SCIENCE

11 February 1966

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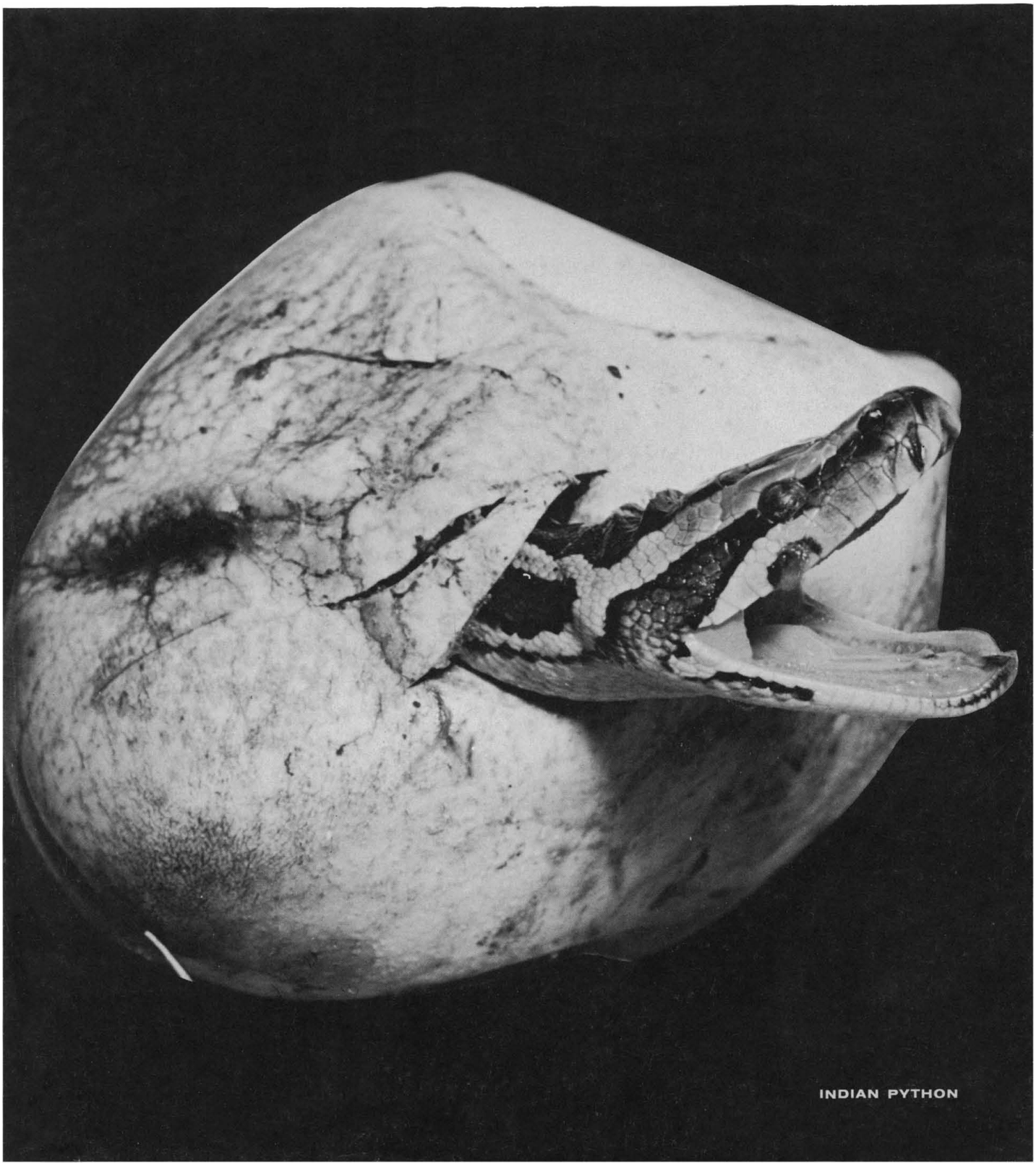
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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Double element heating tapes... waterproof

Only 1/16" thick, can be wrapped on tubes as small as 1/8" diameter. Operable to 480° F (temperature limit of Silicone rubber coverings). Ribbon type heating element.

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- Add $5.00 each unit for finishing ends and fitting with plug and supply cord.

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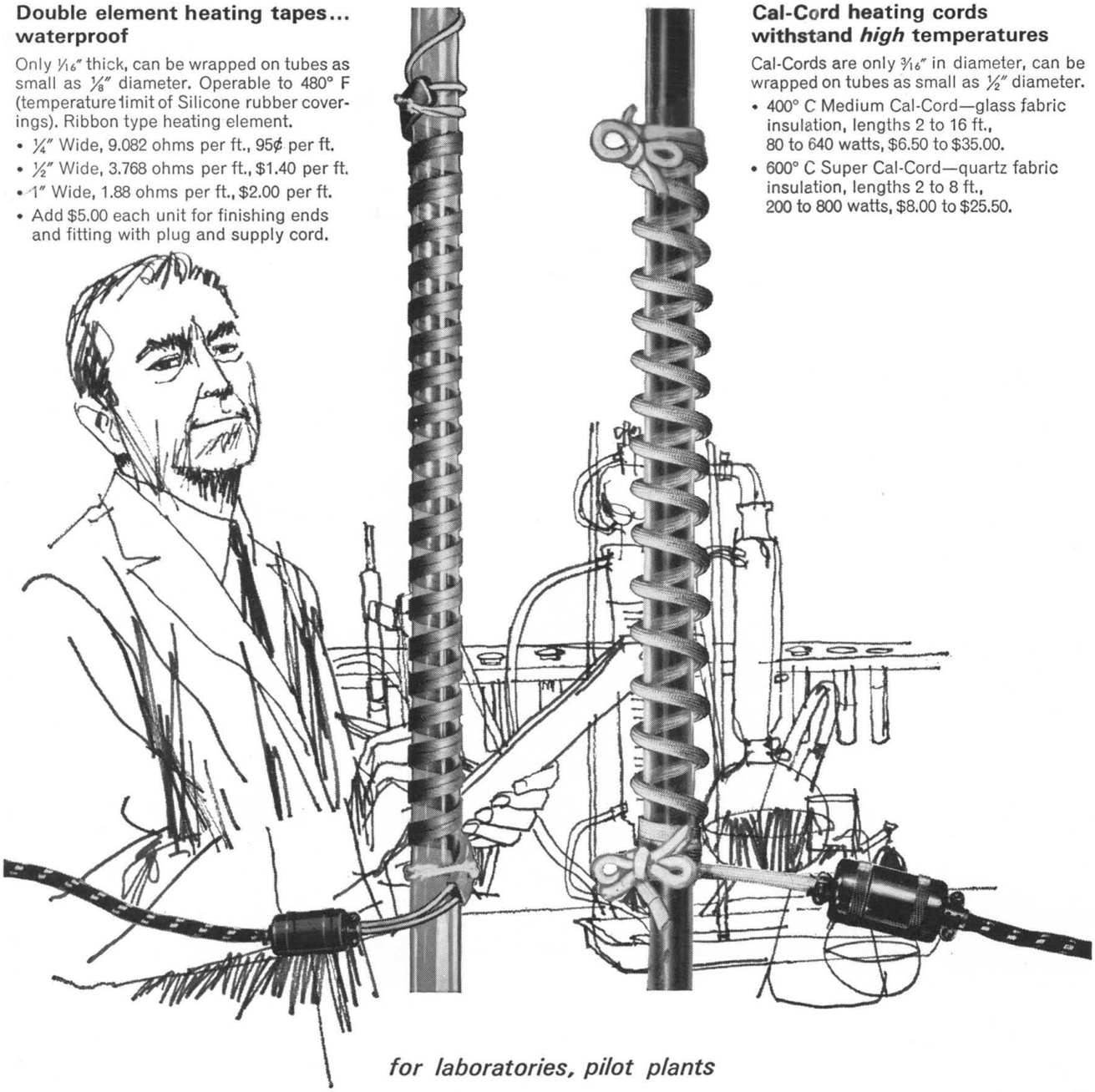

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rugged...flexible... safe heating tapes; cords—by Glas-Col

Glas-Col heating cords and tapes can be loaded right up to insulation limits without burning out. They can be flexed, twisted and coiled again and again, on small diameter equipment, without damage. They're built to withstand rough service and last for years.

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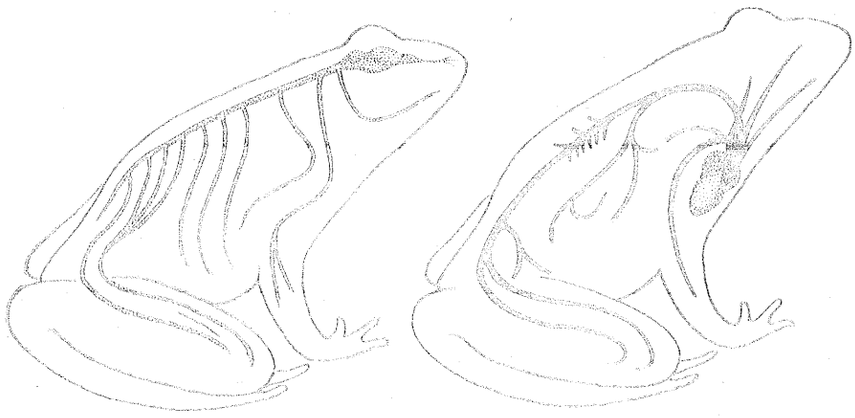

Challenging, Stimulating Introductory Texts from SAUNDERS

Cockrum, McCauley, Younggren—BIOLOGY—*New!*

By E. Lendell Cockrum, Ph.D.; William J. McCauley, Ph.D.; and Newell A. Younggren, Ph.D.; all University of Arizona.

This outstanding new biology text is a rigorous, freshman-level book with a good balance between the "classical approach," (with emphasis on descriptive biology) and the "modern approach" (with emphasis on physiological and biochemical function).

Important material on genetics, reproduction, and ecology is placed in the front of the book and is discussed in relation to both plants and animals. Plant taxonomy and morphology are covered separately in later sections. There is considerable attention given to vertebrate biology with a discussion of form following function.

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Over 500 clear, teaching illustrations complement the text material.

About 800 pages, with 500 illus. * About $9.00 * New! Ready April.

Accompanying LABORATORY MANUAL

By Russell Davis, Ph.D., University of Arizona; the late James R. Dawson, Ph.D., Southern Oregon College; and Drs. Cockrum and McCauley.

This laboratory manual to accompany Cockrum-McCauley-Younggren—BIOLOGY contains more than enough exercises for a one-year course with one 2- or 3-hour lab period per week. Instructions to both teacher and student are clear and complete. Experiments are neither entirely molecular, taxonomic, structural, functional, cellular, nor organismic, but are rather an integration of all these approaches.

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In this most thorough revision, the author presents endocrinology on a truly biological level incorporating significant material from all recent literature on the subject. The central theme of this new edition is the **reciprocal interrelationship of the nervous and endocrine systems.** The author stresses the concept that no sharp line of demarcation can be drawn between these two coordinatory systems, and that they must be considered as an entity—the neuroendocrine system. In keeping with this theme, more space has been devoted to the problem of how hormones act upon the central nervous system to determine and condition reproductive behavior.

The chapter on Invertebrate Endocrinology has been moved to the beginning of the book, in order to provide the most logical starting point for the later study of mammals and their full complement of endocrine glands and very intricate nervous systems.

Two new chapters have been added in connection with the pituitary gland: **The Pars Intermedia and Vertebrate Pigment Cells,** and **The Neurohypophysial Principles.** In addition, a chapter on **The Science of Endocrinology** has been placed in this revision. Considerable attention is given to poikilothermic vertebrates (fishes, amphibians, and reptiles) in this edition.

Many new photographs and drawings have been included in this revision, and all old ones have been updated where necessary.

About 650 pages * Illus. * About $9.75 * New (4th) Edition! Ready April.

Harrow & Mazur—A TEXTBOOK of BIOCHEMISTRY—*New (9th) Edition!*

By Benjamin Harrow, Ph.D., Emeritus, City College, City U. of New York; and Abraham Mazur, Ph.D., City College, City U. of New York

This revision of a long-respected text gives a sound, timely picture of the basic facts of biochemistry and their applications today—written for the serious introductory course in biochemistry. Because of the rapid changes in the field of science and the new concepts in theory and teaching biological sciences and biochemistry, the authors have shifted the emphasis in this new edition. Cellular structure and function are more strongly stressed. The role of genetics and physics in the chemistry of body functions has been integrated into the basic concepts. Physical chemistry is pursued to a lesser degree, but established mechanisms are carefully considered and explained.

Throughout the text, structural formulas lend dimensional depth to understanding biochemical reactions and systems. A core of biochemistry is represented by the first thirteen chapters of this text, which present the unifying concepts of biochemistry. The second half of the text presents an introduction to more specialized areas in biological chemistry in order to stimulate an interest in the relationships that may be found to exist among chemical structures, their reactivities, and their biological functions.

Topics presented include The Cell, Proteins, Enzymes, Nucleic Acids, Biological Oxications, Eipids, Carbohydrate metabolism, Nucleic Acid Metabolism, Urea Synthesis, Blood, Respiration, Kidneys, Tissues, Nutrition, Vitamins, and Hormones.

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☐ Davis, et al.—LAB MANUAL ..... about $5.25
☐ Turner—ENDOCRINOLOGY ..... about $9.75
☐ Harrow & Mazur—BIOCHEMISTRY ..... about $8.50

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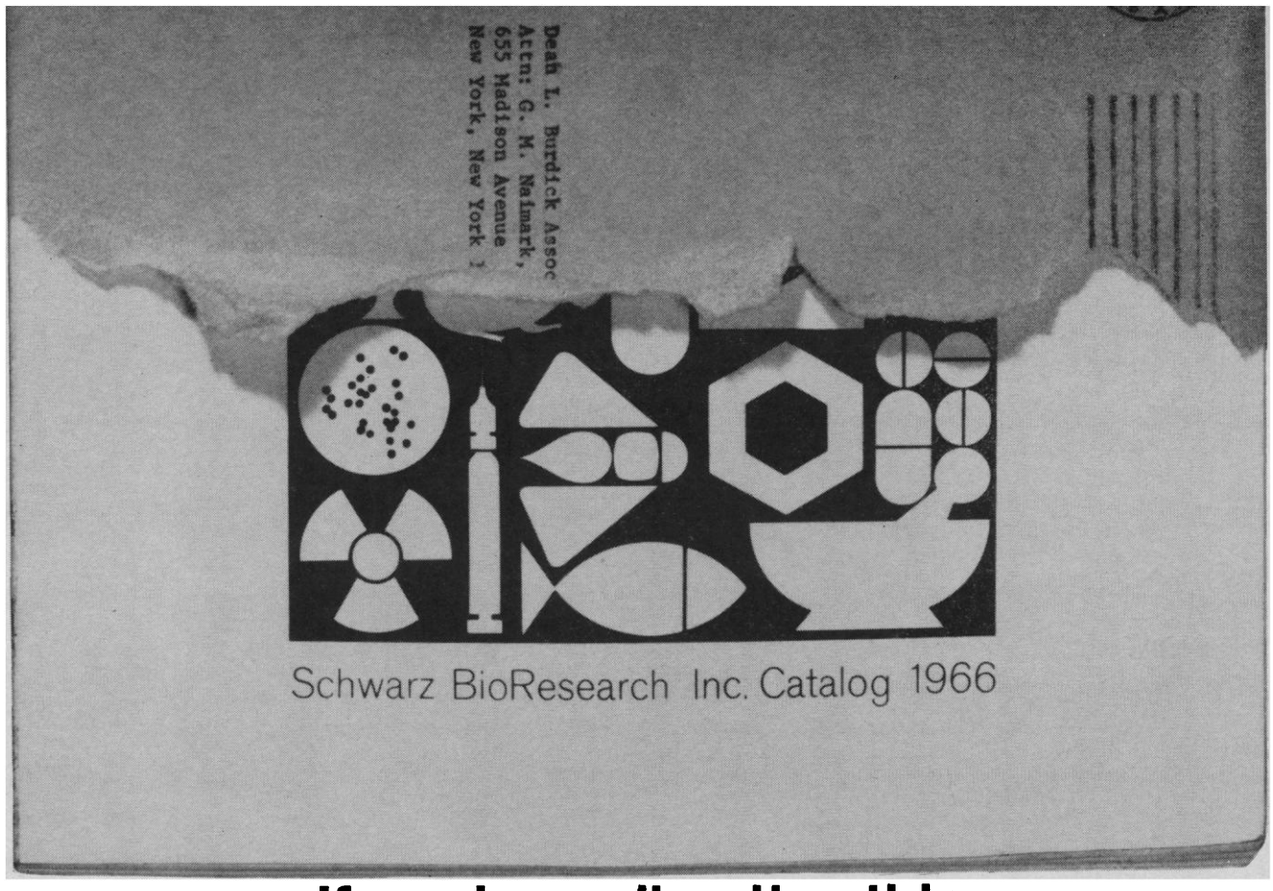
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Hatching of an Indian Rock python (*Python molurus*). Eggs had been brooded about 60 days before they began to hatch. Whenever the ambient temperature fell below 32°C during that period, the mother produced enough metabolic heat by repeated contractions of her body muscles to maintain the eggs at or near that temperature. See page 694. [New York Zoological Society]



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clip this.

Schwarz BioResearch, Inc.
Orangeburg, New York 10962

Dear Sirs:

For some inexplicable reason I do not yet have a copy of your brand-new 1966 catalog whose picture abuts this coupon. I hear it includes a most comprehensive listing of hot and cold biochemicals. (Is it really true that it also features quite a few interesting new products?)

Please send me a copy with all due haste.

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Address_____

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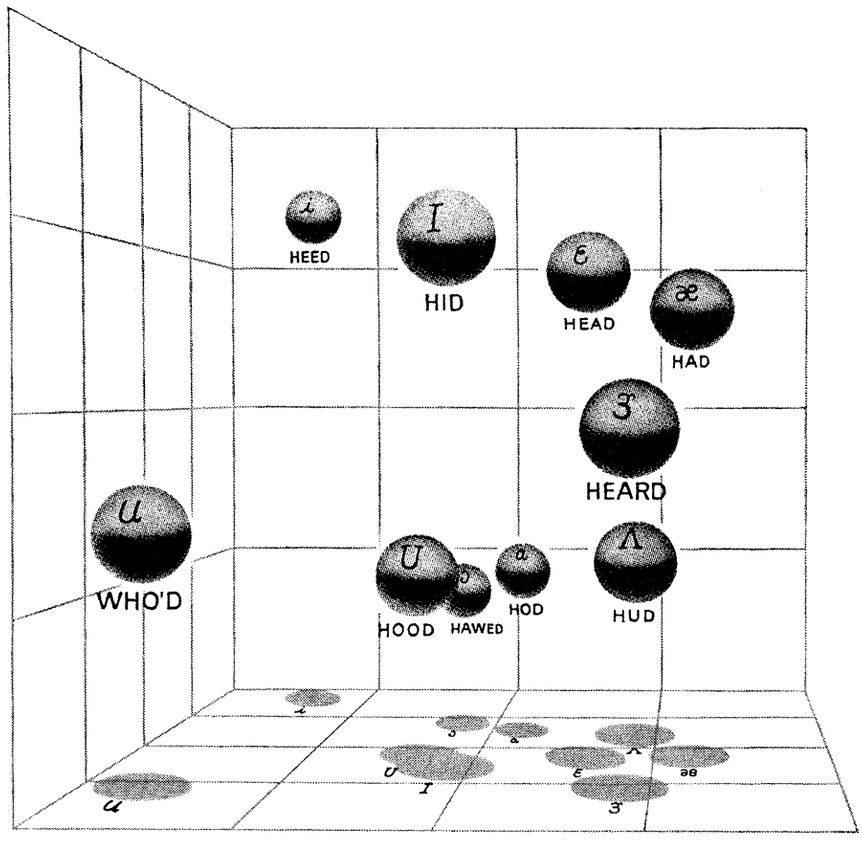
(A happy alternative to clipping this journal: send us a postcard addressed to Dept. C.)

Report from

BELL LABORATORIES



Representation in subjective space of the proximities (i.e., "nearness" or "farness") among ten vowel sounds, indicated at left by phonetic symbols. Test subjects heard these vowels in words like heed, had, hid, etc., and were asked to identify them. Pairs of vowels frequently confused are considered "near" to each other; other pairs which were seldom confused are regarded as "far apart." This computer solution displays these spatial relationships, relating each vowel to every other vowel, in a form easily visualized.

"SUBJECTIVE SPACE"—A NEW METHOD OF UNCOVERING MEANING

It is easy to record people's opinions and reactions, but sometimes it is hard to extract usable information from such subjective data. Valid meaning might be clouded by a mass of seemingly inexact information.

Test subjects listening to telephone channels of varying quality. Subjects heard test sentences transmitted over pairs of channels; for each pair they indicated, by pressing a button, which of the two they preferred. Signals from buttons were used to key-punch cards, which were then processed with adaptations of the "subjective space" program developed at Bell Laboratories.

A new method of analyzing data to reveal such meaning has been developed by R. N. Shepard and adapted for different uses by several of his fellow researchers at Bell Telephone Laboratories. With this method, the underlying structure of the data is displayed in the form of a spatial representation. The illustration above, for example, shows such a representation obtained for ten different sounds—namely, ten words differing only in the vowel sound. This representation was obtained by an analysis of the subjective similarities among these sounds as revealed by how frequently listeners confused each pair of words. In the resultant "subjective space," pairs like *hod* and *hawed* that were frequently confused by listeners are represented as close together, whereas pairs like *heed* and *hud* that were rarely confused are represented as far apart.

In this spatial arrangement, the underlying structure is revealed more clearly than with conventional methods of presenting data. Moreover, the dimensions of the subjective space often provide information about which physical properties of the stimuli are the most critical psychologically. (For example, the three dimensions for the above ten vowel sounds were found to correspond roughly to the frequencies of the first three resonances of the human vocal tract.)

The method devised for finding such spatial representations uses an iterative process programmed for a high-speed digital computer. It seeks an optimum configuration of points in a space of the smallest possible number of dimensions in which the given data are represented in the interpoint distances. Solutions in one, two, and three dimensions are conveniently displayed by a visual computer output. As a result, the psychologically significant dimensions of the stimuli —which might not be evident from traditional methods of analysis—can often be identified simply by inspection. The method is quite general: the data can be subjective judgments of similarity or can be frequencies of actual confusions, and the stimuli can be colors, sounds, or even communication circuits varying in quality.

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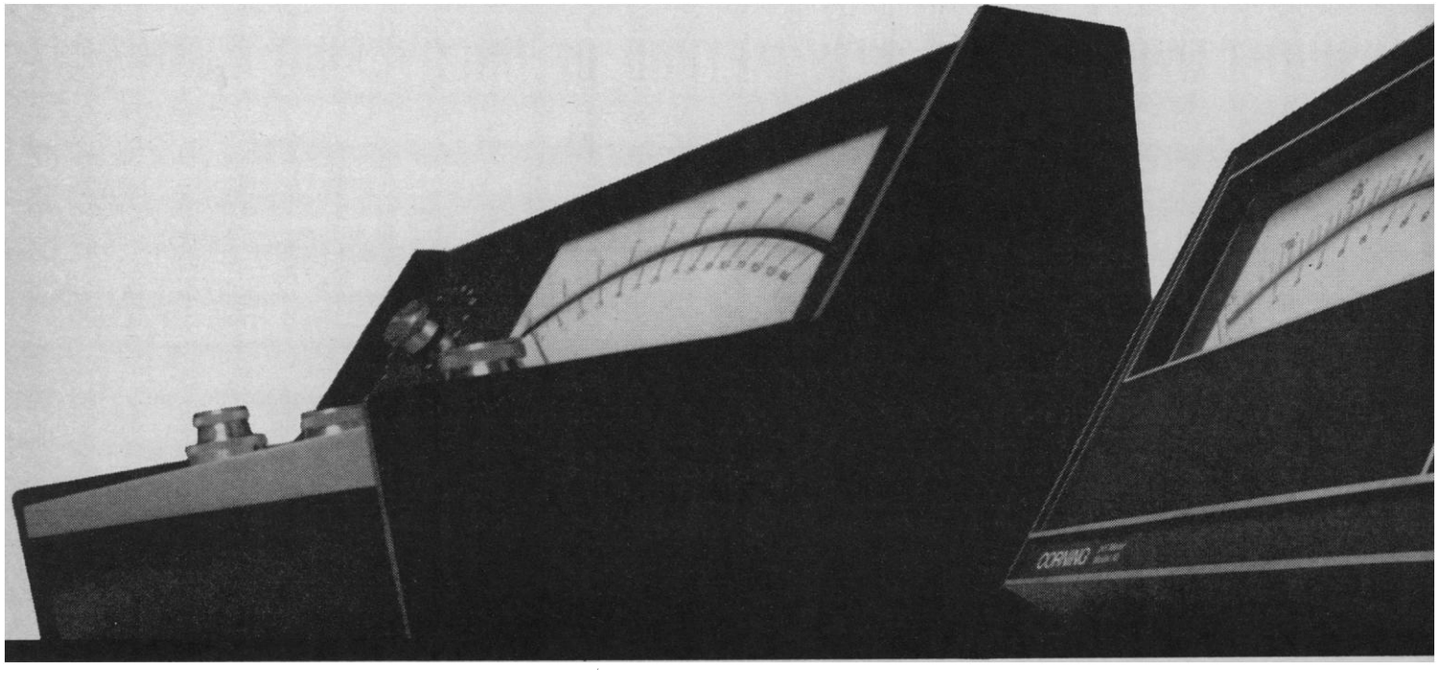

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For evaluation loan or literature, send this coupon to: Dept. SC-02, Corning Glass Works, Medfield, Massachusetts 02052.

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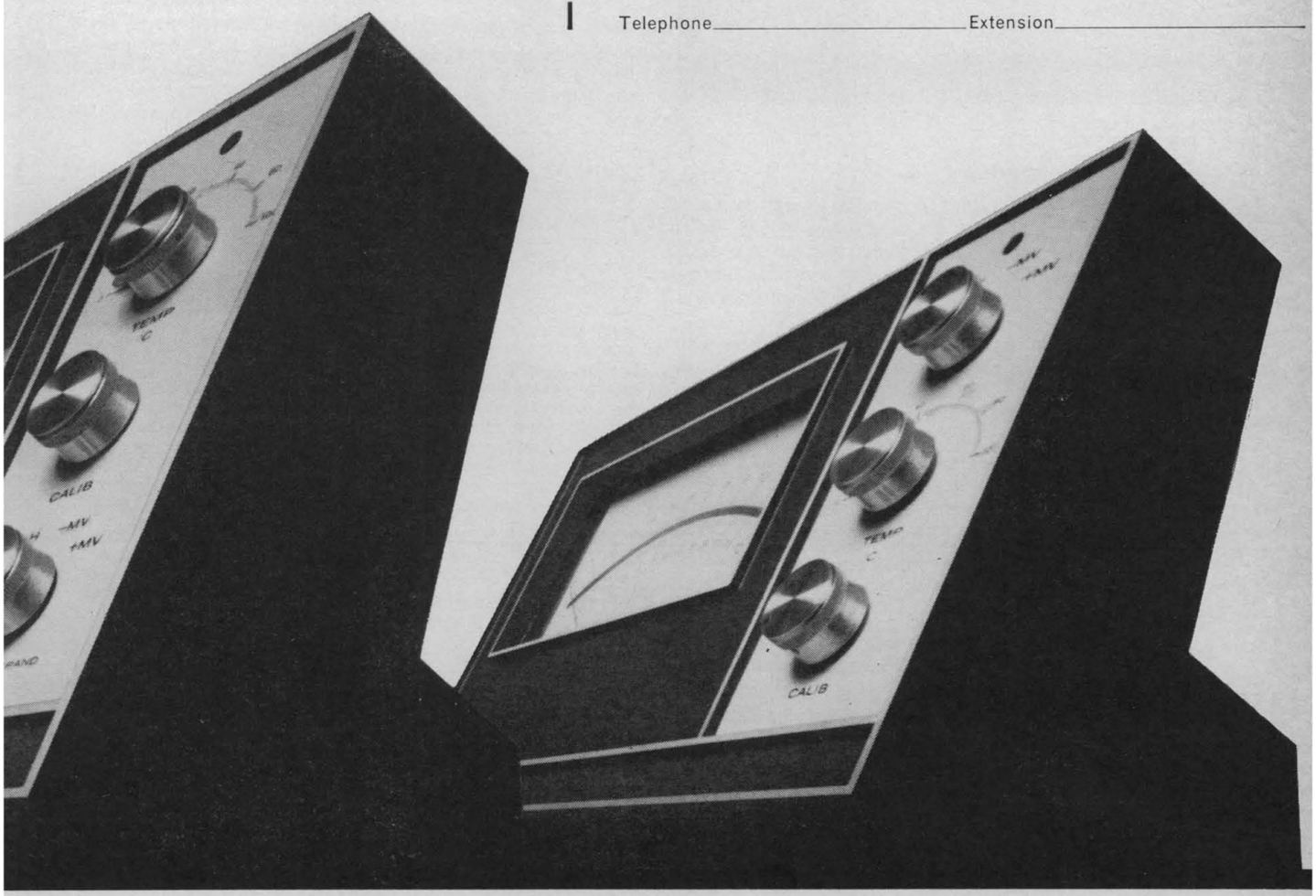

CORNING Model 10 Expanded-Scale pH Meter, center—The longest—10 inches—meter scale on any lab pH instrument lets us put more scale divisions on it, lets you read easily to 0.01 pH on full-scale expansion of any 3 pH units, and to 0.05 pH on the 0-14 range. Reproducibility is better than ±0.005 pH. $485 with accessory kit.

CORNING Model 7 General-Purpose pH Meter, right—Speed up routine work without risking accuracy. Drift of less than 0.01 pH/day means stability that provides dependable measurements all day without restandardization. Reproducibility is better than ±0.02 pH. $330 with accessory kit.

Borrow any one of these meters and you will get the unique CORNING pH Electrode with Triple-Purpose Glass Membrane in its accessory kit. This is the *one* remarkably stable electrode that does the general-purpose, high-alkaline region, and high-temperature work that used to require *three* electrodes.

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how to put some slides together . . . continuing progress against witchcraft . . . seeing to 30μ, unafraid of sweat and dew

Cozy

In putting lecture slides together, regular projection facilities are no longer required. The new self-contained KODAK READY-MATIC Viewer works quite cozily in close quarters, is silent, weighs only 7 pounds, sets up instantly, can be obtained for less than $50 from the nearest convenient camera shop. Have the department get one.

Take a crack at chemistry

Unless read carefully, this is going to sound as though we claim that all it takes to be a chemist is a total outlay of $58.70 for a box of EASTMAN CHROMAGRAM Sheet and an EASTMAN CHROMAGRAM Developing Apparatus. The chemical profession can rest confident that hardly anybody who matters would believe us.

We are really saying that heads-up scientific workers who don't think of themselves as chemists and who don't always have a full-fledged real chemist at their beck and call are now in a position to take a crack at thin-layer chromatography, one of the more potent weapons in the profession's kit when it comes to fine separations among closely similar compounds. The CHROMAGRAM system eliminates certain aspects of witchcraft from thin-layer chromatography, even as the fellow who started our whole company took enough witchcraft out of photography to make every man a photographer while still leaving photography enough of a profession to afford fine livings for many more skilled practitioners than were in it 80 years ago.

Distillation Products Industries (Division of Eastman Kodak Company), Rochester, N.Y. 14603, from whom you can order the complete outfit quoted above, has had the temerity to put together 4 pages of type on the nature of thin-layer chromatography by the CHROMAGRAM *system, part of a packet of TLC procedures for the separation of:* **amino acids, dibasic acids, glycerides, *cis-trans* isomers of fatty acid esters, serum lipids, 2,4-dinitrophenylhydrazones, fat-soluble vitamins, tocopherols, cholesterol and cholesterol esters, pesticides, antioxidants, some common dyes, photographic developing agents, and ball-point inks.** *A request for the TLC packet (which should perhaps precede placement of the order) puts one on the mailing list for more procedures and further TLC news.*

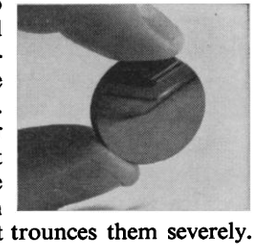
Another successful marriage from the periodic table

Cadmium telluride now becomes an engineering material.

Some imaginative combinations of elements are sought out for what they will do and others for what they won't do. Cadmium telluride won't interact with photons hardly at all from 2 to 30μ in wavelength. Much the same can be said of that more familiar compound sodium chloride, but sodium chloride is far less tenacious of the solid state. Incompatible is usefulness in seasoning watermelon and supporting life with usefulness for constructing durable optical parts that pass thermal radiation.

Similarly transparent are several other alkali halides and similarly vulnerable to dew and sweat. One halide, thallium bromide-iodide ("KRS-5"), that has had to do for far-infrared transmission, is less soluble than the others but still plenty soluble by comparison with CdTe and prone to cold flow under mere gravity, an optically disconcerting effect.

We have learned how to put cadmium telluride into a form which is neither an amorphous glass (no cold flow) nor a crystal (hence no cleavage planes for splitting) but an interlocked mass of crystals that takes and keeps a beautiful optical polish and looks about as transparent as coal.*



CdTe is the sixth compound to which we have successfully applied our proud art of creating polycrystalline optical materials. It will become known as KODAK IRTRAN 6 Material. By comparison with all the other IRTRAN materials, we'd have to call it soft, but it is not as soft as any of the known alternatives for its wavelength range. For low thermal expansion it trounces them severely.

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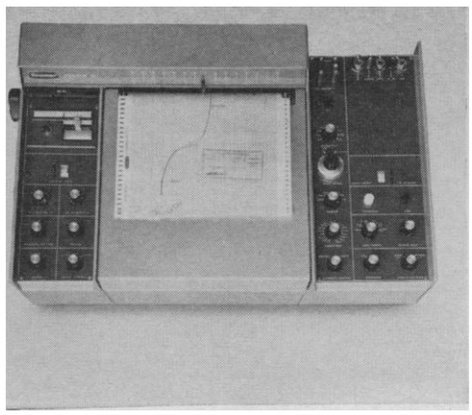
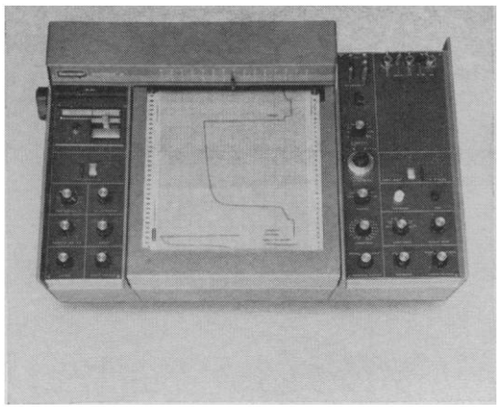
*At 850mμ the curtain due to absorption by electrons starts to lift, is all the way up by 2μ, stays all the way up until lattice vibration starts absorbing photons at 28μ, and doesn't fully cut off the show before 30μ. About the only loss over that long span is the 2-surface reflection loss of 35%. If this is too much, the high index permits relief by coating. The high index also suggests use of the material for "immersing" detectors, where it contributes to collecting power.

Prices subject to change without notice.

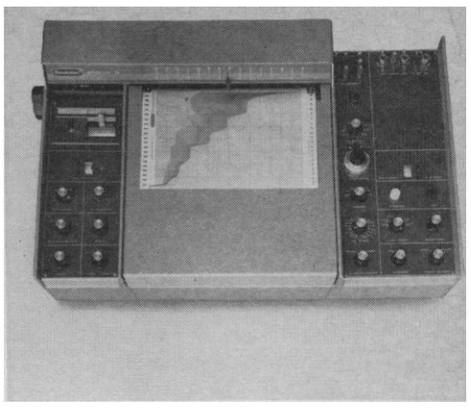
This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science



Coulometer,



Chronopotentiometer,



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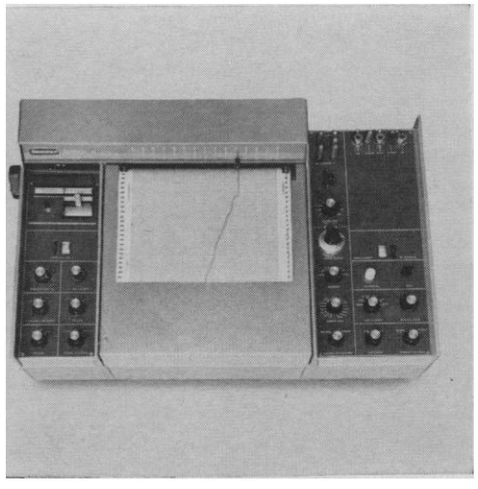
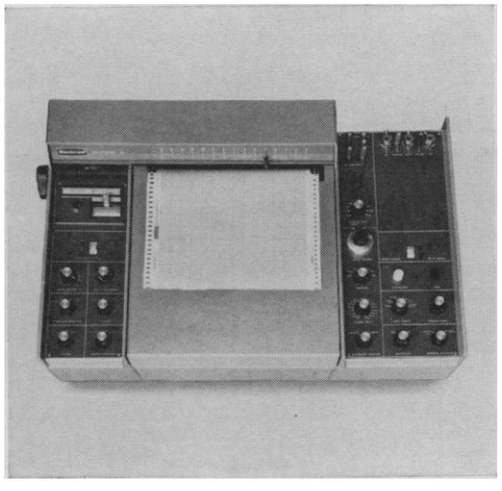


pH Recorder,



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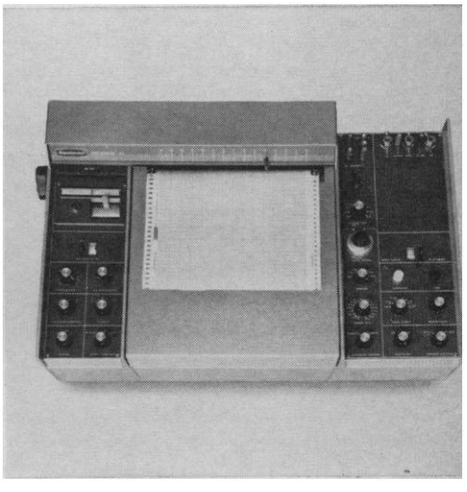

etc.,

etc....

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The etceteras are up to you. We found a dozen names for the new Electroscan 30, but we're sure there are more. In fact, we think the Electroscan 30 is a complete electrochemical laboratory.

It's been evaluated for coulometric titrations, chronopotentiometry, three-electrode polarography, cyclic voltammetry, rapid scan voltammetry, electrodeposition, chronoamperometry, stripping analysis, pH and ORP measurements. What else it will do is up to you, your problems, and your imagination.

The standard Electroscan 30 features a controlled DC current power supply, a high-speed, high-impedance, 10-inch recorder, and a wide variety of electrodes and sensors. It is also available with a built-in potentiostat accessory which converts the controlled current supply into a controlled voltage supply. And it's backed by Beckman's 30 years experience as the leader in electrochemical measurement.

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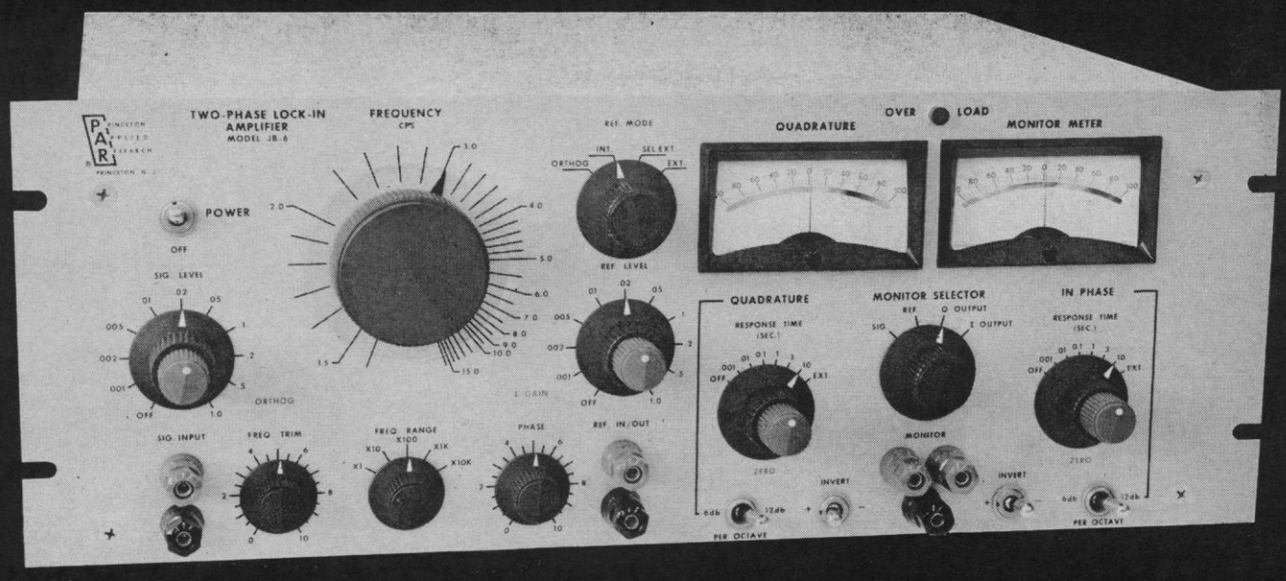

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Two-phase lock-in amplifier simultaneously recovers in-phase and quadrature signals from noise

The PAR Model JB-6 Two-Phase Lock-In Amplifier permits simultaneous measurements of both the in-phase and quadrature components of extremely weak signals buried in noise. This instrument operates essentially as an extremely narrow band detector, the center frequency of which is "locked" to a particular frequency at which the signal information has been made to appear. As a result, complete freedom from drift between the detector center frequency and the characteristic signal frequency is obtained regardless of how narrow the detection bandwidth is made.

The JB-6 provides, for each phase component, individual outputs for strip chart recording, independent filtering selection and separate meter displays. An internal signal is also provided for convenient adjustments of orthogonality between channels over the entire operating frequency range. In experiments where the in-phase and quadrature components of the signal are to be determined, and where the signal information can be made to appear as such, the Two-Phase Lock-In Amplifier will prove to be most useful.

Frequency Range: 1.5CPS to 150KC continuously tunable in five ranges.

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Gain: (rms AC in to push-pull DC out) Greater than 9,000. "In-Phase Mixer Gain" control permits making the gain of the two channels identical.

Outputs: a) ± 5 volts DC maximum balanced to ground into high impedance load

b) ± 1 ma or $\pm \frac{1}{2}$ ma switch selectable into pen recorder of less than 2K input impedance (independent outputs for each channel at rear of instrument).

Operating Modes: External, Selective External or Internal Reference. Lock-in accepts sinusoidal or non-sinusoidal reference signal or provides sinusoidal 5V peak-to-peak reference from internal oscillator.

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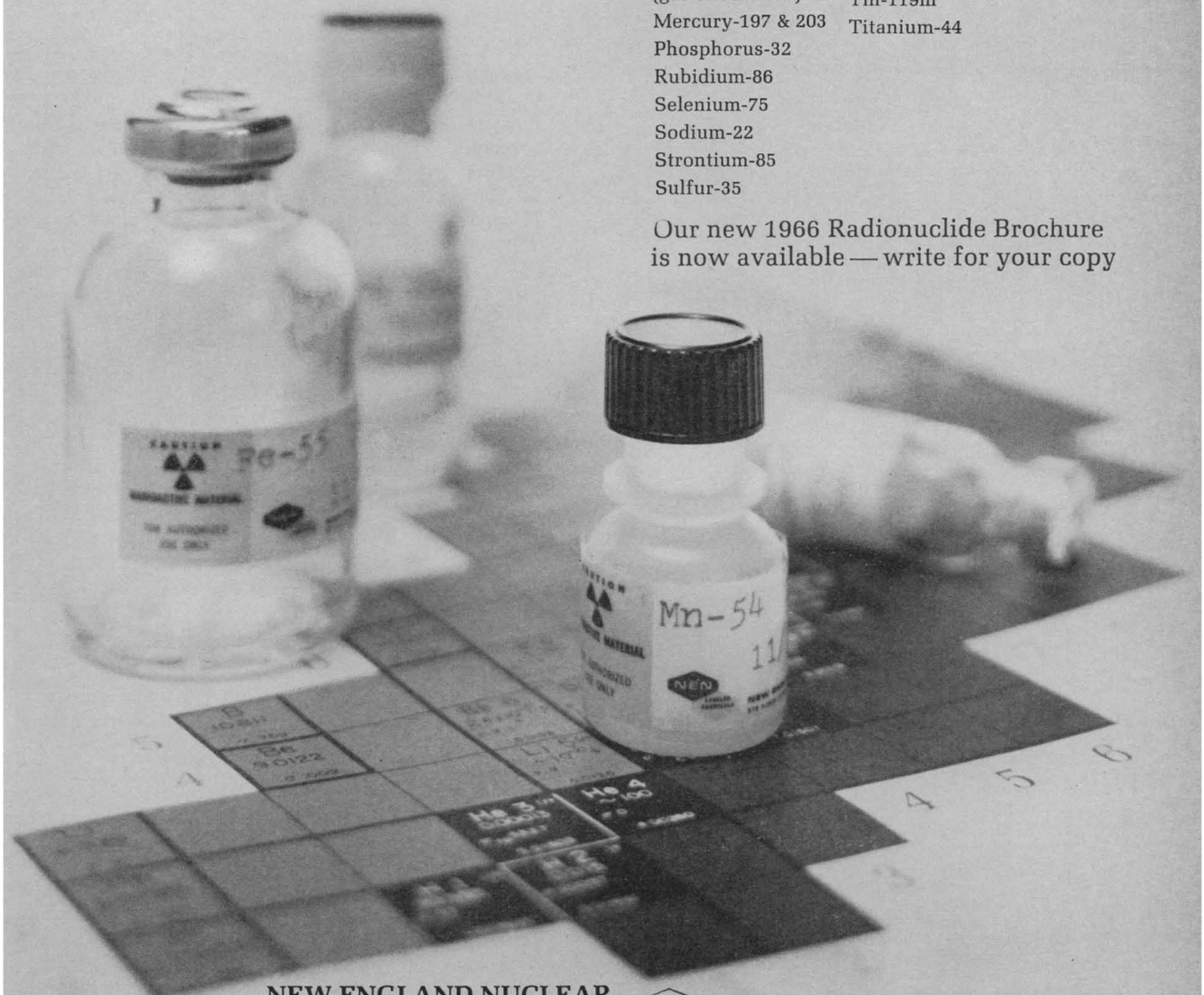

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Mr. and Mrs. Robert B. Greenlee, were relaxing on their fiberglass-screened, roofed patio in Dunnellon, Florida. The temperature was in the 90's, the sky was overcast, and there was a slight drizzle; the Greenlees had heard thunder some distance to the west of their immediate vicinity. Mrs. Greenlee and a neighbor, Mrs. Riggs, were seated a few feet apart in aluminum chairs, and Mr. Greenlee was standing about three feet from Mrs. Greenlee. Mrs. Greenlee had just swatted a fly when a ball of lightning the size of a basketball appeared immediately in front of her. The ball was later described as being of a color and brightness comparable to the flash seen in arc welding, with a fuzzy appearance around the edges. Mrs. Riggs did not see the ball itself, but saw the flyswatter "edged in fire" dropping on the floor. The movement of the ball to the floor was accompanied by a report "like a shotgun blast." The entire incident was over in seconds.

None of the witnesses felt any heat from the ball, and Mrs. Greenlee showed no signs of external injuries, although she complained of pain in the back of her neck and has had occasional headaches since. The explosion was heard by a neighbor about 150 feet away, and it was subsequently learned that another neighbor's electric range had been shorted out at the same time. There was no damage of any sort at the Greenlees, nor were there any marks on the patio floor where the flyswatter had fallen.

With regard to the fly, Mrs. Riggs commented, "You sure got him that time."

FREDERICK B. MOHR
Aerospace Technology Division, Library of Congress, Washington, D.C.

Animal-Care Legislation: Why Scientists Do Object

Morris Goldman's letter (17 Dec. 1965, p. 1536) urging passage of federal legislation controlling the procurement, care, and use of laboratory animals makes nonspecific and unsupported charges of "frivolous and cruel usage" of animals and sets up straw men to destroy. Responsible scientists do not ask, as Goldman suggests that they do, "Why should [I] be penalized" for occasional errors of others?

The persons in the scientific community who are opposing regulatory legislation at the federal level do so primarily on the grounds that such legislation would be contrary to the public interest. I testified for the National Society for Medical Research on 30 September 1965 before the Subcommittee on Health and Welfare of the House Committee on Interstate and Foreign Commerce. The transcript of the hearing will show that I concluded one portion of my testimony by saying "Let me assure you of one thing. It is not scientists as persons who would be hurt by passing bills like H.R. 10049. It is the public which would be hurt." Scientists who oppose legislation that would multiply the bureaucratic red tape involved in research and teaching in which animals are used do so not because it would complicate their lives, but because it would delay or prevent scientific discovery, cause deterioration in medical and other biological education, and increase the cost of the biological science enterprise out of proportion to any probable benefit to animal welfare.

Goldman depreciates the importance of self-regulation in maintenance of standards of ethical concern for animal welfare. It would be interesting to know whether he has any proof that laboratory animals are in general better treated in Great Britain where there is national regulation than they are in the United States where there is not. I have worked in both countries and it is my impression that in the institutions in which I have worked, the self-regulation in the United States has resulted in conditions as good as, and in many instances much better than, those in the nationally regulated laboratories in Britain. Furthermore, the British system has not been compatible with effective work on many problems in relation to which American scientists have made great progress, as in open-heart and other surgery, the management of burns and traumatic shock, and in other important human problems.

If any scientists are opposing federal regulation of animal experimentation simply because it would be troublesome to them, they should cease and desist. The pertinent and valid objection to such regulatory legislation resides in the damage it would do to the public welfare.

MAURICE B. VISSCHER
Department of Physiology, University of Minnesota, Minneapolis

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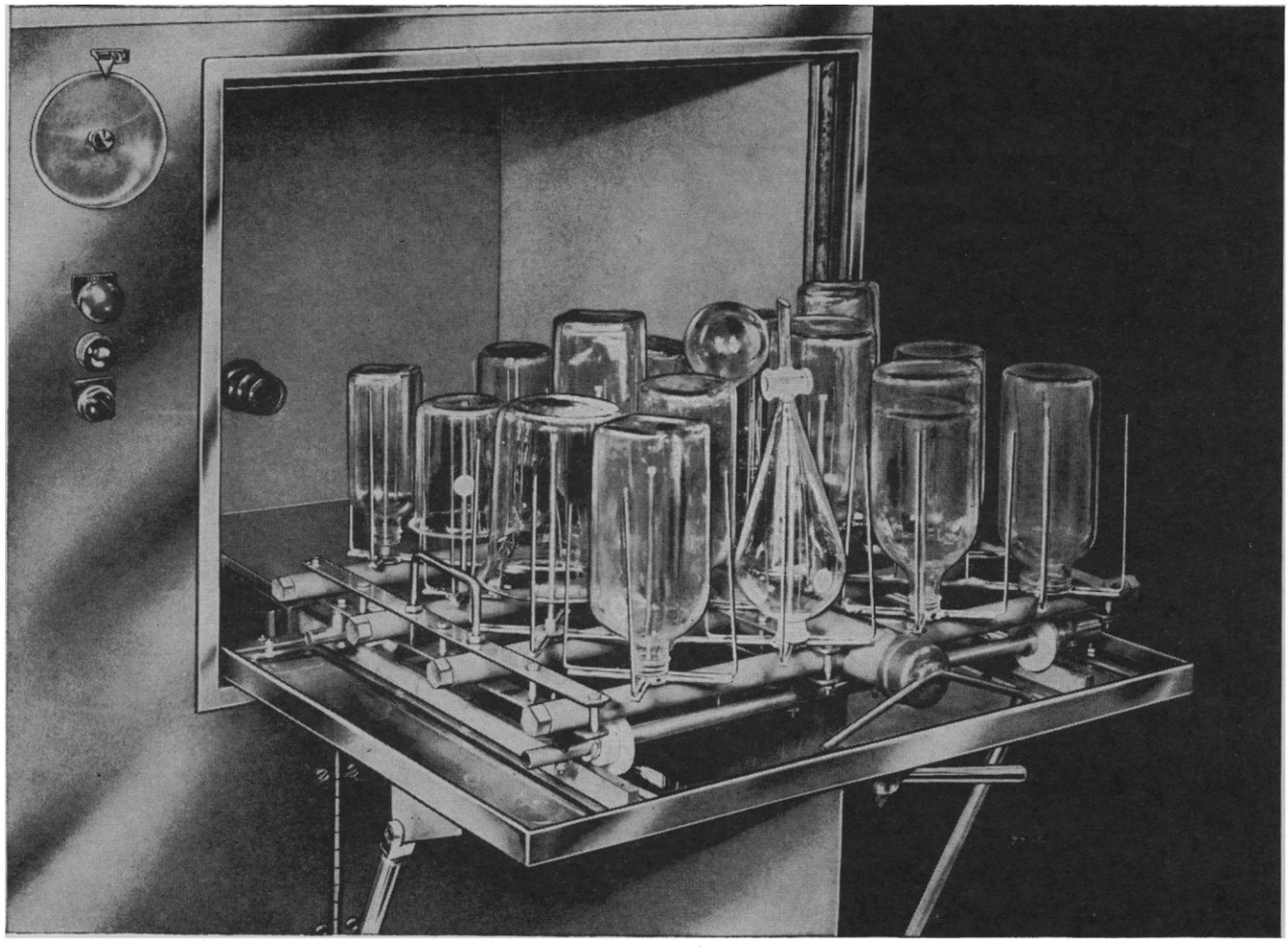

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11 February 1966, Volume 151, Number 3711

SCIENCE

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Letters to Congressmen

Congressmen have well-established methods for learning both the public reaction and the attitudes of specially interested groups on matters with which Congress and the nation have had long experience—for example, taxes, public works, and foreign affairs. They receive the recommendations of the Executive Branch and the advice of staff members and other trusted counselors; they are waylaid by lobbyists; they listen to witnesses at committee hearings; and they read newspapers and the daily mail.

Communication with Congress on scientific and technical issues must follow established patterns, for the legislative process is the same whether Congress is considering a new dam or a new accelerator, the Post Office budget or the budget of the Atomic Energy Commission. Thus on issues involving science and technology Congress gets advice through all the usual means. All, however, have their shortcomings. Sometimes, it is charged, the selection of witnesses to appear at committee hearings is biased. Congress always wants an independent appraisal of Executive recommendations. Lobbysts, almost by definition, are special pleaders. The mail may give a distorted representation of informed judgment. For example, antivivisectionists and persons who believe that research animals are often mistreated have written many letters in support of current proposals to establish federal controls over the use of animals in research and teaching, but there have been few letters about these proposals from biologists and medical researchers.

Congressmen are aware of these difficulties and recognize the need for a wide basis of advice. In order to have a source of information that is independent of the Executive Branch, Congress established the Science Policy Research Division of the Library of Congress. To supplement its other resources, Congress sometimes asks the National Academy of Sciences or other scientific bodies for advice or special studies. But the paucity of letters from scientists on matters about which they are concerned and well informed often puzzles congressmen; they ask, "Why don't we hear from the scientists on this? Aren't they interested?"

Is it worth while to write a letter to a congressman? Not always. The letter may go to a congressman who is not interested, or it may arrive at a time when there is nothing he can do about it, or it may be forgotten in the welter of other mail and other business. Congressmen get junk mail, requests for favors, and much other mail that is not germane to pending legislation. Sometimes they are flooded by letters so nearly identical as to be the obvious result of an organized campaign.

Congressmen get few letters, however, that present a carefully reasoned analysis of why a decision one way or the other would be desirable. The rarity of such letters makes them stand out from the pile of other correspondence. Letters of this kind are particularly likely to be influential if they come from someone the congressman knows, or come with an introduction by a mutual acquaintance; if they come at the time legislation is being drafted, hearings are being held, or a vote is pending; or if they go to a congressman who is serving on the appropriate committee or who has shown a personal interest in the matter at issue.

There can be no guarantee that every letter will result in the desired action. Nevertheless, it is worth while for one who has well-formulated views which he can explain clearly to write to appropriate members of Congress. This is a recognized channel of communication that congressmen understand and use. At the lowest level, the volume of mail is interpreted as a measure of interest. At a higher level, the thoughtful, cogent analysis of an issue may help to achieve a sound decision.

—DAEL WOLFLE

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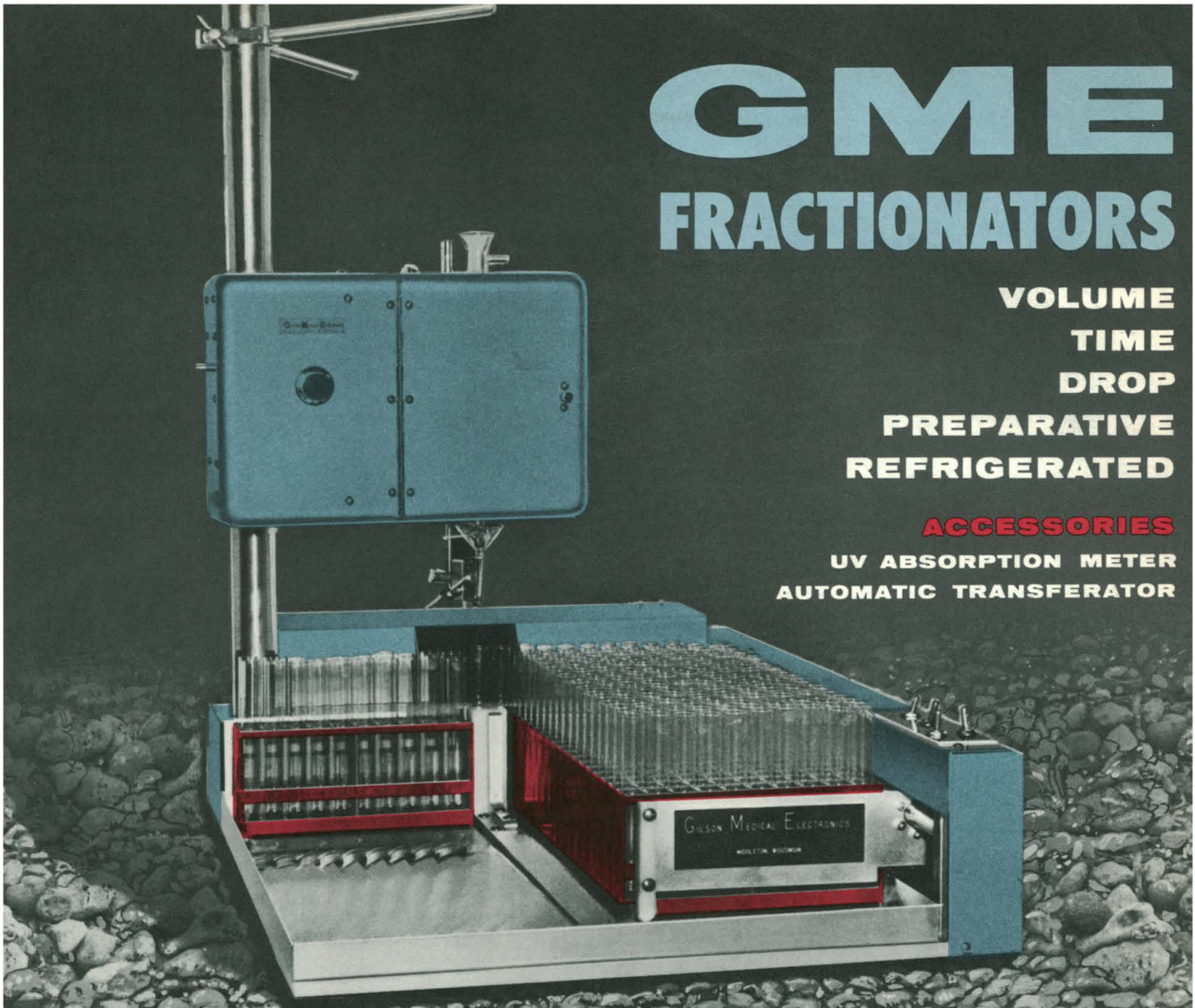

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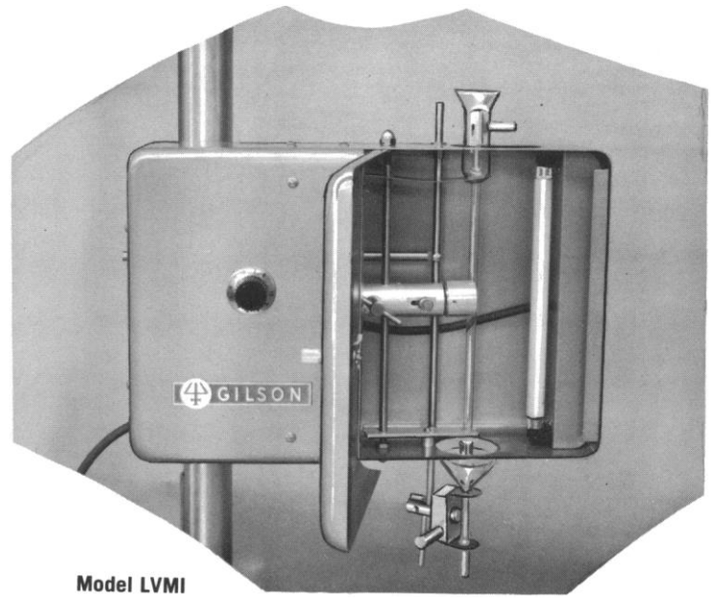
VOLUMETRIC UNIT



Model LVMI

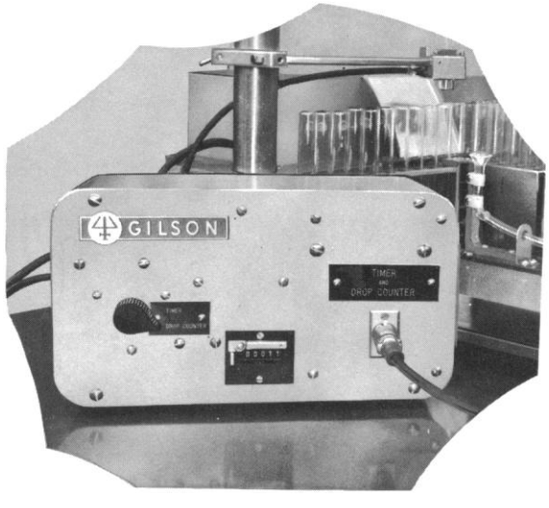
The reliable GME Volumetric Unit provides a constancy of fraction volume which is not affected by changes in drop size. The volume is continuously adjustable for any volume from 1 ml. to 25 ml.

A light from a fluorescent source is focused on a light dependent resistor (LDR) by means of the cylindrical lens formed when the collecting cylinder is filled with the sample. The light dependent resistor actuates a relay; the Fractionator is indexed to the next tube; the ball and socket valve is opened and emptying occurs. The socket is the lower end of the collecting cylinder and the ball projects from the funnel as shown; together they form the ball and socket valve. The funnel is held in an adjustable stainless steel holder and is supported vertically by a bulge in the glass which will pass through the top hole but not through the bottom hole. The larger top hole permits a certain amount of play, allowing the funnel to move slightly and the ball to seat itself freely—making a positive, leakproof seal.

Adjustment to a specific volume is extremely simple; the LDR is moved to the top of the collecting cylinder, the cylinder is filled with the desired volume, and the LDR is then lowered and clamped into position when automatic emptying occurs. Easily interchangeable collecting cylinders permit any volume from 1 ml. to 25 ml. to be collected in each sample.

DROP-COUNTER and TIMER

(combination unit)



Model DCT

The GME Model DCT is a small, efficient and reliable unit. It collects drops directly into test tubes without intervening tubing, thereby preventing undesirable mixing and eliminating areas for bacterial and fungal growth. The DCT unit will count drops at any rate up to 1 per second for a maximum of 100,000 drops per index.

A miniature light and a photo-cell are used to detect the drops—the drops touch nothing. The drop counter is useful for volumes less than 1 ml. or for highly colored solutions.

With the flick of a switch, you can convert to time. Functioning as a timer, the DCT can be set anywhere from 1/10 min. to 10,000 minutes in 1/10 minute increments.

Any of the GME Volumetric Fractionators can easily be converted from volumetric to time or drop operation by unplugging the volumetric unit from the base collecting unit and plugging in the DCT. (Model V15^2 only requires an adapter cable.)

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MEDICAL ELECTRONICS
Middleton, Wisconsin
ON MADISON'S WEST BELTLINE HIGHWAY
Phone 608/836-1551

Recording Ultraviolet Absorption Meters

The GME ULTRAVIOLET ABSORPTION METER fits on the apparatus mast of the Fractionator directly above the volumetric unit. Fluid from the chromatographic column travels through a simple quartz cuvette in the absorption meter before entering the volumetric unit. Light from a mercury lamp passes through the cuvette and Corning glass filter onto a phototube, the output of which is amplified and rectified. The electrical output of the absorption meter will operate a 0-1 ma. recorder of 1000 to 3000 ohms impedance.

UV-254

UV-265IF
for nucleotides

UV-280IF
for proteins

designed to indicate which test tubes in the fraction collector contain material of interest. The volume of the optical chamber has been reduced to 0.15 ml. to minimize mixing.

Models Available

MODEL UV-254 (same as former Model 5), uses a General Electric 4-watt germicidal lamp which has almost all of its output at 254 millimicrons. The lamp and amplifier are supplied with stabilized voltage by a 50 VA voltage regulator. Model UV-254 has been used satisfactorily for nucleotide studies for a number of years. It has the limitation that when using formic acid buffer there is a gradual shift of the baseline with increasing formic acid concentration. For this reason . . .

MODEL UV-265IF was developed. Formic acid absorbs very little at 265 millimicrons, while most nucleotides have a large absorption at this wavelength. In order to provide a light source at 265 millimicrons, an 85 watt General Electric lamp with wide spectral distribution was chosen. The lamp and amplifier are supplied with stabilized voltage by a 150 VA voltage regulator. This lamp is placed in a housing external to the absorption meter.

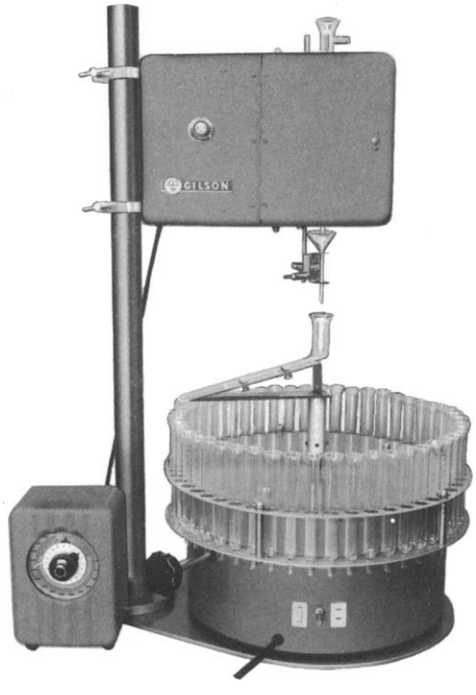
A dual interference filter is used to pass a band approximately 20 millimicrons wide, sharply peaked at 265 millimicrons. Formic acid causes only a minimal baseline shift.

MODEL UV-280IF was developed for protein studies. It uses the same lamp and accessory equipment as Model UV-265IF, but has a dual interference filter passing a band approximately 20 millimicrons wide which is sharply peaked at 280 millimicrons.

IFIL265—a dual interference filter which may be used to convert Model UV-280IF to Model UV-265IF.

IFIL280—a dual interference filter which may be used to convert Model UV-265IF to Model UV-280IF.

SEE SEPARATE CATALOG SHEET ON ULTRAVIOLET ABSORPTION METERS



The GME Model PV10 PREPARATIVE FRACTIONATOR incorporates the volumetric unit described on page 2. The operation of the volumetric unit is repeated a predetermined number of times as set by the counter shown in the illustration. This provides a capacity per sample of from 1 ml. to 10 liters. The delivery tube below the volumetric unit rotates from one of the 50 test tubes to the next after the predetermined number of operations. Each of the flared test tubes has a connection at the bottom for a hose which leads to a container of the desired capacity.

In the GME Model PT10 PREPARATIVE FRACTIONATOR, the delivery tube rotates from one of the 50 test tubes to the next after a period of time set by a timer.

MODEL PV10 Preparative Fractionator

Base unit, volumetric unit, counter for 1 to 400 operations, stainless steel supporting mast, 55 flared test tubes with hose connections, 2 funnel valves, 2 delivery tubes, cylinders for fractions from 1 ml. to 10 liters.

MODEL PT10 Preparative Fractionator

Base unit, stainless steel supporting mast, 55 flared test tubes with hose connections, 2 delivery tubes, timer with 18 sec. to 120 min. intervals in 6-second increments. (Other timer ranges available on special order.)

LINEAR FRACTIONATOR *(see front cover)*

U. S. and Foreign Patents Pending

As soon as 10 fractions are collected in the GME Linear Fractionator, they may be removed. This enables the scientist to keep up with the column with his analytical procedures. The red polypropylene test tube racks holding ten test tubes each may be placed in line again and again, thereby postponing indefinitely the end of the run. Twenty racks can be put in the apparatus for the period of unattended run, after which the Fractionator will shut itself off only if no more racks are put in line.

The test tube rack bed is a stainless steel pan which will collect any spilled material. The apparatus mast is made of heavy 1¾" stainless steel pipe which will easily support 3-foot ion exchange columns without the need for additional stands.

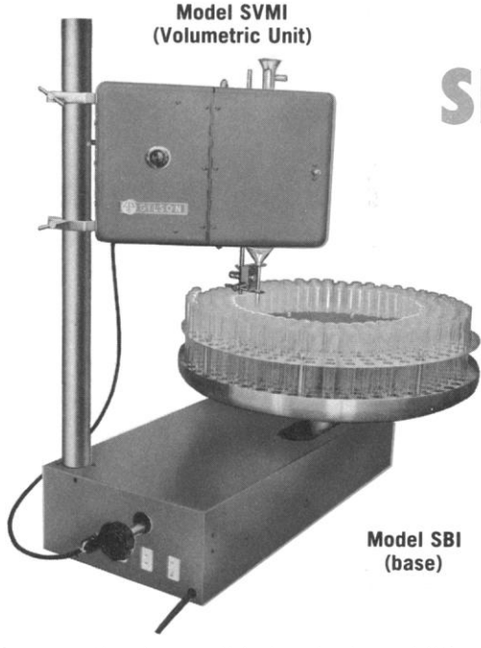
Accuracy of alignment on the LINEAR FRACTIONATOR permits the easy use of smaller sized test tubes, for which adapters are available.

MODEL VL Volumetric Fractionator with Linear Base

Complete unit with linear base, stainless steel test tube pan, 20 polypropylene test tube racks for a total of 200 test tubes (18 x 150 mm—test tubes not included), volumetric unit, 5 foot apparatus mast, 2 apparatus clamps with rods, 2 glass funnel valves, collecting cylinders for fractions to 15 ml. (Other cylinder sizes on special order.) The operation of the volumetric unit used in Model VL is described on page 2. The VOLUMETRIC FRACTIONATOR, Model VL, is easily converted to time or drop-counting operation by unplugging the volumetric unit and plugging in the DCT.

SIZE: 30¼" x 22½"; WEIGHT: 80 lbs.

Linear Fractionators are manufactured in France for European users, and are available at Gilson Medical Electronics (France), 69, Rue Gambetta, Villiers-Le-Bel (S.&O.), France.



SPIRAL FRACTIONATOR

In the GME Spiral Fractionator, a round stainless steel pan with stainless steel test tube rack moves under the collecting cylinder in a combined rotation and straight-line motion to produce a smooth, continuous spiral arrangement of 200 test tubes.

MODEL V10 Volumetric Fractionator with Spiral Base

Complete unit with spiral base, round stainless steel test tube pan, stainless steel rack for 200 test tubes (18 x 150 mm—test tubes not included), volumetric unit described on page 2, 5-foot stainless steel mast, 2 apparatus clamps with rods, 2 glass funnel valves, collecting cylinders for fractions to 15 ml. (Other cylinder sizes on special order.)

The VOLUMETRIC FRACTIONATOR, Model V10, is easily converted to time or drop-counting operation by unplugging the volumetric unit and plugging in the DCT.

Multiple operation is possible by placing additional chromatographic columns on the line of motion of the spiral. Possible combinations are 1 column with 200 fractions, 2 columns with 100 fractions each, 4 columns with 50 fractions, or 8 columns with 25 fractions.

The entire table space occupied, (including travel of the test tube pan), by Model V10 is 32½" x 22"; WEIGHT: 81 lbs.

MINIATURE COLD ROOM

refrigerates column
without condensation problems

STAINLESS STEEL LINED

SELF-DEFROSTING
PROVIDING DRY COLD ATMOSPHERE

MINIMUM OPERATING TEMPERATURE —4°C.
TEMPERATURE ADJUSTABLE
FROM —4°C. TO 24°C.

Refrigerator can be opened periodically for examination or adjustment with little effect on the liquid temperature. A double-glass window 24″ x 33″ in the door permits visual observation without opening the door.

The GILSON Miniature Cold Room refrigerator was designed for Linear Fractionator models with volumetric, time, or drop counting operation. The entire Fractionator fits inside, and there is plenty of room for the column and for accessories such as UV Absorption Meter, pumps, stirrers, etc. A column 53 inches long may be used with a capillary Teflon tube to carry the effluent up to the collecting cylinder. Access holes are provided, in the top for connection to an external hydrostatic column, and on the side for electrical connections and for overflow drainage. Stainless steel shelves are available on special order for additional cold storage.

GILSON

Dimensions Outside: 37″ wide, 29″ deep, 80″ high. Inside: 30″ wide, 24″ deep, 63″ high.

Temperature measurements shown below are of free air inside the refrigerator and of water in a one ounce bottle not in contact with the inside surface of the refrigerator.

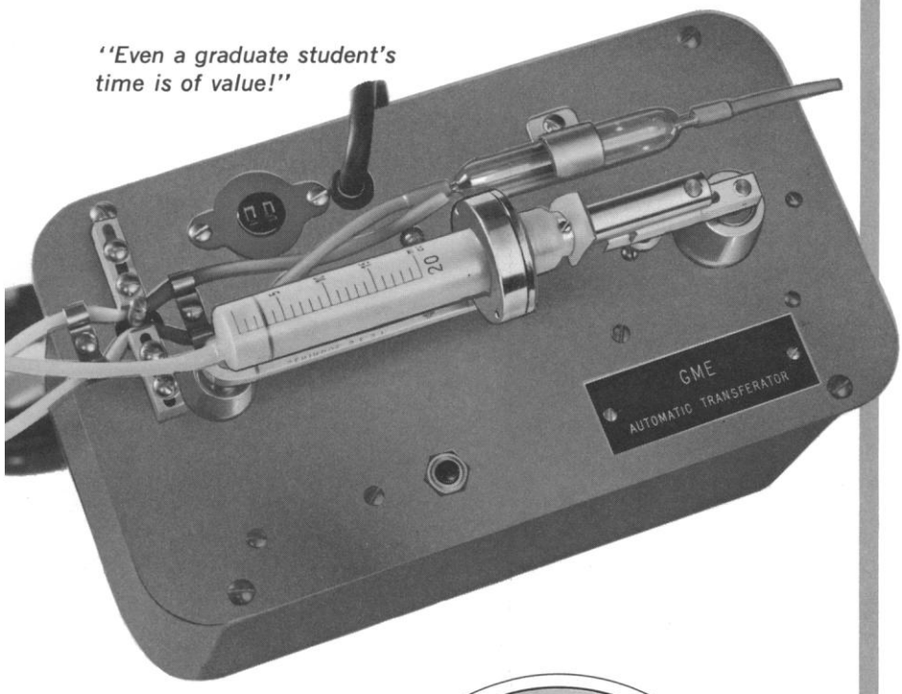
With the ambient temperature at 27°C (80°F), and the thermostat set for 4°C (40°F), the time for initial cool down: air 30 minutes; liquid 72 minutes.

After door was open 2 minutes: air temperature 24°C; liquid temperature 5°C.

Air recovery time: 6 minutes.

Liquid temperature varied approximately 0.5°C with refrigeration unit cycling.

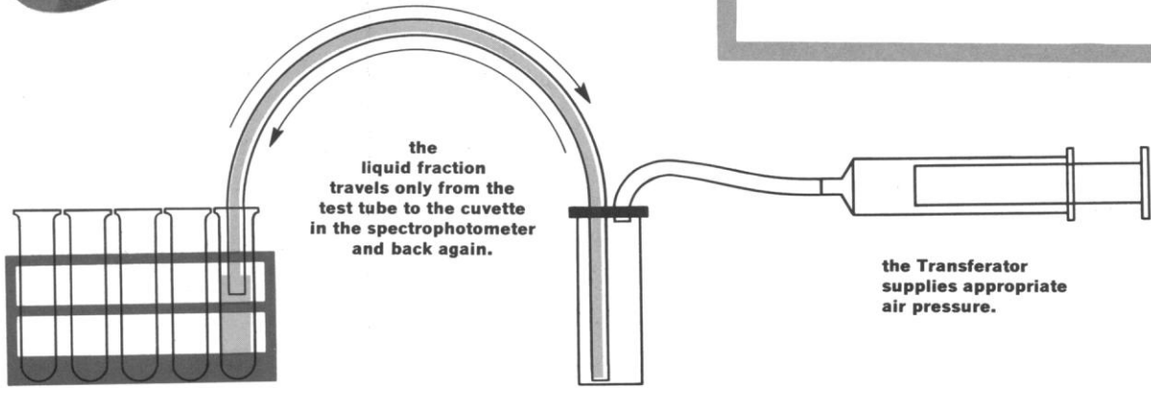
"Even a graduate student's time is of value!"



Do 5 times as many spectrophotometer readings with a

GME

Automatic Transferator



The GME Transferator is an instrument designed to facilitate the use of the spectrophotometer. It has been applied principally to the Beckman DU, but is applicable to others as well. The operator merely inserts a plastic delivery tube into the sample tube, presses either a button or a foot switch, and the transferator automatically fills the cuvette. After reading is taken, pressing the switch again empties the cuvette. Each unit is complete with plastic tubing and connections for the Beckman Model DU cuvette. A cuvette which is also usable in other than Beckman spectrophotometers, the Beckman cuvette No. 46007, may be used with an eye dropper cap suitably pierced for the Teflon tubes.

By means of the Transferator, successive samples may be transferred from test tubes into the spectrophotometer cuvette, read, and transferred back into the original test tube. The hold-over is of the order of one per cent, and it is insignificant when successive tubes from the Fractionator are used. A small Teflon plastic tube is used to conduct the sample from the test tube to the cuvette. This tube is held inside the cuvette and near the edge so that it is out of the path of light. It is so adjusted that it almost touches the bottom. Another Teflon tube is held inside the cuvette and barely passes through the pressure tight gasket at the top of the cuvette. This tube is connected to a motor driven hypodermic syringe which applies negative pressure and positive pressure to fill and empty the cuvette. A cam operated pin which squeezes the rubber tubing in the pressure system acts to valve the air flow appropriately.

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15–18. **Optical Soc.** of America, spring mtg., Washington, D.C. (M. E. Warga, 1155 16th St., NW, Washington, D.C. 20006)

17–19. **Isobaric Spin in Nuclear Physics**, intern. conf., Florida State Univ., Tallahassee. (D. Robson, Dept. of Physics, Florida State Univ., Tallahassee)

18–19. **Rural Health**, conf., Colorado Springs, Colo. (B. L. Bible, 535 N. Dearborn St., Chicago, Ill. 60610)

18–20. American **Psychosomatic** Soc. annual mtg., Chicago, Ill. (W. A. Greene, The Society, 265 Nassau Rd., Roosevelt, N.Y. 11575)

20–23. **Solar Energy** Soc., 2nd annual mtg., Boston, Mass. (F. Edlin, Arizona State Univ., Tempe 85281)

21–24. **Aerospace Instrumentation**, 4th intern. symp., College of Aeronautics, Cranfield, England. (E. K. Merewether, ISA Aerospace Industry Div., 4515 Canoga Ave., Woodland Hills, Calif.)

21–25. Institute of **Electrical and Electronics Engineers**, intern. conv., New York, N.Y. (IEEE, 345 E. 47 St., New York 10017)

22–23. **Biomagnetics**, 3rd intern. symp., Univ. of Illinois, Chicago. (M. F. Barnothy, Univ. of Illinois, 833 S. Wood St., Chicago)

22–23. Modern Concepts of **Cardiovascular Diseases**, conf. and workshop, Reno, Nev. (G. T. Smith, Laboratory of Patho-Physiology, Univ. of Nevada, Reno 89507)

22–24. Measurement and Applications of **Neutron Cross Sections**, conf., Washington, D.C. (W. W. Havens, Dept. of Physics, Columbia Univ., 538 W. 120 St., New York 10027)

22–31. American **Chemical** Soc., spring mtg., Pittsburgh, Pa. (ACS, 1155 16th St., NW, Washington, D.C.)

23–25. Institute of **Mathematical Statistics**, Purdue Univ., Lafayette, Ind. (G. E. Nicholson, Jr., Univ. of North Carolina, Chapel Hill)

23–25. Modern Methods of **Weather Forecasting and Analysis**, Chicago, Ill. (J. R. Fulks, U.S. Weather Bureau, 5730 S. Woodlawn Ave., Chicago)

24–26. **Biomathematics and Computer Science** in the Life Sciences, symp., Houston, Tex. (Dean, Div. of Continuing Education, Univ. of Texas Graduate School of Biomedical Sciences, Texas Medical Center, Houston 77025)

24–26. Pediatric and Adolescent **Gynecology**, conf., New York Acad. of Sciences, New York. (W. R. Lang, Jefferson Medical College of Philadelphia, 1025 Walnut St., Philadelphia, Pa.)

24–26. **Pollution and Marine Ecology**, conf., Galveston, Tex. (S. M. Ray, Texas A&M Univ. Marine Laboratory, Galveston 77550)

24–27. International Assoc. for **Dental Research**, 44th general mtg., Miami, Fla. (G. H. Rovelstad, U.S. Navy Dental School, Natl. Naval Medical Center, Bethesda, Md. 20014)

25–26. National Assoc. of **Biology Teachers**, western regional conv., Los Angeles, Calif. (The Association, Professional Building, Great Falls, Mont.)

26–2. **Stress Analysis**, 3rd intern. conf., Berlin, Germany. (H. Kotthaus, Verein Deutscher Ingenieure, Prinz-Georg Str. 77/79, 4 Düsseldorf 10)

26–27. Arizona **Chest Disease** Symp., Tucson. (E. A. Oppenheimer, P.O. Box 6067, Tucson 85716)

27–30. American Assoc. of **Dental Schools**, Miami Beach, Fla. (R. Sullens, 840 N. Lake Shore Dr., Chicago, Ill.)

28–30. **Great Lakes Research**, 9th conf., Chicago, Ill. (B. M. McCormac, IIT Research Inst., 10 W. 35 St., Chicago 60616)

28–31. Collegium Intern. **Neuro-Psychopharmacologicum**, 5th biennial mtg., Washington, D.C. (M. K. Taylor, 3636 16th St., NW, Washington 20010)

29–31. **Airborne Infection**, 2nd intern. conf., Illinois Inst. of Technology, Chicago. (E. K. Wolfe, U.S. Army Biological Laboratories, Fort Detrick, Frederick, Md.)

29–31. **Applied Meteorology**, 6th natl. conf., Los Angeles, Calif. (B. N. Charles, Booz-Allen Applied Research, 6151 W. Century Blvd., Los Angeles 90045)

29–31. **Chemical** Soc., anniversary mtgs., Oxford, England. (General Secretary, Burlington House, London W.1)

29–31. **Surface-Active Substances**, intern. conf., Berlin, East Germany. (Inst. für Fettchemie, Deutsche Akademie der Wissenschaften zu Berlin, Rudower Chaussee 5, 1199 Berlin-Adlershof)

29–31. **Symbolic and Algebraic Manipulation**, symp., Assoc. for Computing Machinery, Washington, D.C. (J. E. Sammet, I.B.M. Corp., 545 Technology Sq., Cambridge, Mass. 02139)

29–1. American Assoc. for **Contamination Control**, 5th annual technical mtg., Houston, Tex. (W. T. Maloney, The Association, 6 Beacon St., Boston, Mass. 02108)

29–1. Ultraviolet and X-ray **Spectroscopy of Laboratory and Astrophysical Plasma**, conf., Abingdon, England. (Inst. of Physics and the Physics Soc., 47 Belgrave Sq., London, S.W.1, England)

30. **Oral Cancer**, 4th symp., St. Francis Hospital, Poughkeepsie, N.Y. (M. A. Engelman, 1 E. Academy St., Wappingers Falls, N.Y.)

30–1. **Magnetohydrodynamics**, 7th symp., Princeton, N.J. (R. G. Jahn, Guggenheim Laboratories, Forrestal Research Center, Princeton, N.J. 08540)

31–2. Michigan **Acad. of Science, Arts, and Letters**, Wayne State Univ., Detroit. (E. A. Wunsch, Dept. of English, Univ. of Michigan, Ann Arbor)

April

1–2. Alabama **Acad. of Science**, Birmingham-Southern College, Birmingham. (W. B. DeVall, Dept. of Forestry, Auburn Univ., Auburn, Ala.)

1–2. Arkansas **Acad. of Science**, Little Rock. (G. E. Templeton, Univ. of Arkansas, Fayetteville)

1–5. National **Science Teachers** Assoc., New York, N.Y. (R. H. Carleton, 1201 16th St., NW, Washington, D.C. 20036)

1–7. American Acad. of **General Practice**, Boston, Mass. (M. F. Cahal, Volker Blvd. at Brookside, Kansas City 12, Mo.)

4–6. **Atomic Energy** Soc. of Japan, annual mtg., Tokyo. (M. Masamoto, Japan Atomic Energy Research Inst., 1-1, Shibatamura-cho, Minato-ku, Tokyo)

4–6. **Exobiology**, conf., Ames Research Center, Moffett Field, Calif. (Letters and Science Extension, Univ. of California, Berkeley 94720)

4–6. American Assoc. of **Physical Anthropologists**, Berkeley, Calif. (F. E. Johnston, Dept. of Anthropology, Univ. of Pennsylvania, Philadelphia 19104)

4–7. Federation of European **Biochemical** Soc., 3rd mtg., Warsaw, Poland. (T. Klopotowski, Polish Biochemical Soc., Freta 16, Warsaw)

4–7. Advances in **Water Quality Improvement**, conf., Univ. of Texas, Austin. (Special Lecture Series, Engineering Laboratories Bldg. 305, Univ. of Texas, Austin 78712)

4–8. International **Biological Program**, 2nd general assembly, Paris, France. (F. W. G. Baker, 2 via Sebenico, Rome, Italy)

4–10. **Psychology**, 10th inter-American congr., Lima, Peru. (Intern. Soc. of Psychology, 2104 Meadowbrook Dr., Austin, Tex.)

5–7. Middle East **Neurosurgical** Soc., mtg., Jerusalem, Jordan. (F. S. Haddad, Orient Hospital, Beirut, Lebanon)

5–8. American Assoc. of **Anatomists**, San Francisco, Calif. (R. T. Woodburne, Dept. of Anatomy, Univ. of Michigan, Ann Arbor 48104)

6–7. **Phlebology**, 6th intern. mtg., Aix-en-Provence, France. (F. Beurier, 94, cours Sextius, Aix-en-Provence)

6–8. **Electron and Laser Beam Technology**, Univ. of Michigan, Ann Arbor. (G. I. Haddad, Electrical Engineering Dept., Univ. of Michigan, Ann Arbor)

6–8. Recent Advances in **Phytochemistry**, intern. symp., Univ., of Texas, Austin. (T. J. Mabry, Dept. of Botany, Univ. of Texas, Austin 78712)

6–8. **Plant Phenolic** Group of North America, 6th annual mtg., Austin, Tex. (V. C. Runeckles, Imperial Tobacco Co., Montreal, P.Q., Canada)

7–8. Southern **Sociological** Soc., annual mtg., New Orleans, La. (J. J. Honigmann, Dept. of Anthropology, Univ. of North Carolina, Chapel Hill)

7–9. Southern Soc. for **Philosophy and Psychology**, New Orleans, La. (G. R. Hawkes, U.S. Army Medical R&D Command, Washington, D.C. 20315)

8–11. **Animal Toxins**, intern. symp., Atlantic City, N.J. (F. E. Russell, Box 323, Los Angeles County General Hospital, 1200 N. State St., Los Angeles, Calif. 90033)

11–12. American Soc. for **Artificial Internal Organs**, Atlantic City, N.J. (B. K. Kusserow, Dept. of Pathology, Univ. of Vermont College of Medicine, Burlington)

11–13. Institute of **Electrical and Electronics Engineers**, Region 3, conv., Atlanta, Ga. (M. D. Price, Dept. 72-14, Zone 400, Lockheed-Georgia Co., Marietta, Ga.)

11–13. Comparative **Hemoglobin** Structure, intern. symp., Salonika, Greece. (Secretary, P.O. Box 201, Salonika)

11–15. **Aeronomic Studies of Lower Ionosphere**, conf., Ottawa, Ont., Canada. (W. Pfister, Air Force Cambridge Research Laboratories, Upper Atmosphere Physics Laboratory, L. G. Hanscom Field, Bedford, Mass.)

11–15. American Assoc. of **Cereal Chemists**, New York, N.Y. (R. J. Tarleton, The Association, 1955 University Ave., St. Paul, Minn. 55104)

11–16. Federation of American Societies for **Experimental Biology**, 50th annual mtg., Atlantic City, N.J. The following societies will meet in conjunction with the FASEB; information may be obtained from FASEB, 9650 Rockville Pike, Bethesda, Maryland 20014:

American Physiological Society

American Soc. of Biological Chemists

American Soc. for Pharmacology and Experimental Therapeutics

American Soc. for Experimental Pathology

American Inst. of Nutrition

American Assoc. of Immunologists

11–20. **Oceanography**, intern. conf., Moscow, U.S.S.R. (R. C. Vetter, Committee on Oceanography, Natl. Acad. of Sciences, 2101 Constitution Ave., NW, Washington, D.C. 20418)

12–13. Frontiers in **Food Research**, symp., Cornell Univ., Ithaca, N.Y. (W. F. Shipe, Dept. of Dairy and Food Science, Cornell Univ., Ithaca)

12–14. **Generalized Networks**, intern. symp., New York, N.Y. (H. J. Carlin, Polytechnic Inst. of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201)

12–14. **Remote Sensing of Environment**, 4th symp., Univ. of Michigan, Ann Arbor. (Extension Service, Conference Dept., Univ. of Michigan, Ann Arbor 48104)

12–15. **Quantum Electronics**, intern. conf., Phoenix, Ariz. (J. P. Gordon, Bell Telephone Laboratories, Murray Hill, N.J.)

12–16. Society for Applied **Mathematics and Mechanics**, annual scientific mtg., Darmstadt, Germany. (F. Reutter, Gesellschaft für Angewandte Mathematik und Mechanik, Templergraben 55, 51, Aachen, Germany)

12–29. **Soil Conservation**, 1st Pan American congr., São Paulo, Brazil. (J. Abramides Neto, avda. Francisco Matarazzo 455, Caixa Postal 8366, São Paulo)

13–15. Institute of **Environmental Sciences**, 12th annual tech. mtg. and equipment exp., San Diego, Calif. (The Institute, 34 S. Main St., Mount Prospect, Ill. 60057)

13–16. **Geological Soc.** of America, southeast section, Univ. of Georgia, Athens. (L. D. Ramspott, Dept. of Geology, Univ. of Georgia, Athens 30601)

13–16. American **Orthopsychiatric** Assoc., 43rd annual mtg., San Francisco, Calif. (M. F. Langer, The Association, 1790 Broadway, New York 10019)

13–16. American **Radium** Soc., annual mtg., Phoenix, Ariz. (J. L. Pool, Memorial Soc., 444 E. 68 St., New York 10021)

13–16. National Council of **Teachers of Mathematics**, 44th annual mtg., New York, N.Y. (J. D. Gates, 1201 16th St., NW, Washington, D.C. 20036)

14–15. British **Biophysical** Soc., spring mtg., Oxford, England. (D. Noble, Balliol College, Oxford)

14–15. **Molecular Interactions and the Crystallography of Ceramics**, Univ. of Nottingham, Nottingham, England. (S. C. Wallwork, Dept. of Chemistry, Univ. of Nottingham, University Park, Nottingham)

14–16. Association of Southeastern **Biologists**, Raleigh, N.C. (M. Y. Menzel, Dept. of Biological Sciences, Florida State Univ., Tallahassee)