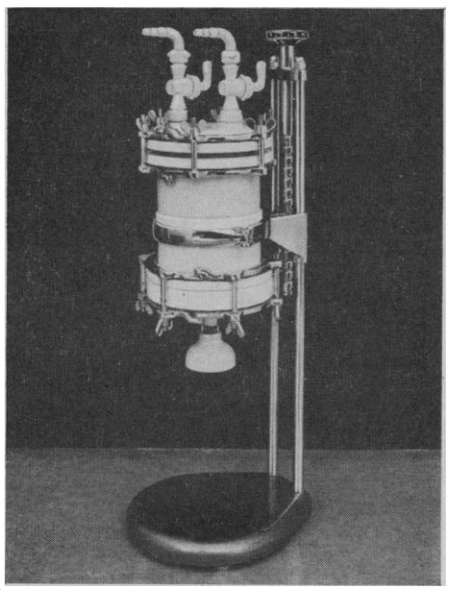

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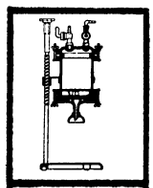

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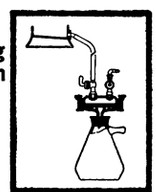

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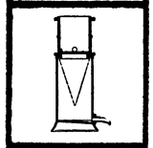

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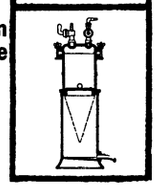

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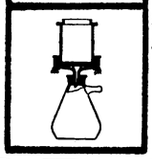

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lever-pressing conditioning, the occurrences of the two conditioned responses being positively correlated."

The method of combining the salivary (type 1) with the motor (type 2) conditioned response used by Shapiro was first described by Konorski and Miller as early as 1930, in French, under the title "Méthode d'examen de l'analysateur moteur par les réactions salivo-motrices" (*2*). Since that time a great number of experimental studies have been published in which this method was used in various experimental conditions. Although extensive monographs dealing with our prewar studies of this subject were published only in Polish (*3*) and Russian (*4*), references to these and other papers, as well as the general description of the facts obtained, were presented not only in my English monograph concerning conditioning (*5*) but also in various American papers and monographs by Razran (*6*), Hilgard and Marquis (*7*), and others. After the war all papers of our laboratory were published in English in *Acta Biologiae Experimentalis*, a journal easily available in America. The method is also used in several Russian laboratories.

It is really regrettable that facts which are generally known by those concerned in the given subject are published among the papers reporting new scientific achievements.

J. KONORSKI
Department of Neurophysiology, Institute of Experimental Biology, Warsaw, Poland

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5. J. Konorski, *Conditioned Reflexes and Neuron Organization* (Cambridge Univ. Press, London, England, 1948), pp. 267 ff.
6. G. M. S. Razran, *Psychol. Rev.* **46**, 445 (1939).
7. E. R. Hilgard and D. G. Marquis, *Conditioning and Learning* (Appleton Century, New York, 1940), pp. 429 ff.

Konorski has raised the question of the extent to which my report in *Science* was a new contribution to the study of the relationship between operant and respondent conditioning. Unfortunately, particularly in psychology, even minor differences in experimental procedure seem to make quite a difference both in the results obtained and in their interpretation. There are major differences between the procedures used by Konorski in his studies and those used in my series, of which the report to which we are referring was the first publication. (i) In the work described by Konorski (*1*), a leg-lifting

response was conditioned by following the passive lifting of the leg with food. The experimenter, by mechanical means, produced the response in the initial training trials. In the experiment which I reported, lever pressing was conditioned by following its operant occurrence with food. (ii) Konorski's animals were restrained in a stand. My animals were in an experimental space with freedom of movement. (iii) The relationship between operant and respondent behavior was studied with regard to a specific schedule of reinforcement—fixed interval. It is conceivable that the nature of the relationship will be found to be a function of the different reinforcement schedules—that is, "facts which are generally known by those concerned in the given subject" may not be general facts.

I was pleased to find that Konorski had read my paper in *Science*, or the reprint which was sent to him unsolicited. I have always found the published reports of Konorski's experiments most interesting and was grateful for the opportunity to discuss them with him personally on two different occasions, once in Baltimore, Maryland, and once in Bloomington, Indiana.

MARTIN M. SHAPIRO
Department of Psychology,
University of Houston, Houston, Texas

Reference

1. J. Konorski, *Conditioned Reflexes and Neuron Organization* (Cambridge Univ. Press, London, England, 1948). pp. 2-232.

Wildlife Ranges in Alaska

I have tardily read a news note [*Science* **132**, 1878 (1960)] dealing with Alaskan wildlife ranges. It is unfortunate that so respected a publication should inadvertently be a tool for propagating misinformation concerning these national wildlife ranges.

First, I would like to observe that Canada has expressed only opposition to the establishment of comparable ranges in the Yukon Territory adjacent to the Arctic Wildlife Range of Alaska.

Second, I would like to point out that the ranges are not needed for the protection of "Arctic caribou, grizzly bears, Dall sheep, moose, and marine mammals, whose numbers are dwindling," as reported in the published news note. Many of these species are probably as abundant as ever before in the history of white man's occupancy of Alaska.

Alaska's caribou, sheep, and moose populations are all at high levels of abundance, and even the most intensively hunted populations around human population centers are being maintained or increased under the state's

management program. We recognize that grizzly bears are not compatible with land development by human beings, but even these animals are certain to maintain their numbers over most of Alaska with the protection and management being afforded them by the state.

The question as to whether or not there was justification for establishing additional, enormous wildlife ranges in Alaska does not, therefore, hinge on the welfare and continued abundance of certain species of game animals, but is rather tied in much more closely with the issue of whether federal or state control of huge parcels of land is the more desirable.

Federal control of vast areas in Alaska precludes implementation of Section 4, Article 8 of the Constitution of the State of Alaska, which reads: "Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State, shall be utilized, developed and maintained on the sustained yield principle, subject to preference among beneficial uses."

It is the contention of many Alaskans that absentee authorities, which so long directed the destiny of Alaska as a territory, are less apt to provide the wisest possible management of the state's resources. It is, furthermore, certain that Alaskans above all others cherish and wish to preserve their wild and renewable resources, including the wilderness aspect of Alaska.

In view of these considerations I suggest that the pros and cons concerning establishment of these new wildlife ranges in Alaska are somewhat complex, and that more is involved than the protection of certain animals, as implied in your news note.

C. L. ANDERSON

Alaska Department of Fish and Game, Juneau

Quantum Mechanics and Freedom

The article by S. S. Kety, "A biologist examines the mind and behavior" [*Science* **132**, 1861 (1960)], points out correctly that in order to grasp a biological problem the investigator has to understand the necessity of using various approaches in both the methodological and the conceptual sense, because a biological structure is a composite of different levels of organization. Kety errs, however, when he brushes away, as irrelevant to the problems of mind and behavior, the principle of indeterminacy of quantum mechanics and the acausal character of the elementary quantum processes, by assumming that the source of this principle and of the acausality of elementary quantum processes is the clumsiness of our instru-

ments, which has made it impossible for us to determine, simultaneously, the position and motion of every particle. ("It would seem," he says, "that the concepts of freedom and purpose in the universe should be based upon nobler stuff than the clumsiness of our instruments.")

The point made by the quantum mechanics is that the inability to establish, simultaneously, precise measurements of the position and motion of an elementary particle is due to the inherent acausal "freedom" of this particle. As expressed by P. A. M. Dirac [*The Principles of Quantum Mechanics* (Oxford Univ. Press, New York, new ed., 1935), p. 10]: "When an observation is made on any atomic system which has been prepared in a given way and is thus in a given state, the result will not in general be determinate, i.e., if the experiment be repeated several times under identical conditions several different results may be obtained." Consequently, if certain mental processes are elicited by quantum processes on the molecular level of observation, which seems quite possible, the quantum mechanical "freedom" as highly relevant to these processes is a hypothesis not to be minimized in our concepts of the problems of mind. I am referring, in this connection, to the book by Pascual Jordan, *Die Physik und das Geheimniss des organischen Lebens* (Vieweg and Sohn, Brunswick, Germany, 1948).

SILVIO FIALA
Department of Pathology, Columbia University, New York, New York

I am grateful to Fiala for pointing out what could have been interpreted as a rather cavalier dismissal of a controversy which has rocked modern physics for the past three decades.

While the Heisenberg principle of indeterminism may originally have been only a simple recognition of instrumental interference, it quickly became elaborated by Bohr and by Heisenberg himself into a doctrine of the inherent unpredictability and, in fact, acausality in the behavior of the elementary subatomic particles. This inference of the "Copenhagen school of physics" has received wide acceptance by quantum physicists, although it would not be correct to imply that it has achieved universal acceptance. In fact, de Broglie, Planck, and Einstein remained unconvinced of its validity.

I should like to point out, however, that those who accept that doctrine and wish to use it as a scientific basis for a belief in human freedom should be willing to assume a difficult if not impossible task. Since a single neuron is composed of thousands of billions of such elementary particles and a single

voluntary act requires the approximately simultaneous action of at least several thousand neurons in concert, it will be necessary for them to explain what is difficult for me to imagine—the means by which sufficient order, let alone purpose, emerges from the random behavior of these countless congeries of particles, especially since the very concept of acausality brooks no possible interaction in this respect between the particles. It may be possible to imagine a means whereby certain particles may be given the possibility of dictating the behavior of the whole. Even by this great stretch of the imagination, however, what would result would not be "free will," or freedom of the individual or even of a single neuron, but a response which was completely random, acausal, and nonpurposive.

I should like to amend my previous statement, quoted by Fiala, to read: "It would seem that the concepts of freedom and purpose in the universe should be based upon nobler stuff than the clumsiness of our instruments *or the acasual, random noise of the subatomic particles.*"

SEYMOUR S. KETY
Laboratory of Clinical Science, National Institute of Mental Health, Bethesda, Maryland

I hope that Kety's article will be read widely, especially by college presidents, college division or department chairmen, and state and federal civil service executives. However, as one who has grubbed hard and long most of his professional life trying to modify human behavior through the techniques of social work and group psychotherapy, I am afraid that the fond wish behind such sentiments has little chance of being realized. I think that Kety's eloquent plea for flexibility and increased communication among the various disciplines, or even for checking the proliferation of specializations which continues to sweep the academic and scientific communities, will only be heard by those like myself who are already convinced.

Besides the over-all excellence of his essay I was especially delighted by his charming and sly parable, "The true nature of a book." Although it falters somewhat when it touches on the last group, the behavioral scientists ["Finally, the book is brought in desperation to the psychoanalyst in the hope that he will be able to read it. That he does not do precisely, but instead asks the author to select portions and read them while he listens. . . ." (What author?)], its over-all impact is not inconsiderable.

Kety suggests that psychoanalysts, despite their biases—or even because

of them—or their lack of scientific discipline, may have a great deal to offer. This is all to the good. But why stop at psychoanalysts? How about social workers, who are also in the day-to-day business of trying to understand and modify behavior? Although their terminology is not as exotic as that of the analysts, I can assure you that they are just as biased, and furthermore, they outnumber psychoanalysts about 50 to 1.

And finally, let us not forget the poets. Perhaps in the last analysis it may very well be the rare insight possessed only by some future poet which will unlock a few of the mysteries of human behavior.

JOSEPH ANDRIOLA
Department of Mental Hygiene, Atascadero State Hospital, Atascadero, California

Palestine Refugee Problem

Wendell Cleland, in his review of Lengyel's *The Changing Middle East* [*Science* **132**, 614 (1960)] cites Lengyel's failure to mention the assassination of Count Bernadotte as an example of pro-Israel bias. The assassination of Count Bernadotte, for which the small and dissident Stern group was held responsible, was abhorred and condemned by the government and people of Israel. The group was forcibly disbanded immediately afterwards. The military action of the Irgun Zvi Leumi (Etzel) at the village of Dir Yassin, near Jerusalem, took place before Israel existed as a state. Both of these terrorist groups during the British mandate refused to accept the discipline or the democratic will of the Jewish community of Palestine, expressed through its national council and defense group, Haganah. To hold Israel responsible for these two actions, condemned by the Jewish authorities, population, and defense forces, is certainly unjust. Moreover, this action at Dir Yassin was the only action of its kind conducted by any Jewish group, dissident or otherwise; hence, the expression "the massacres of Arab villagers which created the refugee problem" is a distortion.

The fact is that the Dir Yassin incident did not create the Palestine Arab refugee problem, nor the problem of the 450,000 Jewish refugees who fled from the Arab states (a problem which Cleland significantly fails to mention). Both of these refugee problems were the direct outcome of the Arab invasion of Palestine in 1947–1948 in violation of the United Nations Partition Decision of 29 November 1947. Had this invasion not taken place, had the Arab command not issued instructions to the

Palestine Arabs to evacuate the designated battlefield, and had these Arabs listened to Jewish appeals to stay put, as those who chose to remain and are today free citizens of Israel did, no Palestine Arab refugee problem would today exist.

Cleland's phrase "or the ignoring [by Israel] of United Nations' resolutions looking toward a settlement" make strange reading in the light of the fact that the two basic resolutions, the U.N. Partition Decision and the Armistice Agreements between Israel and each of the Arab states, entered into under United Nations auspices, have been violated by the Arabs since 1947. No United Nations resolution has been violated by Israel. The Armistice Agreements were designed by their architects as a bridge to peace, and they have the inbuilt provision that the two sides will sit together and amicably resolve still outstanding problems. The Arabs have refused to sit with any Israel delegation to discuss these problems but instead have resorted to maritime blockade, economic boycott, infiltration, and armed attack and have waged war by other means. In the United Nations resolutions, return of the Palestine Arab refugees is made conditional on the willingness of the Arabs to live in peace and on the practicability of the return. The Arabs have expressed the opposite of such willingness and by their belligerence have made their return impractical. Not Israel but the Arab states have violated even this resolution. The very bias that Cleland claims to find exhibited by the author of *The Changing Middle East* is, unhappily, displayed by his own comments.

YAAKOV MORRIS
Department of Research and Publications, Israel Office of Information, New York, New York

Morris's repudiation of the actions of the Stern Gang and the Irgun Zvi Leumi are welcome. But the general opinion is that the State of Israel did not take sufficient action to redeem the bad situation these bandits caused. On the contrary, Israel has accepted every advantage she got from their criminal actions.

As for why the Arabs evacuated their homes, the situation certainly was chaotic, but there is little doubt, if any, that the evacuation was sparked by the Dir Yassin massacre, which occurred five weeks before any of the Arab states sent their forces into Palestine—a move made to preserve order in the vacuum created by the British withdrawal on 14 May 1948.

As to Morris's statement that "no United Nations resolution has been violated by Israel," the facts are quite the opposite. Three of the United Nations resolutions of 1947 and 1948 are

still being ignored, in whole or in part.

1) The boundaries set in the original resolution of 1947, which would require Israel to return to the Arabs 22 percent of her present territory occupied during the fighting, but of which Israel has declared she will yield absolutely none. The implication that the Armistice Agreements of 1949 confirm these boundaries is quite unjustified, as the Egypt-Israel Agreement, article V, paragraph 2, reads, "The Armistice Demarcation Line is not to be construed in any sense as a political or territorial boundary, and is delineated without prejudice to rights, claims and positions of either Party to the Armistice as regards ultimate settlement of the Palestine question." If Israel holds that the armistice boundaries are unchangeable, then the armistice continues, and that the war is only in suspension, with no peace in sight.

2) The right of the refugees to opt whether they will return to their homes and property or accept compensation. The option has been denied, except in a limited number of cases where a choice was allowed in order to reunite families. Morris's statement that the Arabs "by their belligerence have made their return impractical" would seem to be related to the haste of the government of Israel to bring in a million Jews from other countries since 1949 in order to occupy the Arab lands and make the return to the owners impossible.

3) The international status of Jerusalem. Israel has totally ignored this resolution, has incorporated parts of this area in her state, and has declared Jerusalem her capital. This defiant action on the part of Israel has not been accepted by the United States Government and by certain other members of the United Nations, who refuse to acknowledge Jerusalem as the capital and still maintain their embassies at Tel Aviv. Any official negotiations between the U.S. embassy and the Israeli Foreign Office have to take place in Tel Aviv, or outside the international zone.

The other occupant of the Jerusalem zone is Jordan, and Jordan will not agree to negotiate evacuation as long as Israel publicly proclaims her right to Jerusalem, contrary to the United Nations resolution.

There is no question that the situation in Palestine is becoming more and more complicated, and it seems to me that the burden of proof as to rights there lies distinctly on those whose invasion of the country, previously a peaceful land, brought on all the troubles.

W. WENDELL CLELAND
American University,
Washington, D.C.

New Products

■ COLOR-MIXTURE COMPUTER displays on an oscilloscope a series of dots representing a spectrophotometric curve. Each dot represents one of 10 or 16 equations (depending on the model), which are to be solved simultaneously. Each equation represents the sum of the contributions to light absorption made by each dyestuff or pigment at a particular wavelength and at the concentration set into the computer. If the sum of these contributions is equal to the light absorption of the standard to be matched, the dot representing the equation appears at the zero line of the oscilloscope. When all dots appear at the zero line, all equations have been solved and the reflectance of the proposed match equals that of the standard at all wavelengths. The concentrations of the chosen colorants required are read from dials that have been adjusted to achieve the solution.

The equations solved by the computer are based on the use of some function of reflectance that is a measure of the absorption and is proportional to colorant concentration. Tables of suitable functions are available. Measured values of the function for the standard color and the batch or trial color are placed into the computer on dials. Values for the various colorants to be used are set into plug-in units that can be adjusted to represent any desired colorant. Calculations, including manual input of data, are said to take about 5 minutes if the colorants to be used are known.

To make a color match, the reflectance of the standard is measured at 10 or 16 wavelengths, and the reflectance values are changed to values of the appropriate absorption function by means of tables. These values are set on the computer dials. The plug-in units representing colorants to be used are inserted. The concentration dials are adjusted until a straight line appears on the oscilloscope, and finally the concentrations of colorants are read from the adjusted dials. (Davidson and Hemmendinger, Dept. Sci168, 2857 Nazareth Rd., Easton, Pa.)

■ MCLEOD-TYPE GAGE features measuring capillaries that are completely separate and that may be detached from the main body of the gage for replacement or cleaning. The separate capillaries afford two ranges of pressure measurement: 0.150 to 2 mm and 1 to 2000 μ. The capillary tube can be replaced without recalibration (see Fig. 1). (Kinney Div., New York Air Brake Co., Dept. Sci107, 3529 Washington St., Boston 30, Mass.)

■ PHYSIOLOGICAL GAS ANALYZER measures oxygen concentrations within blood vessels or other body-fluid reservoirs. The oxygen detector is an electrode; its sensing end is a tiny fleck of platinum 0.005 in. in diameter. The sensing end, encased in layers of glass and silver, is sheathed in a stainless-steel tube. The assembly fits inside a hypodermic needle of the size normally used to withdraw blood samples from a patient's veins. The electrode tip is capped with a thin polyethylene membrane that permits the passage of oxygen. Current flow at the electrode tip is proportional to the amount of oxygen present. The current is amplified to drive a meter that registers the oxygen concentration. (Beckman Instruments, Inc., Dept. Sci144, 1117 California Ave., Palo Alto, Calif.)

■ SPECTROPHOTOMETER ACCESSORY permits the measurement and recording of absorbance of multiple samples as a function of time. The instrument is said to be linear with absorbance over a range of 3 optical density units with sufficient sensitivity to permit scale expansion to 0.1 density unit full scale. The accessory is designed to be attached to such spectrophotometers as the Beckman DU, the Zeiss PMQ II, and others, without modification of the instruments. (Gilford Instrument Laboratories, Inc., Dept. Sci135, Oberlin, Ohio)

■ DIFFERENTIAL AMPLIFIER has common mode rejection of 10^8 at d-c and 10^6 at 60 cy/sec. Zero stability is said to be better than 0.05 percent of full scale for 1000 hr. Output is ± 10 volts at 200 ma into a 50-ohm load. The output can tolerate capacitive loading up to 10 μfd without going into oscillation. (Video Instruments Co., Dept. Sci160, 3002 Pennsylvania Ave., Santa Monica, Calif.)

■ PRESSURE TRANSDUCER of the flush-diaphragm, strain-gage type features extremely small size. Diameter is 0.59 in., thickness is 0.05 in., and weight is 0.5 g. Ranges are 0 to 10 lb/in.^{2}, available in absolute, gage, or differential models. Excitation is 15 volts, and output is 5 mv full scale on open circuit. Combined error due to nonlinearity and hysteresis is said to be less than ± 1.0 percent of full scale. Ambient temperature limits are $-65°$ to $+150°$F. (Statham Instruments Inc., Dept. Sci153, 12401 W. Olympics Blvd., Los Angeles 64, Calif.)

■ FLAW-DETECTOR ATTACHMENT permits an ultrasonic flaw detector to be used to measure the thickness of metals and plastics from one side, with accuracy said to be ± 0.01 in. The attachment consists of a fixed scribed vertical line and a second line on a slider movable across the face of the display cathode-ray tube. A synchronized indicator measures the amount of this motion permitting direct determination of thickness without calculation or interpolation. (Branson Instruments, Inc., Dept. Sci154, 40 Brown House Rd., Stamford, Conn.)

■ HIGH-CURRENT ADAPTER for the manufacturer's type 575 transistor curve tracer provides 200-amp collector displays, three ranges of collector supply, and 12-amp base supply. The adapter

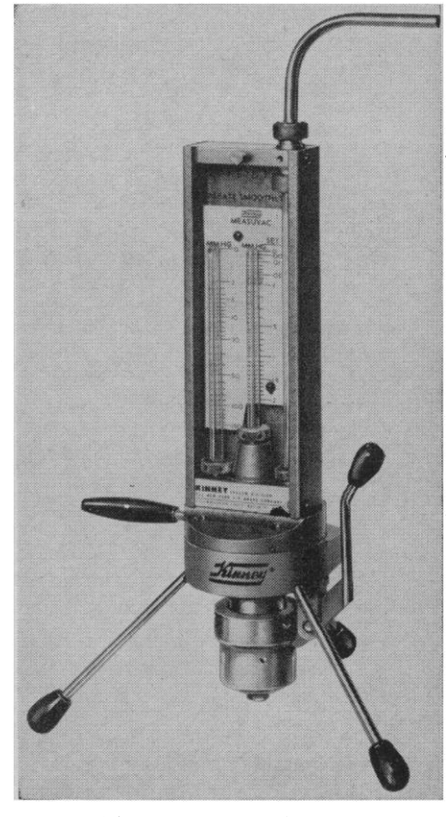


Fig. 1. McLeod-type gage.

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither Science *nor the writer assumes responsibility for the accuracy of the information. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 1179 and 1277. Circle the department number of the items in which you are interested on this card.*

allows observation and measurement of characteristic curves of both *n-p-n* and *p-n-p* transistors and of diodes. It permits display of characteristic curves with collector current on the vertical axis and either collector-to-emitter voltage or base-to-emitter voltage on the horizontal axis. (Tektronix, Inc., Dept. Sci146, Box 500, Beaverton, Ore.)

■ TACHOMETER accomplishes digital measurement of shaft speeds by use of an integral light source, a 60-segment rotating interrupter, a photo-junction cell, and a transistor amplifier. Every 6 deg of shaft rotation results in a 2-volt pulse. The resultant square wave is fed into a digital counter with one-second base time to provide a reading of speed in revolutions per minute. Range is 0 to 25,000 rev/min; torque required is 0.05 in. oz at 3600 rev/min. (Servo-Tek Products Co., Dept. Sci147, 1086 Goffle Rd., Hawthorne, N.J.)

■ CHROMATOGRAPHIC COLUMN PACKING of diethylene glycol adipate polyester treated with phosphoric acid is available for separation of the C_8 through C_{18} common fatty acids, including unsaturates, without the need for preliminary esterification. With a 6-ft long, 6-mm inside diameter U-tube column and a column temperature of 217°C, approximate retention times in minutes are: caprylic, 2; captric, 3.4; lauric, 6; myristic, 10; palmitic, 17; stearic, 28.7; oleic, 32.1. (Applied Science Laboratories, Inc., Dept. Sci137, 140 N. Barnard St., State College, Pa.)

■ TEMPERATURE RECORDER is a miniature thermocouple instrument that operates directly from the thermocouple without signal amplification. The instrument operates on the clamper-bar principle with a 4-sec clamping period. Pressure sensitive chart paper is used to record. Minimum temperature span is 0° to 500°F; maximum span is 0° to 2500°F. Accuracy is said to be ±2 percent of full scale. Electrical requirement is 115 volt a-c. (Assembly Products, Inc., Dept. Sci158, Chesterland, Ohio)

■ INFRARED DETECTORS of photoconductive indium antimonide peak at a wavelength of 6.8 μ. Time constant is said to be less than 1 μsec. The detectors are custom built and supplied in any configuration including arrays. (Block Associates, Inc., Dept. Sci172, 385 Putnam Ave., Cambridge, Mass.)

■ SPECTRUM ANALYZER analyzes signals in the frequency range of 0.0025 to 1000 cy/sec on a real-time basis. Seven sensitivity scales are provided. Selectivity on the lowest scale is 0.0037 cy/sec, and on the highest it is 3.75 cy/sec. The analyzer operates on the

frequency multiplication principle with multiplication factors of 100 to 100,000. The frequency-multiplied signal is analyzed in a heterodyne frequency analyzer. Typically, the band between 0.5 and 200 cy/sec is analyzed in 1.6 sec with equivalent filter bandwidth of 0.75 cy/sec. Range of the instrument can be expanded by heterodyning to cover any band in 1000 cy/sec intervals. (General Applied Science Laboratories, Dept. Sci155, Merrit & Stewart Avenues, Westbury, N.Y.)

■ PHYSIOLOGIC DATA MONITOR displays condition of the patient continuously and automatically in digital form. All parameters are also recorded on a 10-in.-wide record. Monitor-scope and wave form recorders for electrocardiograms and electroencephalograms are included. Plug-in units and transducers are available for a variety of measurements including temperature, blood pressure, heart rate, respiration rate, skin resistance, medication flow, urine output, oxygen saturation, carbon dioxide level, and others. An alarm function is actuated should any deviation from preset limits occur in the condition of the patient. Modular construction permits expansion or modification as the situation requires. (Starling Corp., Dept. Sci171, 2047 Sawtelle Blvd., Los Angeles 25, Calif.)

■ X-Y PLOTTER is a 30- by 30-in. instrument said to be accurate to ±0.05 percent of full scale and to repeat exactly from any direction. Input to the plotter may be IBM cards, punched paper tape, or keyboard. Slewing speed is 20 in./sec. The printing head contains 12 symbols, which can be selected at random. Other print sectors can be added to plot digital as well as symbol information. (Gerber Scientific Instrument Co., Dept. Sci156, Hartford, Conn.)

■ IONIZATION DETECTOR MODULE permits the modification of existing gas chromatographs to flame ionization detection. The module permits 2-in. insulation to be used between the detector burner assembly and the bulkhead which contains terminals for hydrogen, combustion air, and high-voltage lines and for the electrometer and flame igniter. Collector insulation is sapphire. The manufacturer's model 21 electrometer is normally used with the detector. (Loe Engineering Co., Dept. Sci162, 2092 N. Lincoln Ave., Altadena, Calif.)

■ ULTRAVIOLET-VISIBLE SPECTROPHOTOMETER covers the ranges 190 to 390 mμ in the ultraviolet and 350 to 750 mμ in the visible. Dispersing element is a 60-deg, fused-quartz prism. Each spectral range is recorded linearly in

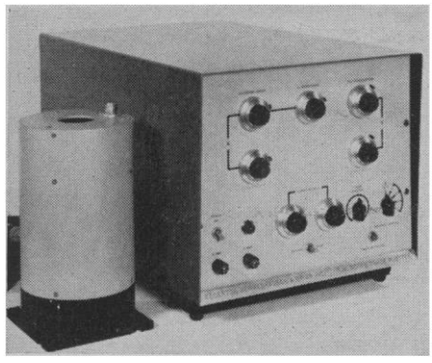


Fig. 2. Oscilloscope trace plotter.

absorbance with a range of 0 to 1.5 units on 8.5- by 11-in. preprinted chart paper. Changeover from one range to the other is accomplished by moving the recorder drum past the end of its normal travel. Accompanying interchange of an air-cooled hydrogen lamp for ultraviolet work and a tungsten-filament source for visible work is automatic. Two scanning rates can be used, covering the spectral ranges in 2 or 8 minutes. An automatic gain control system increases spectral information in regions of heavy absorption. Detector sensitivity gain is maintained sufficiently at all times. (Perkin Elmer Corp., Dept. Sci167, Norwalk, Conn.)

■ MICROMANOMETER measures differential gas pressure with full-scale sensitivity of 0.004 in. The measuring head consists of two symmetrically arranged cavities, separated by a metal diaphragm, and two fixed electrodes. These form two capacitors that constitute part of the capacitances of two tuned circuits. Difference of capacitance of the two capacitors, caused by motion of the diaphragm, is measured and displayed on a panel meter. Several measuring heads of different ranges can be used with the same instrument. Static working pressures up to 1000 lb/in.^{2} and differential overloads up to ten times full-scale pressure can be applied without damage. The sensitive element in the measuring head is said to respond to sinusoidal pressure variations of 200 cy/sec. A switch is provided to increase the time constant of the measuring circuit to 0.3 to eliminate rapid fluctuations of measured values. Output for operation of an external recorder is included. (Gelman Instrument Co., Dept. Sci174, 106 N. Main St., Chelsea, Mich.)

■ OSCILLOSCOPE TRACE PLOTTER (Fig. 2) uses a photoelectric pickup to detect, amplify, and plot trace deflections as small as 1 mμ and is capable of time resolution in the submillimicrosecond region to the limits of the manufacturer's TW deflection tube. Designed for use with the manufacturer's high-frequency oscilloscope, the plotter can nevertheless be used with virtually any oscilloscope, according to the manufacturer. The trace on the face of the oscilloscope tube is reproduced on a prescaled piece of graph paper on an x-y recorder; sensibility of the trace is increased about 15 times. Settings of the x and y axes are independent of each other; magnification of the axes is arbitrarily adjustable as determined by the recorder. According to the manufacturer, no optical distortion of the image is introduced and no accuracy is lost in converting the pulse from the cathode-ray tube to electrical x-y analogs. A trace or a particular section of a trace may be scanned and magnified to obtain full-scale recorder drawings of deflections as small as 1 μ. Traces are reproduced in 1½ to 3 min. (Edgerton, Germeshausen & Grier, Inc., Dept. Sci94, 170 Brookline Ave., Boston, Mass.)

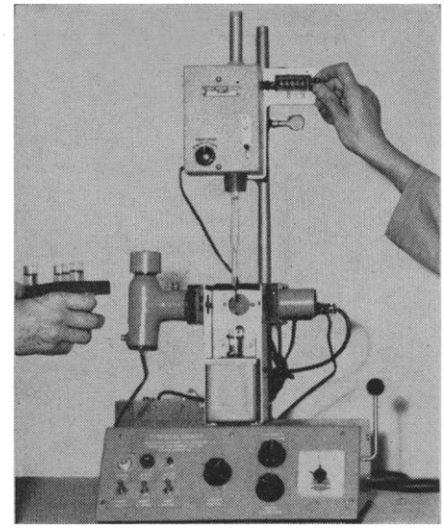


Fig. 3. Automatic titrator.

■ AUTOMATIC TITRATOR (Fig. 3) uses a motor-driven burette that dispenses titrant into a vessel placed in the path of a beam of light which passes through the unknown solution and then into a detector. The instrument automatically stops the titration and provides a digital readout of the equivalence volume of titrant when the end point, determined by color change, is reached. Data obtained may be fed to a recorder, volume data may be printed, or data can be logged on printers or computers exhibiting both sample and titrant volumes. A remote-readout digital indicator permits monitoring of the burette volume from another area. (American Instrument Co., Dept. Sci133, 8030 Georgia Ave., Silver Spring, Md.)

■ THIOLATED GELATIN is used to measure enzyme activity. This gelatin is said to be attacked by any enzyme that can hydrolyze gelatin. The product is cross linked with a mild oxidant to produce rigid gels that do not dissolve in boiling water. The cross-linked gels, unlike gelatin, cannot be penetrated by the enzyme, and hydrolysis is restricted to the surface. Because the lysis products are soluble, the gel slowly dissolves away maintaining its shape so that the length of all edges decreases at a constant rate. The rate of change of the length of an edge is a measure of enzyme activity. (Schwarz BioResearch, Inc., Dept. Sci163, 230 Washington St., Mt. Vernon, N.Y.)

■ DATA SYSTEM will monitor up to 250 channels of low-level or high-level data representing temperatures, pressures, displacements, and voltages. Stepping rate is 10 channels per second. Analog signals are digitized and transmitted through an audio radio channel, telephone leased line, or telephone handset. At the recording point, the data, channel identification, and other pertinent information are printed or perforated. Over-all accuracy, including transmission over the line, is said to be ±0.1 percent. Operation may be unattended. (Communication Control Corp., Dept. Sci161, 14707 Keswick St., Van Nuys, Calif.)

■ TIME-RESOLVED SPECTROGRAPHS are designed to permit temperature measurements in the 2000° to 20,000°K region of events resolved in time to 3×10^{-8} sec and with wavelength distribution through the 2000- to 9000-A range. Photographic recordings can be made of events in these classes by coupling the manufacturer's sweeping image camera to one of the spectrographs. Recorded film densities, when related to a calibration standard, provide temperature measurements said to be accurate within ±5 or ±10 percent depending upon the temperature range. (Beckman & Whitley, Inc., Dept. Sci165, San Carlos, Calif.)

■ RECORDER is a portable instrument with a self-contained power source. Battery life is said to be 250 hr in normal use. The chart is driven by an 8-day clockwork motor; standard chart speeds are ½ to 12 in./hr. Full-scale deflection ranges are available between 0 to 5 mv and 0 to 100 mv; over-all accuracy is said to be ±0.5 percent; input impedance is 15,000 ohms. Inkless recording is employed on a chart 3 in. wide. (Instrument Corporation of America, Dept. Sci148, 516 Glenwood Ave., Baltimore 12, Md.)

JOSHUA STERN

National Bureau of Standards, Washington, D.C.

Meetings

Forthcoming Events

May

5–7. American Soc. of Internal Medicine, Miami Beach, Fla. (G. T. Bates, 350 Post St., San Francisco 8, Calif.)

5–7. Wisconsin Acad. of Sciences, Arts, and Letters, 91st annual, Waukesha. (T. J. McLauglin, Secretary, 2865 N. Prospect Ave., Milwaukee, Wis.)

5–8. American Psychoanalytic Assoc., Chicago, Ill. (Mrs. H. Fischer, 1 E. 57 St., New York 22)

6–7. Academy of Psychoanalysis, annual, Chicago, Ill. (J. H. Merin, 49 E. 78 St., New York 21)

6–9. Circuit Theory, 5th midwestern symp., Urbana, Ill. (M. E. Van Valkenburg, Dept. of Electrical Engineering, Univ. of Illinois, Urbana)

7–10. American Inst. of Chemical Engineers, Cleveland, Ohio. (J. F. Van Antwerpen, American Inst. of Chemical Engineers, 25 W. 45 St., New York 36)

7–11. Institute of Food Technologists, New York, N.Y. (C. S. Lawrence, 176 W. Adams St., Chicago 3, Ill.)

7–12. Medical Library Assoc., Inc., Seattle, Wash. (Miss R. J. Mann, Mayo Clinic Library, Rochester, Minn.)

7–12. Society of Motion Picture and Television Engineers, Toronto, Canada. (SMPTE, 55 W. 42 St., New York 36)

8–9. Titrimetric Methods of Analysis, symp., Cornwall, Ontario, Canada. [J. R. McCallum, Courtaulds (Canada) Ltd., Cornwall]

8–10. Aerospace Electronics Conf., 13th annual natl., Dayton, Ohio. (R. G. Stimmel, Institute of Radio Engineers, 1 E. 79 St., New York 21)

8–10. Instrument Soc. of America, Power Instrumentation Symp., 4th natl., Chicago, Ill. (H. A. Van Wassen, Duquesne Light Co., Pittsburgh 19, Pa.)

8–10. Mathematical Theories of Biological Phenomena, symp., New York, N.Y. (N. Rashevsky, Committee on Mathematical Biology, 5741 Drexel Ave., Chicago 37, Ill.)

8–12. American College of Physicians, 42nd annual, Miami Beach, Fla. (American College of Physicians, 4200 Pine St., Philadelphia 4, Pa.)

8–12. American Psychiatric Assoc., 117th annual, Chicago, Ill. (C. H. H. Branch, 156 Westminster Ave., Salt Lake City, Utah)

9–11. Western Joint Computer Conf., Los Angeles, Calif. (W. F. Bauer, 8433 Fallbrook Ave., Canoga Park, Calif.)

10–12. Production Engineering Conf., Toronto, Canada. (R. B. Larson, 5701 Carnegie Ave., Cleveland 3, Ohio)

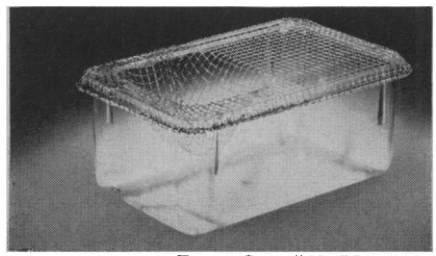
10–13. National Science Fair—International, 12th, Kansas City, Mo. (Science Service, 1719 N Street, NW, Washington 6, D.C.)

11–13. Acoustical Soc. of America, Philadelphia, Pa. (W. Waterfall, 335 E. 45 St., New York 17)

11–13. American Inst. of Industrial Engineers, annual, Detroit, Mich. (W. J. Jaffe, Newark College of Engineering, 367 High St., Newark 2, N.J.)

A Mousellany of Animal Care Developments

They Said It Couldn't Be Done



Econo-Cage #27, LID #22D

The new Polycarbonate Econo-Cage #27 is clear, autoclavable and unbreakable.

To operate most efficiently animal colonies must use cages which withstand the rough and tumble of mechanized washing systems and the high temperatures at which these systems and autoclaves operate. Because colonies must be inspected quickly, cages should afford maximum visibility. Until now the cages were either transparent or durable, but none had both characteristics.

The new Polycarbonate combines the optical and thermal properties of glass with an *impact resistance unmatched by any other clear material.* A good example of the degree of impact resistance was furnished by a doubting Thomas who could not break the cage by dropping it out of a fourth floor window. Polycarbonate retains this remarkable strength from 275° F. to −40° F. It is the first clear plastic which can be autoclaved repeatedly.

This new material, a linear aromatic polyester of carbonic acid, has a very low absorption level. Odor producing gases are not absorbed, resistance to most acids and basics is very good.

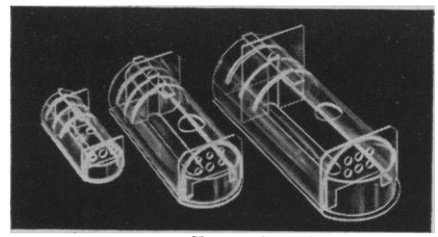
The cage is constructed to N I H Spec. EG-84. For housing mice, the cage is 11½" x 7½" x 5" deep. The cages nest for easy storage.

This is one of the "20 Series" of Econo-Cages, which includes cages of fibre glass, acrylonitrile-styrene-copolymer, polypropylene and polycarbonate. These are all 11½" x 7½" x 5" deep. There are four lid styles which are interchangeable on all "20 Series" cages. Write for complete information on this series.

Working With Restraint

Two new pieces of animal restraining equipment are now available from the Econo-Cage Division of Maryland Plastics, Inc. A small restrainer for mice weighing from 10 to 40 grams (Econo-Cage #88), and a large unit for rats and hamsters weighing from 250 to 600 grams (Econo-Cage #91), are new additions which supplement Econo-Cage #90 for 150 to 300 gram rats and hamsters.

These clear acrylic plastic units afford rapid and safe immobilization of animals, easy access and maximum visibility of animals in restraint. Econo-restrainers prevent unanesthetized animals from attacking tubes, cannulae, and other fixtures; provide extended housing during nutritional studies; restrain animals during administration of intravenous, intraperitoneal, intramuscular, and subcutaneous injections; and are useful for administering intravenous fluid drips and anaesthetic.



Econo-Cage #88, #90, #91

All three sizes have an adjustable tailgate which fits into any of three slots to vary cage length, confine the animal, and serve as a cage door. Openings at the top, bottom, and tail provide easy access to any part of the animal (the bottom slot also permits drainage of animal waste). A hopper permanently attached to the front of the unit includes a trough for granular feeds and a water tube inlet.

The small restrainer, Econo-Cage #88, can be varied from 2" to 3½" in length and is 1¼" wide. The medium restrainer, Econo-Cage #90, can be varied from 4½" to 6" in length and is 2½" wide. The large restrainer, Econo-Cage #91, can be varied from 5" to 7" in length and is 3" wide. All these units can be cleaned chemically or with hot water, they are not autoclavable.

econo-cage

ECONO-CAGE DIVISION
MARYLAND PLASTICS, INC.
9 East 37th Street,
New York 16, N. Y.

11–13. American Radium Soc., Colorado Springs, Colo. (C. G. Stetson, 350 Engle St., Englewood, N.J.)

13–14. Society for Economic Botany, annual, Cambridge, Mass. (R. E. Schultes, Botanical Museum of Harvard University, Cambridge 38)

15–16. Co-ordination Compounds, symp., Hamilton, Ontario, Canada. (R. J. Gillespie, McMaster Univ., Hamilton)

15–17. Institute of Radio Engineers, natl. symp., Washington, D.C. (G. Shapiro, National Bureau of Standards, Washington 25)

15–17. Radiation Research Soc., annual, Washington, D.C. (E. L. Powers, Div. of Biological and Medical Research, Argonne National Laboratory, Argonne, Ill.)

15–18. Society of Aeronautical Weight Engineers, Akron, Ohio. (D. B. Block, 4004 Oxford Ave., NW, Massillon, Ohio)

15–18. Spectroscopy, 12th annual symp., Chicago, Ill. (W. Ashby, Continental Can Co., Inc., 7622 S. Racine Ave., Chicago 20, Ill.)

15–20. Conference on Nuclear Electronics, Belgrade, Yugoslavia. (J. Burt, International Atomic Energy Agency, United Nations, New York, N.Y.)

16–18. Western Conf. on Anesthesiology, biennial, Portland, Ore. (J. O. Branford, 2307 NW Overton St., Portland 9, Ore.)

17–20. American College of Cardiology, New York, N.Y. (P. Reichert, 350 Fifth Ave., Empire State Bldg., New York 1)

18–20. Host Tumor Interactions, intern. symp., Detroit, Mich. (M. J. Brennan, Oncology Div., Henry Ford Hospital, Detroit 2)

22–24. American Thoracic Soc., Cincinnati, Ohio. (F. W. Webster, 1790 Broadway, New York 19)

22–24. Global Communications, 5th natl. symp., Chicago, Ill. (R. D. Slayton, 5555 Touhy Ave., Skokie, Ill.)

22–24. Telemetering Conf., natl., Chicago, Ill. (J. Becker, AC Spark Plug Division, General Motors Corp., Milwaukee 1, Wis.)

22–25. American Urological Assoc., Los Angeles, Calif. (W. P. Didusch, 1120 N. Charles St., Baltimore 1, Md.)

22–25. Design Engineering Conf. and Show, Detroit, Mich. (ASME Meetings Dept., 29 W. 39 St., New York 18)

22–25. National Tuberculosis Assoc., Cincinnati, Ohio. (J. G. Stone, 1790 Broadway, New York 19)

22–26. Engineering Conf. and Exhibit, 29th annual, New York, N.Y. (G. E. Seeley, ASTME Headquarters, 10700 Puritan Ave., Detroit 38, Mich.)

22–26. Society of Photographic Scientists and Engineers, annual, Binghamton, N.Y. (M. G. Anderson, Ansco, Vestal Parkway East, Binghamton, N.Y.)

22–27. International Acad. of Legal Medicine and of Social Medicine, 5th cong., Vienna, Austria. (M. Helpern, Chief Medical Examiner, City of New York, 55 East End Ave., New York 28)

23–25. Large Capacity Memory Techniques for Computing Systems, symp., Washington, D.C. (Miss J. Leno, Code 430A, Office of Naval Research, Washington 25)

25. Gastroenterology Research Group, Chicago, Ill. (N. C. Hightower, Scott and White Clinic, Temple, Tex.)

25–26. Medical Technology, symp., Cleveland, Ohio. (J. W. King, Cleveland Clinic, 2020 E. 93 St., Cleveland 6)

25–26. Nitro Aliphatic Chemistry, symp., Lafayette, Ind. (Purdue Memorial Union, Purdue Univ., Lafayette)

25–26. Operations Research Soc. of America, 9th annual, Chicago, Ill. (D. Schiller, Gaywood-Schiller Associates, 203 N. Wabash Ave., Chicago 1)

26–27. American Otological Soc., Lake Placid Club, Essex County, N.Y. (J. A. Moore, 525 E. 68 St., New York 21)

26–27. Biology of the Trachoma Agent, symp., New York, N.Y. (F. B. Gordon, Natl. Naval Medical Center, Bethesda 14, Md.)

26–27. Cardiovascular Tissue Culture Conf., Dover, Del. (O. J. Pollak, Dover Medical Research Center, Inc., P.O. Box 228, Dover)

26–3. American Acad. of Dental Medicine, cruise to Bermuda and Nassau. (H. Ward, 15 Bond St., Great Neck, N.Y.)

28–1. Special Libraries Assoc., 52nd annual, San Francisco, Calif. (B. M. Woods, SLA, 31 E. 10 St., New York 3)

29–31. American Gynecological Soc., Colorado Springs, Colo. (A. H. Aldridge, 899 Park Ave., New York 21)

29–31. Cancer Symp., 6th annual, Regina, Saskatchewan, Canada. (A. J. S. Bryant, Allan Blair Memorial Clinic, Regina)

29–31. Chemical Inst. of Canada, 44th annual, Ottawa. (Chemical Inst. of Canada, 48 Rideau St., Ottawa 2)

29–3. Molecular Spectroscopy, 5th European cong., Amsterdam, Netherlands. (D. H. Zijp, Secy., Nieuwe Achtergracht 123, Amsterdam-C.)

30. Nutrition Soc. of Canada, 4th annual, Guelph, Ontario. (E. V. Evans, Dept. of Nutrition, Ontario Agricultural College, Guelph)

31–2. Canadian Federation of Biological Societies, Guelph, Ontario, Canada. (E. H. Bensley, Montreal General Hospital, 1650 Cedar Ave., Montreal 25, P.Q.)

31–2. Radar symp., 7th annual, Ann Arbor, Mich. (Coordinator, 7th Annual Radar Symposium, Institute of Science and Technology, Box 618, Ann Arbor)

June

2–3. Canadian Soc. for Clinical Chemistry, annual general meeting, Guelph, Ont. (C. R. Cameron, Ontario Veterinary College, Guelph)

2–5. Latin-American Congress of Physical Medicine, Lisbon, Portugal. (C. Lopez de Victoria, 245 E. 17 St., New York, N.Y.)

3–11. Medical-Surgical Film Festival, 4th intern., Turin, Italy. (Minerva Medica, Corso Bramante 83–85, Turin)

4–9. Mass Spectrometry, ASTM Committee E-14, Chicago, Ill. (G. Crable, Gulf Research Center, P.O. Box 2038, Pittsburgh 30, Pa.)

4–10. World Congress of Psychiatry, 3rd, Montreal, Canada. (A. Roberts, Allan Memorial Inst., 1025 Pine Ave. West, Montreal 2, P.Q.)

4–12. Cellular Regulatory Mechanisms, 26th Cold Spring Harbor Symp. on Quantitative Biology, Cold Spring Harbor,

N.Y. (A. Chovnick, Long Island Biological Assoc., Cold Spring Harbor)

5–7. American Soc. for Quality Control, Philadelphia, Pa. (W. P. Youngclaus, Jr., 161 W. Wisconsin Ave., Milwaukee 3, Wis.)

5–7. Fundamental Aspects of Radiosensitivity, symp., Upton, N.Y. (A. H. Sparrow, Brookhaven National Laboratory, Upton, L.I.)

5–8. International Instrument-Automation Conf. and Exhibit, Instrument Soc. of America, Toronto, Canada. (I.S.A., 313 Sixth Ave., Pittsburgh 22, Pa.)

5–9. Animal Reproduction, 4th intern. cong., Amsterdam, Netherlands. (Secretariat, Burgemeester de Monchyplein 14, The Hague, Netherlands)

5–9. Effects of Ionizing Radiation on the Nervous System, symp., Vienna, Austria. (J. Burt, International Atomic Energy Agency, United Nations, New York, N.Y.)

5–10. International Colloquium on Spectroscopy, 9th, Lyon, France. (Secretariat, Groupement pour l'Avancement des Méthodes Spectrographiques, 1, rué Gaston Boissier, Paris 15)

5–16. Operations Research and Systems Engineering, Baltimore, Md. (Dean, School of Engineering, Johns Hopkins Univ., Baltimore 18)

6–8. Tissue Culture Assoc., 12th annual, Detroit, Mich. (F. E. Payne, Dept. of Epidemiology, Univ. of Michigan, Ann Arbor)

8–11. American Electroencephalographic Soc., Atlantic City, N.J. (G. A. Ulett, Malcolm Bliss Mental Health Center, 1420 Grattan, St. Louis 4, Mo.)

8–18. International Organization for Standardization, general assembly (members only), Finland. (American Standards Association, 70 East 45 St., New York 17)

9–11. Society of Biological Psychiatry, Atlantic City, N.J. (G. N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Calif.)

9–17. European Convention of Chemical Engineering, Frankfurt, Germany. (DECHEMA, Postfach No. 7746, Frankfurt/Main 7)

11–15. American Soc. of Mechanical Engineers, summer annual, Los Angeles, Calif. (O. B. Schier II, 29 W. 39 St., New York 18)

12–13. Radio Frequency Interference, 3rd natl. symp., Washington, D.C. (E. F. Mischler, National Engineering Service, Washington, D.C.)

12–14. American Dairy Science Assoc., Madison, Wis. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

12–14. American Neurological Assoc., Atlantic City, N.J. (M. D. Yahr, Neurological Inst., 710 W. 168 St., New York 32)

12–14. Society for the Study of Development and Growth, regeneration symp., Williamstown, Mass. (A. C. Braun, Rockefeller Inst., New York 21)

12–15. Nature of the Real, conf., Milwaukee, Wis. (E. D. Simmons, Dept. of Philosophy, Marquette Univ., Milwaukee 3)

12–15. Physics of Electronic and Atomic Collisions, intern. conf., Boulder, Colo. (B. Bederson, Physics Dept., New York Univ., New York 53)

12–16. Association of Official Seed Analysts, Richmond, Va. (D. D. Forsyth, Agronomy Building, Madison 6, Wis.)

12–16. Molecular Structure and Spectroscopy, symp., Columbus, Ohio. (R. A. Oetjen, Dept. of Physics and Astronomy, Ohio State Univ., Columbus 10)

12–18. European Assoc. for Animal Production, 8th intern. cong., Hamburg, Germany. (European Assoc. for Animal Production, Via Barnaba Oriana 28, Rome, Italy)

12–24. European Inst. of Scientific Studies for the Prevention and Treatment of Alcoholism, Amsterdam, Netherlands. (D. Ehlbeck, Intern. Bureau against Alcoholism, Case Gare 49, Lausanne, Switzerland)

12–29. Statistical Quality Control Intensive Courses for the Chemical and Processing Industries, 18th annual, Rochester, N.Y. (H. M. Kentner, Extended Services Div., Rochester Inst. of Technology, Rochester 8)

13–14. Product Engineering and Production, 5th natl. conf., Philadelphia, Pa. (P. J. Riley, R.C.A., Building 10-6, Camden 2, N.J.)

13–16. Gas Chromatography Symp., 3rd biennial, East Lansing, Mich. (J. E. Callen, Procter and Gamble Co., Miami Valley Laboratories, P.O. Box 175, Cincinnati 39, Ohio)

13–16. Institute of Aerospace Sciences and American Rocket Soc., Los Angeles,

Calif. (Inst. of Aerospace Sciences, 2 E. 64 St., New York 21)

13–18. Nuclear Congress, 6th, Rome, Italy. (Ufficio Stampa e Relazioni Pubbliche-CNEN, Via Belisario 15, Rome)

14–16. Applied Mechanics Conf., Chicago, Ill. (American Soc. of Mechanical Engineers, Meetings Dept., 29 W. 39 St., New York 18)

14–16. Semiconducting Compounds, conf., Schenectady, N.Y. (W. W. Tyler, General Electric Research Laboratory, Schenectady)

14–16. Theory of Weak and Strong Interactions, conf., La Jolla, Calif. (T. A. Manar, Scripps Institution of Oceanography, La Jolla)

14–17. American Assoc. of Bioanalysts, Dallas, Tex. (L. D. Hertert, 490 Post St., Room 1049, San Francisco 2, Calif.)

16–17. Meteoritical Soc., Nantucket, Mass. (G. L. Rowland, Long Beach City College, Long Beach 8, Calif.)

17–21. American Nuclear Soc., Boston Mass. (O. J. Du Temple, ANS, 86 E. Randolph St., Chicago 1, Ill.)

18–21. American Astronomical Soc., Nantucket, Mass. (J. A. Hynek, Dearborn Observatory, Northwestern Univ., Evanston, Ill.)

18–23. American Meteorological Soc., 193rd natl., and Pacific Div., AAAS, 42nd annual, Davis, Calif. (AMS, 45 Beacon St., Boston 8, Mass.)

18–23. American Soc. of Medical Technologists, Seattle, Wash. (Miss R. Matthaei, Suite 25, Hermann Professional Bldg., Houston 25, Tex.)

19–21. American Soc. of Pharmacognosy, annual summer meeting, Houston, Tex. (R. S. Westby, Eli Lilly and Co., 740 S. Alabama St., Indianapolis 6, Ind.)

19–23. Conference on Carbon, 5th biennial, University Park, Pa. (Fifth Carbon Conf., Pennsylvania State Univ., Conference Center, University Park)

19–24. Feed Microscopy, annual meeting and special short course, Denver, Colo. (C. Jones, Colorado Department of Agriculture, 3130 Zuni St., Denver 11)

19–30. Astrophysics Seminar, Cloudcroft, N.M. (J. R. Foote, P.O. Box 1053, Holloman Air Force Base, N.M.)

21–1. International Plastics Exhibition and Convention, London, England. (British Plastics, Dorset House, Stanford St., London, S.E.1)

22–23. American Rheumatism Assoc., Dallas, Tex. (F. E. Demartini, 622 W. 168 St., New York 32)

22–23. Computers and Data Processing, 8th annual symp., Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver, Colo.)

22–24. Endocrine Soc., New York, N.Y. (H. H. Turner, 1200 N. Walker, Oklahoma City 3, Okla.)

22–26. American College of Chest Physicians, New York, N.Y. (M. Kornfeld, 112 E. Chestnut St., Chicago 11, Ill.)

23–25. American College of Angiology, 7th annual, New York, N.Y. (A. Halpern, Secretary, 11 Hampton Court, Great Neck, N.Y.)

25–28. American Soc. of Agricultural Engineers, annual, Ames, Iowa. (J. L. Butt, 420 Main St., St. Joseph, Mich.)

25–29. Morphological Precursors of