

## Kodak reports to laboratories on:

duodecupling the speed of dental x-ray film... modifying the spectral distribution of radiant energy... news that only a biochemist can truly appreciate... freezing patterns written at hundreds of miles per second

### Save your roentgens

The general increase in the attainable sensitivity of photographic emulsions which we have perpetrated in the last couple of years now shows up in dental x-ray film.

For example, all things else being equal, the new *Kodak Periapical Ultra-Speed Dental X-ray Film* requires one twelfth the x-ray exposure that the old *Kodak Radiatized Dental X-ray Film* needed. This slower film, though itself now twice as fast as before, is still available to the dentist whose plan of attack calls for it. There is even a *Kodak Periapical Regular Dental X-ray Film* with half the speed of that (because the emulsion is on one side only).

But the heightened sensitivity widens choice. If sharper pictures are needed, the x-ray source can be farther away. Alternatively, the pictures can be sharper because the patient doesn't have to hold those packets still against his gums so long. There are also other benefits. If you can't see for yourself what they are, don't bother your dentist about them.

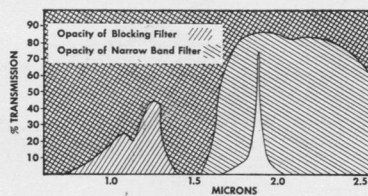
### Filters: plea and offer

Once every few years a queer sense of obligation compels us to spend our hard-earned money on advertising to acquaint the next cadre of technical people with the existence of *Kodak Wratten Filters*. Of these precisely dyed little sheets of gelatin we offer at present 116 different species, and though in truth they make little direct contribution to our prosperity, they do seem to contribute to the convenience of those who desire to modify the spectral distribution of radiant energy by simple and reasonably reproducible means.

The data book "Kodak Wratten Filters," which describes them all in the fullest, most quantitative spectrophotometric and colorimetric detail, has recently appeared in its 19th edition. Kodak dealers sell it for 75¢. The one niggardly favor we would ask in return for our

magnanimity in selling the filters is that before an order is placed, this edition, and not one of its 18 predecessors, be consulted for current specifications and designations.

As for the newer-fangled and much costlier multi-layer interference filters, we make them but so also do several of our distinguished optical-manufacturing contemporaries. We shall not feel at all badly about your giving them your custom if you need transmission in the range up to  $1.4\mu$ . But if you find it necessary to specify a wavelength between  $1.4\mu$  and  $4.5\mu$  as a narrow transmission band or any wave-



length above  $1.4\mu$  as a cut-off for a blocking filter—there we think you need us.

In that event, just state your problem to Eastman Kodak Company, Military and Special Products Sales Division, Rochester 4, N. Y.

### A selective precipitant for sodium

The radio and TV newscasters have apparently failed to grasp the importance of this news (very few of them being biochemists), but word has very recently been received that DL-Methoxyphenylacetic Acid is a selective precipitant for sodium in the presence of large amounts of  $K^+$ ,  $Ru^+$ ,  $NH_4^+$ ,  $Mg^{++}$ ,  $Cl^-$ ,  $NO_3^-$ ,  $PO_4^{---}$ ,  $SO_4^{--}$ , and up to 30 mg per ml of  $Li^+$ . And we gladly sell it as Eastman 7361, even providing an abstract if you like.

We first heard of DL-Methoxyphenylacetic Acid as a plant growth regulator, but it wasn't spectacular. Now its new use makes it a pleasure to add it to our stock of some 3500 Eastman Organic Chemicals. For the abstract, chemical, or a copy of our List No. 40, write Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

### Oscillographic opinion

Call us ingenuous (if not ingenious). Still it's easy to be amazed that it has become humdrum routine for patterns to be written at hundreds of miles per second and then frozen high forever for the minutest examination and debate. (Even the seemingly agile stream of electrons in your TV picture tube plods its monotonous course at scarcely  $3\frac{1}{2}$  miles to the second.)

The credit is not all ours. The manufacturers of oscillographs have contributed nobly to the feat. One of them recently was kind enough to offer us the rostrum of his company publication to vent our latest opinions about film for high speed oscillography.

Our opinions are that

1) It is going to be extremely difficult to improve on the speed and image quality you get from simply developing *Kodak Tri-X Film* in *Kodak Developer D-19* at 68 F for 10 minutes. (True the new *Kodak Royal-X Pan Film* enjoys a fourfold speed advantage over *Kodak Tri-X Film* for picture taking, but a force-developed line-image that's just over the threshold between being there and not being there is an entirely different proposition from picture taking.)

2) Development for 12 minutes in *Kodak Developer SD-19a* gives higher contrast. Under some circumstances this is as good as a gain in speed. But you pay in granularity.

3) Under some conditions, an overall postexposure of 1/500 meter-candle for one second helps the oscillographic speed a little.

4) P-16 phosphors seem in many cases to be more satisfactory photographically than P-11 phosphors.

The most convenient way to get further details is to persuade Mr. L. Arthur Hoyt, Allen B. DuMont Laboratories, Inc., 760 Bloomfield Avenue, Clifton, N. J., that your technical sophistication entitles you to a place on the mailing list for "DuMont Instrument Journal," beginning with the May, 1957, issue.

Price quoted is subject to change without notice.

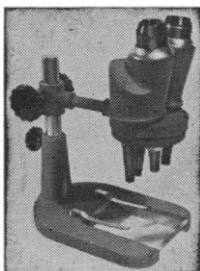
This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are... serving laboratories everywhere

**Kodak**  
TRADE MARK

## OPTICAL BARGAINS

Fine, American-Made Instrument at  
Over 50% Saving

### STEREO MICROSCOPE



Up to 3" Working Distance—  
Erect Image—Wide 3 Dimensional Field

Now, ready after years in development—this instrument answers the long standing need for a sturdy, efficient STEREO MICROSCOPE at low cost. Used in production—in research—in the lab, shop, factory, or at home: for inspections, examinations, counting, checking, assembling, dissecting—speeding up and improving quality control. 2 sets of objectives on rotating turret. Standard pair of wide field 10X Kellner Eyepieces give you 23 power and 40 power. Additional eyepieces available for greater or lesser magnification. A low reflection coated prism erecting system gives you an erect image—correct as to right and left—clear and sharp. Helical rack and pinion focusing. Precision, American-made! Storage chest included. 10-DAY TRIAL . . . complete satisfaction or your money back.

Order Stock No. 85,039-W (Shipping wt. approx. 11 lbs.)  
Full price . . . . . \$99.50 f.o.b. Barrington, N. J.

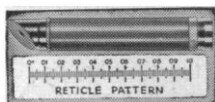
Send Check or M.O.

See the Stars, Moon, Planets Close Up!  
3" "PALOMAR, JR." TELESCOPE  
60 and 120 Power — An Unusual Buy!



Assembled—ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Aluminized and overcoated 3" diameter high-speed f/10 ventilated mirror. Equatorial mount with lock on both axes. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. Order by Stock No. — Send check or M.O. — Money-back guarantee!

Stock No. 85,050-W (Shipping wt. 10 lbs.)  
\$29.50 f.o.b. Barrington, N. J.



MEASURING  
POCKET  
MICROSCOPE  
— 50 POWER

No larger than an ordinary fountain pen, this handy pocket instrument is ideal for making direct reading measurements; for checking small parts and dimensions under powerful magnification. Speeds up quality control. Instrument contains a precision, glass etched reticle calibrated for measurements up to 1/10" by .001" divisions. Estimates to .0005" can easily be made. Chrome reflector at base of instrument reflects light on object examined or measured. Sturdy construction assures long, useful service.

Stock No. 30,225-W . . . . . \$7.95 Postpaid

New! 2 in 1 Combination!  
Pocket-Size  
50 Power MICROSCOPE  
and  
10 Power TELESCOPE

ONLY  
\$4.50  
ppd.



Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for sports, looking at small objects, just plain snooping.

Send Check or M.O.  
Satisfaction Guaranteed

Order Stock No. 30,059-W . . \$4.50

### WRITE FOR FREE CATALOG-W

Huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, binoculars. Hand spectrosopes, reticles, mirrors, Ronchi rulings, dozen of other hard-to-get optical items. America's No. 1 source of supply for Photographers, Hobbyists, Telescope Makers, etc.

Order by Stock No. — Send Check or M.O.  
Satisfaction Guaranteed

**EDMUND SCIENTIFIC CO.**  
BARRINGTON, NEW JERSEY

nual, San Francisco, Calif. (J. J. Harford, ARS, 500 Fifth Ave., New York 36.)

9-13. American Soc. of Mechanical Engineers, semiannual, San Francisco, Calif. (C. E. Davies, ASME, 29 W. 39 St., New York 18.)

10-12. American Nuclear Soc., 3rd annual, Pittsburgh, Pa. (W. W. Grigorieff, ANS, P.O. Box 963, Oak Ridge, Tenn.)

10-12. Canadian Soc. of Microbiologists, annual, London, Ont., Canada. (J. A. Carpenter, Dept. of Bacteriology, Ontario Agricultural College, Guelph.)

10-14. Molecular Structure and Spectroscopy Symp., Columbus, Ohio. H. H. Nielsen, Dept. of Physics and Astronomy, Ohio State Univ., Columbus 10.)

10-14. Technical Writers' Institute, 5th annual, Troy, N. Y. (J. R. Gould, TWI, Rensselaer Polytechnic Inst., Troy.)

11-13. American Meteorological Soc., Monterey, Calif. (K. C. Spengler, AMS, 3 Joy St., Boston 8, Mass.)

11-15. Ionization Phenomena in Gases, 3rd internatl. conf., Venice, Italy. (U. Facchini, Laboratori CISE, Via Procaccini 1, Milan, Italy.)

12-15. Colloquium of College Physicists, 19th annual, Iowa City, Iowa. (J. A. Van Allen, Dept. of Physics, State Univ. of Iowa, Iowa City.)

16-20. American Soc. of Mammalogists, annual, Lawrence, Kansas. (B. P. Glass, Dept. of Zoology, Oklahoma A.&M. College, Stillwater.)

16-21. American Soc. for Testing Materials, Atlantic City, N.J. (R. J. Painter, ASTM, 1916 Race St., Philadelphia 3.)

17-19. American Neurological Assoc., Atlantic City, N.J. (C. Rupp, 133 S. 36 St., Philadelphia 4, Pa.)

17-19. Astronomical Soc. of the Pacific, annual, Flagstaff, Ariz. (S. Einarsson, Univ. of California, Berkeley 4.)

17-19. Health Physics Soc., 3rd annual, Pittsburgh, Pa. (H. W. Patterson, Radiation Lab., Univ. of California, Berkeley.)

17-19. Military Electronics, national convention, Washington, D.C. (G. Rapaport, Emerson Radio & Phonograph Corp., 701 Lamont St., NW, Washington 10.)

17-20. Carbon Conf., 3rd, Buffalo, N.Y. (Carbon Conf., Univ. of Buffalo, Buffalo.)

17-20. Institute of Aeronautical Sciences, natl. summer, Los Angeles, Calif. (S. P. Johnston, IAS, 2 E. 64 St., New York 21.)

17-21. American Soc. for Engineering Education, annual, Ithaca, N.Y. (W. L. Collins, Univ. of Illinois, Urbana.)

17-21. Association of Official Seed Analysts, annual, Baton Rouge, La. (L. C. Shenberger, Seed Lab., Dept. of Agricultural Chemistry, Purdue Univ., Lafayette, Ind.)

17-21. Canadian Medical Assoc., 90th annual, Edmonton, Alberta, Canada. (CMA, 244 George St., Toronto, Ont., Canada.)

17-22. Coordination of Galactic Research, internatl. symp., Stockholm, Sweden. (P. T. Oosterhoff, University Observatory, Leiden, Netherlands.)

17-22. Internal Combustion Engine Cong., 4th internatl., Zurich, Switzerland. (C. C. M. Logan, British National Committee, 6 Grafton St., London, W.1.)

(See issue of 19 April for comprehensive list)

## LETTERS

*The editors take no responsibility for the content of the letters published in this section. Anonymous letters will not be considered. Letters intended for publication should be typewritten double-spaced and submitted in duplicate. A letter writer should indicate clearly whether or not his letter is submitted for publication. For additional information, see Science 124, 249 (1956) and 125, 16 (4 Jan. 1957).*

### Political Means

Since I am only on a leave of absence from the United States, I feel free to comment on the article concerning the resolutions of the AAAS [Science 125, 280 (1957)]. I was particularly struck by the statements concerning the lack of attention which greeted the recommendations of the Radiation Committee of the National Academy of Sciences. I should think the answer would be obvious. Any group that wants to enter the political arena to obtain politically what it desires must use political means. If most AAAS members and most other scientists back the findings of the Radiation Committee, as I think they do, it does no good simply to issue reports and hope for the best.

I would recommend that, if we desire action based on the recommendations, we should lobby for it. The AAAS should bring into being a political arm, should set up a lobbying group in Washington, should see to it that its members constantly relay to the public, through meetings, talks, and propaganda, its views, and should badger the scientifically interested public to write their Congressmen and express their views.

We should not be ashamed of this activity; we scientists have as much right to try to impose our views on the public as do other interest-groups. Only in this way can we make sure that not only our own interests but what we think are the interests of the country can be forcefully brought to the attention of the legislators.

PHILIP SIEKEVITZ

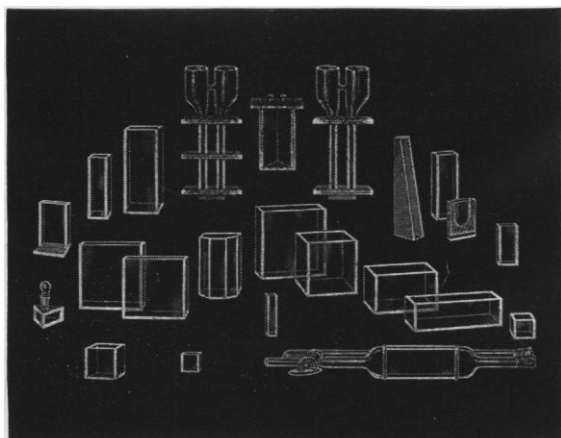
*Rockefeller Institute for Medical Research, New York, New York*

### Feedback

Referring to your editorial of 15 March, "Feedback," there is proposed the problem of applying the brakes to the inflationary competition for scientists and engineers without discriminating against the governmental employee. It is questionable whether this competition will contribute enough to inflation to counterbalance the effect the lack of competition will have on the problem of the shortage of engineers. Many young students are not entering

## GLASS ABSORPTION CELLS

made by **KLETT**



Makers of Complete Electrophoresis Apparatus

### SCIENTIFIC APPARATUS

Klett-Summerson Photoelectric Colorimeters—  
Colorimeters — Nephelometers — Fluorimeters—  
Bio-Colorimeters — Comparators — Glass Stand-  
ards—Klett Reagents.

**Klett Manufacturing Co.**

179 East 87 Street, New York, New York



CHICAGO U.S.A.

## STUDENT MICROSCOPES

Most reasonably priced **GUARANTEED**  
Microscope on the market.

Made in West Germany

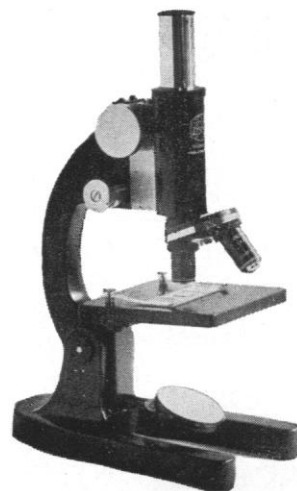
NEW DESIGN  
EXCLUSIVE  
SAFETY FEATURES  
HIGH QUALITY OPTICS  
10X OCULAR  
OBJECTIVES  
16mm (10X) N.A. 0.27  
4mm (44X) N.A. 0.66

**STILL \$118.00**  
**TEN YEAR GUARANTEE**

Write for catalogue  
listing safety features

10% Discount on 5 or more.  
Models may be assorted to ob-  
tain this discount

TRANSPORTATION  
INCLUDED



**THE GRAF-APSCO CO.**

5868 BROADWAY

CHICAGO 40, ILL.

## VENOMS

**AAAS Symposium Volume No. 44**

6" x 9", 480 pp., 113 illus.,  
index, cloth, Dec. 1956

**Price \$9.50. AAAS Members'**  
**cash order price \$8.25**

First International Conference  
on Venoms, with 95 contribu-  
tors from 18 countries. Com-  
prehensive coverage of all as-  
pects of the problem.

This book covers poisonous fishes and  
marine organisms, many species of  
venomous snakes, the Gila monster,  
toads, scorpions, spiders, caterpillars,  
wasps and other venom-bearing insects;  
hyaluronidase-like substances and other  
spreading factors in venoms; various  
chemical components of venoms, coagu-  
lant and anticoagulant factors, antigenic  
principles; various experimental and sug-  
gested clinical uses of venoms; clinical  
considerations: mortality rates, treat-  
ment of many kinds of envenomation;  
new developments in serotherapy and  
types of supplementary medication; dan-  
gers of refrigeration for treatment.

*Of special interest to:* Physicians,  
pharmacologists, chemists, and zoolo-  
gists.

**AAAS**

1515 Mass. Ave., NW, Washington 5, D.C.

3 MAY 1957

## Fluorometric Analysis



For rapid precise analysis of compounds  
susceptible to fluorometric measurement . . .  
Vitamins, Quinine, Atabrine, Porphyrins, Steroids  
and metal complexes.

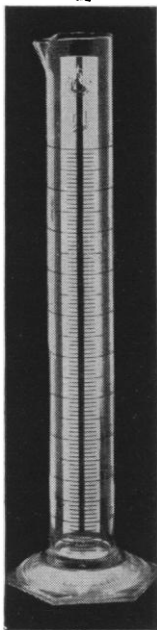
**Sensitive to low intensity fluorescence**  
and to low concentrations. AC operated,  
no-drift circuit. Only 3 simple controls;  
direct reading. . . **Only \$420.00.**

Ask for:  
"Coleman Tools for Science,"  
contains useful discussions of  
nephelometry and other mod-  
ern analytical technics.



**Coleman Photofluorometer**

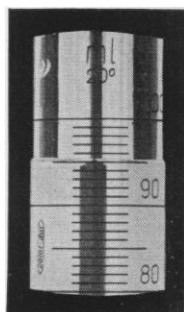
**Dept. S. Coleman Instruments, Inc., Maywood, Ill.**



UP TO  
**25%**  
**LESS!**

*Send for new catalog  
of finest imported  
lab glassware*

Complete selections of superior glassware, porcelainware and equipment. First time available in quantity, from America's leading importer. Low cost West German manufacture gives prices 10%-25% below U.S. average. **EXAMPLE:** New improved Shellbach cylinders' blue & white striping forms magnified pointer for extreme accuracy. Compare prices below!



Capacity in ml	10	25	50	100	250	500	1000
Quantity Per Case	24	18	18	12	12	8	4
Net Price Ea	1.22	1.62	1.75	2.04	2.81	3.86	5.39
Case Price	26.35	26.25	28.35	22.03	30.35	27.79	17.47

**KERN**  
LABORATORY SUPPLY CO.

8639 Venice Blvd., Los Angeles 34, Calif.

JENA laboratory glassware  
HALDENWANGER porcelainware  
*America's Leading Importer of  
Fine Laboratory Equipment*



**SEND FOR FREE CATALOG**

**Kern Laboratory Supply Co., Dept. E-7**  
**8639 Venice Blvd., Los Angeles 34, Calif.**

Gentlemen:

Please send free catalog and literature on imported laboratory glassware, porcelainware and equipment.

Name ..... Position .....

Company .....

Address .....

City ..... Zone .... State .....



## simple • flexible • inexpensive **MULTI-PURPOSE DIALYZER**

Providing for 16 separate samples, each up to 20 ml, the Oxford Model B Dialyzer has a buffer capacity up to 5 liters. The unit is particularly useful for concentrating dilute protein samples for paper electrophoresis and for treating protein fractions prepared by the continuous-flow curtain method.

Arranged for utmost convenience, the Model B revolves samples in a circular path as shown in the illustration. Samples are separately contained in lengths of cellophane tubing. Baffles at the bottom of the Pyrex brand glass tank contribute a maximum dialyzing efficiency by giving both internal agitation to the sample and external agitation to the buffer.

Send for further details. Write:

**Oxford**  
**Laboratories**

111 SUTTER STREET • SAN FRANCISCO 4 • CALIFORNIA

## SPECIFIC L-AMINO ACID DECARBOXYLASES

For rapid manometric assay of

Arginine, Aspartic Acid,

Glutamic Acid, Histidine,

Lysine, Ornithine, and Tyrosine

**for further information write**

**WORTHINGTON BIOCHEMICAL CORP.**

Freehold, N.J.



engineering or science because of the salary level, which does not yet compare favorably with that of other professions and trades attained after a comparable number of years of experience. It is also widely felt that the engineering shortage is a temporary one created by large federal armament spending. It would be wisest and in the best interests of the country to increase the salary level of all research and development engineers and scientists, including biological and medical scientists, to a level which is at least commensurate with the training required and which will at least offer a sufficient return on the investment to induce those promising students of a practical nature to enter research.

NORMAN RABINER

116½ Twelfth Avenue,  
Belmar, New Jersey

I enjoyed your editorial "Feedback" in the recent issue of *Science* until I ran against the last sentence in which you wish to "find some way to apply the brakes without discriminating against the governmental employee," with regard to increases in salaries for scientists in government and industry. Obviously, there should be some limit to the ceiling on salaries, but I do not see why we need any brakes applied yet. If we are to attract young men into science in our present society, the only feasible method is to make science financially attractive to them. This, in my opinion, has not yet happened. They can do better in medicine and far better in business administration. Until the scientist receives a salary comparable to what he might get in these two and other fields, we have not solved the problem. Hence, I feel that no effort should be made to "apply brakes" yet.

FRED L. WHIPPLE

Smithsonian Institution,  
Washington, D. C.

#### Scientists on Politicians, and the Obverse

J. Bronowski said: "... the decisions of state cannot be taken out of the context of science. ..."

"The fate of a nation may hang on an error of judgment here. Let me give you a slightly mischievous example. In 1945, the British Government published ... a White Paper on the wartime development of atomic energy. Among the documents in this White Paper is the directive by which Mr. Winston Churchill ... set up the project to make an atomic bomb. This directive begins with the words: 'Although personally I am quite content with the existing explosives. ...'

"This bland phrase is a monument to a nonscientific education. ... I do not much care for atomic bombs myself, but still less do I care to have them judged

in phrases like Mr. Churchill's. In 1941, they might have weighed life and death between this country and Germany; and what brought down the scales was not the wisdom of statesmen, but the democratic tradition which caused Mr. Churchill to waive his own unwisdom.

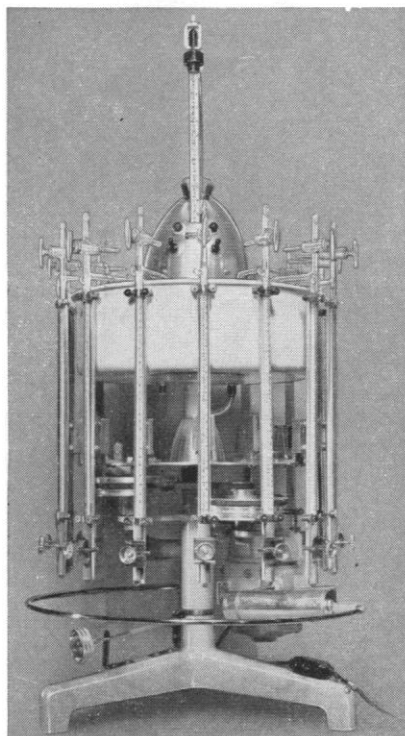
"This example shows us succinctly what voters and statesmen do not know. I have called Mr. Churchill's astonishing phrase a monument to a nonscientific education. For it could have been written only by a man, an intelligent man, who simply does not understand how big a million is."

This remarkable series of statements was published once in Great Britain [*Advancement of Sci.* 12, 301 (1955)] and once in *Science*, [123, 70 (1956)] and was recently quoted in *Science* [125, 179 (1957)] by Dael Wolfe, who apparently takes them at face value

It is astonishing, and it is a prime example, but not of what the authors intended. Churchill's statement was obviously a bitter jest and nothing more. Doubtless, his knowledge of the devilish uses to which explosives can be put and his good judgment, rather than merely the "democratic tradition," "brought

## THE "BRONWILL"\* Warburg

### most compact-most versatile Warburg Available



Model UV shown above, is a compact, circular unit, only 20½" diameter, 31" high, rotatable thru 320° permitting any of the manometers to be quickly read. Model UVL equipped for photo-chemical work.

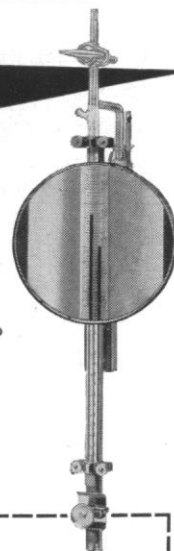
### Requires only 20½" of Desk Space

- Magnetic Temperature Setting.
- Highest Temperature Constancy  $\pm 0.01^\circ \text{C}$ .
- Cooling Coil Built In.
- Fastest to Set Up. Small bath (only 8 liters) heats from ambient to  $37^\circ \text{C}$  in 22 minutes.
- Rotatable thru  $320^\circ$ .
- Calibrated—Interchangeable Manometers & Vessels Available.
- Available for Photosynthesis.

EASY TO READ

#### DOUBLE CAPILLARY MANOMETERS

Single background scale—a sturdy single rod containing two capillaries. Available pre-calibrated—interchangeable—no more calibrating each time a piece is broken.



\*The trademark identifying products of Bronwill Scientific Division, Will Corporation.

**BRONWILL**  
SCIENTIFIC DIVISION  
WILL CORPORATION

131 GOULD STREET  
ROCHESTER, N. Y.

BRONWILL SCIENTIFIC DIVISION  
WILL CORPORATION  
131 Gould St., Rochester, N.Y., Dept. S-57  
Please send full information on Bronwill Warburgs.

Name.....  
Position.....  
Company.....  
Address.....  
City..... Zone..... State.....

# VIVID SCREEN IMAGES WITHOUT FUSS OR DELAY



## BAUSCH & LOMB *SpeedMatic* MICRO-PROJECTOR

Automatically synchronized objectives and condensers. See critical detail in clearer, sharper screen images. You get the right light for every magnification . . . automatically . . . because when you center an objective you simultaneously move its matched condenser into position. No tedious, time-wasting adjusting. Instant choice of screen magnifications from 20X to 3000X (at 12 feet).

### Automatic electronic-feed arc lamp

No flicker! No flare! Provides uniformly intense light for brilliant, vivid screen images—60 minutes without interruption! Efficient heat-control system eliminates need for cumbersome water cells and color-distorting coolants . . . protects slides, ensures true color projection.

BAUSCH & LOMB OPTICAL CO.  
75917 St. Paul Street, Rochester 2, N. Y.

☐ I'd like an obligation-free demonstration of the B&L SpeedMatic Micro-Projector at my convenience.

☐ Send me SpeedMatic Micro-Projector Catalog E-246.

NAME.....

TITLE.....

PROFESSIONAL ADDRESS.....

CITY..... ZONE..... STATE.....

down the scales" and permitted work on atomic energy to go ahead.

If Bronowski had any information concerning the former Prime Minister's opposition to the atomic studies other than his own peculiar interpretation of the White Paper, he should have stated it. If he did not have such information, his remarks are an example of drubbing a straw man, and their influence may not be merely "mischfevous" but baleful, unless perchance they alert politicians to the need for educating scientists in politics, government, and similar matters.

GORDON GUNTER

Gulf Coast Research Laboratory,  
Ocean Springs, Mississippi

### Causes and Effects

A comment may perhaps be in order on one point in the argument of Robert B. MacLeod, in his article on "Teleology and theory of human behavior" [*Science* 125, 477 (15 Mar. 1957)]. MacLeod is discussing the possibility of reintroducing the idea of teleology into science and suggests that the theory of relativity may permit us to relax the ideas of cause and effect that have prevailed since the Newtonian revolution. He says:

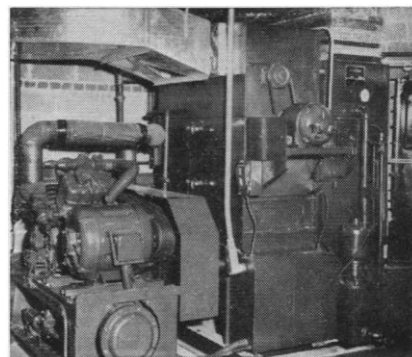
"If, however, we question the absoluteness of time and play with the idea that, in different frames of reference, the relationship between antecedent and consequent may be reversed, we may be left free to think that something that has not yet happened may be an essential condition of something that is about to happen. If the temporal relationship is relationally, rather than absolutely, determined, we might conceivably reincorporate purpose as a natural fact into the stream of natural causation."

It is here suggested that the theory of relatively cannot be strained to permit such a thought. Even though the "absolute" idea of time may have been overthrown, it is still not true that effects can, in any conceivable frame of reference, precede their causes. It is true that the time-order of two events may be reversed for two different observers, but it must be noted that this can happen *only if* the two events are in each other's "absolute elsewhere." The two events must be so far in space and so close in time that no signal from either event could possibly have arrived at the other in time to cause it. If two events are related in this manner for one observer, they are related in this manner for all observers. Such a pair of events could be described as "not possibly causal." But if two events are related so that a signal from *A* could have got through in time to cause *B*, then they are "possibly causal," and they have this "possibly causal" relationship, and in the same sense, *A* to *B*, for *all* observers.

It may be true to say, as MacLeod

# DRY AIR...

PRECISELY AS YOU  
WANT IT



## The Niagara Controlled Humidity Method using HYGROL Moisture- Absorbent Liquid

**is best and most effective because...** it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

**Most reliable because...** the absorbent is continuously re-concentrated automatically. No moisture-sensitive instruments are required to control your conditions.

**Most flexible because...** you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

**Inexpensive to operate because...** no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

Write for full information; ask for Bulletins 112 and 121. Address Dept. SC-5.

NIAGARA BLOWER COMPANY  
405 Lexington Ave., New York 17, N. Y.  
District Engineers  
in Principal Cities of U. S. and Canada

does, that "space and time have ceased to be absolutes," but unfortunately this generalization is all too often misunderstood. Under certain circumstances, it may permit a reversal of apparent time-order, but under no circumstances does it permit a reversal of causality. We may indeed speculate whether something "might conceivably reincorporate purpose as a natural fact into the stream of natural causation," but this speculation should not be based on a misunderstanding of relativity.

ANTHONY STANDEN  
250 Fifth Avenue, New York, N.Y.

### Science, a Worth-While Endeavor

The mixed reactions, on the editorial pages of the newspapers [*Science* 125, 269 (15 Feb. 1957)] (editorial), to the report of the Interim Committee on the Social Aspects of Science were no doubt duplicated in the mind of the general public. Science is widely considered to be amoral, being, in itself, neither good nor bad. Most of the practical applications of science are good, whereas a few of the applications are unquestionably evil. But in the mind of the public, amoral science is confused with its applications, and, depending on personal prejudice, "science" is seen as a good or as a potential evil.

Scientists can never hope for complete control over the applications of their work; the policies now being developed within the AAAS are based on this reality. It might be profitable, in order to further the development of these policies, to depart here from the obvious and indulge in a little speculation. A reexamination of the purposes of science may disclose a way to promote a more favorable attitude toward science on the part of the general public. As a start, it is proposed that the primary purpose of science is the attainment of certain knowledge of things by knowing their causes. All men, by their nature, desire to know. And if it is innate in man to wonder, to be curious, then surely the attainment of knowledge, however proximate or incomplete it may be, is, in itself, a good.

In a word, science, abstracting from its applications, is not amoral, it is a worth-while endeavor. If this point can be successfully taught to the general public, perhaps scientists, as a group, would be more easily able to recommend actions that seem, from the point of view of science, to be desirable. Perhaps, even, if it were eventually accepted as part of our cultural milieu that science is not amoral, that it is good in itself, more young men and women might choose it as a career.

JAY A. YOUNG

King's College,  
Wilkes-Barre, Pennsylvania

3 MAY 1957

# Two superb microscopes

## WILD M 20

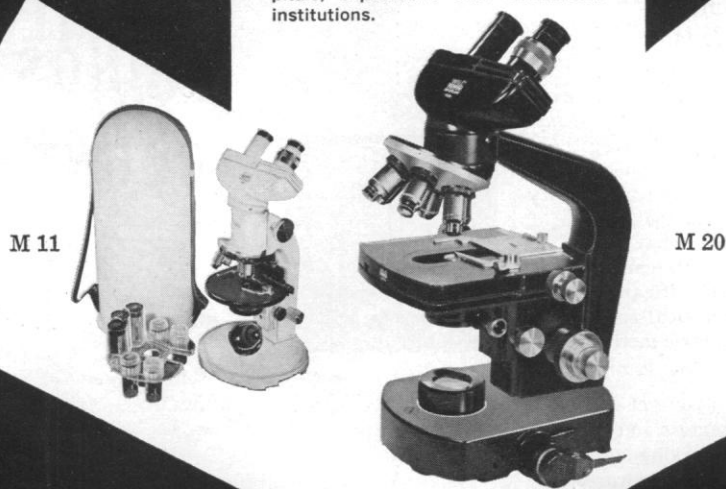
Meets the very highest requirements for research and scientific exploration, and provides unmatched versatility in many fields of microscopy.

Features include sextuple revolving nosepiece if desired • 20 Watt built-in illumination • beam splitting phototube for binocular focusing for photomicrography • phase contrast plus a complete line of attachments for every observation method.

## WILD M 11

A highly precise instrument, ideal for the laboratory and many research applications.

Lightweight, easily portable and self-protected by the sturdy steel hood, the Wild M 11 offers a degree of versatility and precision far beyond its price and size. Outstanding optics, low-placed fine adjustment, easily interchangeable accessories and many other features make this a most noteworthy instrument for hospitals, expeditions and educational institutions.



DETAILED DESCRIPTIONS AND TECHNICAL DATA ARE GIVEN IN BOOKLETS M 20 AND M 11. WRITE FOR YOUR COPIES TODAY!

**WILD HEERBRUGG  
INSTRUMENTS, inc.**

Main at Covert Streets • Port Washington, N.Y. POrt Washington 7-4843  
SALES • FULL FACTORY SERVICES

## EQUIPMENT NEWS

*The information reported here is obtained from manufacturers and from other sources considered to be reliable. Science does not assume responsibility for the accuracy of the information. All inquiries concerning items listed should be addressed to Science, Room 740, 11 W. 42 St., New York 36, N.Y. Include the name(s) of the manufacturer(s) and the department number(s).*

■ **PRESSURE TRANSDUCER SYSTEM** measures rate of change of pressure. Pressure is sensed by a quartz piezoelectric element. Instead of measuring charge, which is proportional to pressure, the system measures current or rate of change of charge. Response rise time is said to be 15 sec. Ranges from 0-to-1 to 0-to-1000 lb/in<sup>2</sup>. are covered. (Kistler Instrument Co., Dept. S303)

■ **TEMPERATURE-COMPENSATING CAPACITOR** of the air-dielectric type utilizes a bimetal bar to provide compensation. As it responds to temperature changes, the bimetal bar adjusts the stator of the capacitor. (British Radio Electronics Ltd., Dept. S294)

■ **VACUUM SYSTEM** designed primarily for vacuum coating reaches a pressure of 0.5  $\mu$ -Hg in 5 min; a pressure of  $3 \times 10^{-6}$  mm-Hg is attainable. Pressures are measured by Pirani and discharge gages. The work chamber is an 18- by 30-in. bell jar. (Consolidated Electrodynamics Corp., Dept. S332)

■ **FREEZE-DRYING EQUIPMENT** is described in an 18-page catalog. Included are descriptions of a complete portable unit and of histological, biological, infrared, and Roto-Freeze units and accessories. (Will Corp., Dept. S308)

■ **THERMAL CONDUCTIVITY PROBE**, designed by Pittsburgh Corning Corp., utilizes the principle that the temperature of a line heat source in a block of insulating material rises by an amount that depends on thermal conductivity. Temperature at the midpoint of the line source is measured by a thermocouple. The probe is 8½ in. long and 0.02 in. in diameter. Results are said to be reproducible to 1 percent. (Custom Scientific Instruments, Inc., Dept. S293)

■ **MEASURING SYSTEM** uses magnetic servo amplifier and a null-balance indicating receiver fed by transducers for pressure, flow, and temperature measurements. Pressure is sensed by a twisted Bourdon tube that actuates a rotary differential transformer to furnish an output voltage proportional to the variable. Bellows used for differential pressure and flow, feed similarly into a differential transformer. Temperature is converted into an electric signal by a resistance thermometer. (Norwood Controls, Dept. S310)

■ **MULTIPLE INDICATOR** is equipped with numbered push-button switches and scans up to 48 points. Full-scale travel of the 26-in.-long, drum-type scale requires 4.5 sec. The indicator is offered primarily for measurement of temperature but can also be supplied for measurement of other variables. (The Bristol Co., Dept. S290)

■ **TEFLON TAPE** reinforced with finely woven glass cloth is produced in widths of ¼ to 12 in. and in thicknesses from 0.002 to 0.06 in. The tape can be bonded with ordinary adhesives. The cementable surface is produced by treatment with a mixture of sodium and ammonia. It is claimed that reinforcement provides greater abrasive resistance, higher tensile strength, lower cold flow, and improved dimensional stability for Teflon tape. (Continental-Diamond Fibre Corp., Dept. S309)

■ **FIVE-CHANNEL RADIATION MONITOR** indicates radiation levels at five separate locations. Each channel is provided with a Geiger-Müller tube or a scintillation detector mounted at a distance of up to several thousand feet from the indicators. Indication of count rate is provided for each channel by contact-type meter relays that may also be used to actuate alarms. The five-channel instrument can be mounted in a 19-in. rack. (Universal Atomics Corp., Dept. S302)

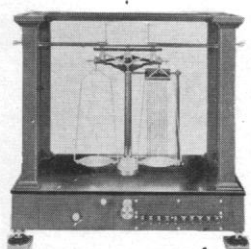
■ **PSYCHROMETER** consist of wet- and dry-bulb thermometers and an electric fan that is powered by flashlight batteries. The range of relative humidities from 10 to 100 percent is measured. (Bendix Aviation Corp., Dept. S312)

# in balances...

*good balances  
help whole lab*

"Recently I was discussing balances with a group of my chemist friends. During the session I realized more fully that the balance was a pretty important lab tool. For example, what other lab instruments can give you 6 or 7 significant figures like an analytical balance... and gravimetric methods are ubiquitous.

"And when you get down to fundamentals and get into things like making standards or calibrating glassware, a balance really proves its worth. So, all 'the little things' that go into a balance, to assure accuracy, are important to you because a real good balance saves trouble all over the lab... that's why so many of my customers prefer Ainsworth."



# IT'S THE LITTLE THINGS THAT COUNT



*Just call your laboratory supply salesman... he can give you more information about Ainsworth proved and improved balances and weights...  
or write for free catalog*

**WM. AINSWORTH & SONS, INC.**  
2151 LAWRENCE STREET • DENVER 5, COLORADO



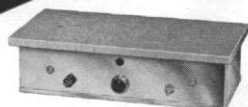
## MULTI-BLOCK HEATER

For digestions, extractions,  
and other reactions requiring  
close temperature control.

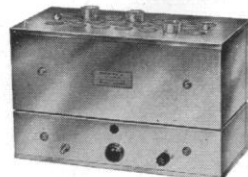
Interchangeable heat-transfer  
blocks mountable on a single  
heating base: hot plate,  
tube heater, liquid bath...  
sold individually or in  
combination.

Constant temperature control  
 $\pm 1^\circ \text{C}$ .

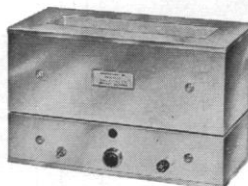
Variable from ambient to  
 $300^\circ \text{C}$ .



Hot Plate



Tube Heater



Liquid Bath

SEND FOR FREE CATALOG 2125-A



**RESEARCH SPECIALTIES CO.**  
2005 Hopkins St. Berkeley 7, Calif.

## PHOTOVOLT Line-Operated Multiplier FLUORESCENCE METER Mod. 540



- High-sensitivity for measurement of low concentrations (full-scale setting for 0.001 microgram quinine sulphate)
- Micro-fluorimetry with liquid volumes as low as 1 ml
- Low blank readings, strict linearity of instrument response
- Universally applicable due to great variety of available filters, sample holders, adapters and other accessories
- Interference filters for high specificity of results and for determining spectral distribution of the fluorescent light
- High-sensitivity nephelometry for low degrees of turbidities
- Fluorescence evaluation of powders, pastes, slurries, and solids, also for spot-tests on filter paper without elution

Write for Bulletin #392 to

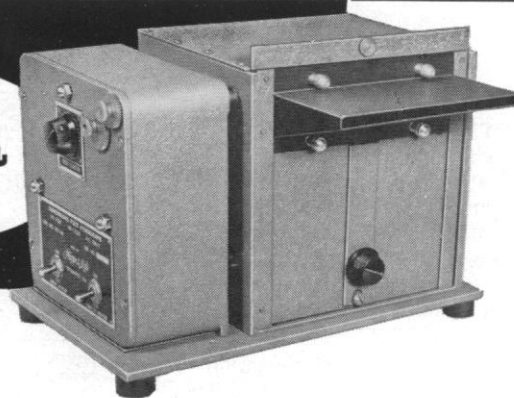
**PHOTOVOLT CORP.**

95 Madison Ave.

New York 16, N. Y.

**BIRD**

## Kymograph Recording Camera



This instrument makes possible the recording of many physiological reactions by the photographic process. It is modestly priced and is suitable for student demonstration purposes and student use. The kymograph movement is from our standard 70-140 continuous feed kymograph.

The speeds in cms per minute are approximately:

Used in conjunction with a light source (including focusing lens and vertical exit slit) and a mirror galvanometer, or other type of optical lever, the physiological action under observation is recorded on the paper as the vertical line of light travels back and forth along the adjustable horizontal slit in the front panel of the camera.

	With change gears in nor- mal position	In reverse
1st	2.2	4.3
2nd	11.0	21.5
3rd	55.0	107.5
4th	275.	537.5

The supply roll quill accommodates a roll of Linagraph No. 483 paper 100 feet long by 6 inches wide.

The camera may be detached from the driving unit, by turning a single knurled screw, and removed to a dark room for loading or unloading. The driving unit and base need not be disturbed during this procedure.

Kymograph Recording Camera with one roll of Linagraph No. 483 paper **\$425<sup>00</sup>**

Linagraph Paper No. 483 in rolls 6 inches wide, 100 feet long per roll **\$12<sup>00</sup>**

**PHIPPS & BIRD, INC.**

Manufacturers & Distributors of Scientific Equipment



6th & Byrd Streets - Richmond, Va.

■ **RADIOCHEMICALS** are available in solution form with specific activities 10 to 100 times higher than those of standard crystalline preparations. (Schwarz Laboratories, Inc., Dept. S325)

■ **LABORATORY GLASSWARE** utilizing stopcocks with Teflon plugs is described in a 16-page catalog. Included are precision burettes, aspirator bottles, gas collecting tubes, Karl Fischer apparatus, separatory funnels, nitrometers, and manifolds. (Fischer and Porter Co., Dept. S305)

■ **PARTICLE-SIZE DISTRIBUTION ANALYZER**, the Micromerograph, utilizes a technique in which powder particles are dispersed in air and allowed to settle, under the action of gravity, onto a servoelectronic balance. The output is a continuous plot of the weight of powder settled against time. Application of Stokes' law to the data yields a particle-size distribution curve. A test run requires 15 min and about 0.1 gr of sample. Compressed nitrogen is used to inject the powder into the sedimentation tube. (Sharples Research Laboratories, Dept. S306)

■ **ELECTRONIC INDICATOR** measures dimensional variations from 10 in. to 10 mils. The device consists of an adjustable gage head, an amplifier, and a stand. Displacements of the gaging tip, applied with a gaging force of  $\frac{3}{4}$  oz, are amplified 10,000 times and displayed on a zero-center meter. (Cleveland Instrument Co., Inc., Dept. S279)

■ **SODIUM REAGENT**, a buffered aqueous-alcoholic preparation of  $\alpha$ -methoxyphenylacetic acid, reacts with sodium ions to produce an insoluble sodium acid salt. The reagent is useful for quantitative as well as qualitative analysis. It is said that large amounts of  $\text{NH}_4^+$ ,  $\text{Mg}^{++}$ ,  $\text{K}^+$ ,  $\text{Rb}^+$ ,  $\text{Cl}^-$ ,  $\text{NO}_3^-$ , and  $\text{PO}_4^{--}$  do not interfere. (Monroe Chemical Co., Dept. S307)

■ **FLOW METER** uses the modification of an ultrasonic beam to measure fluid flow. The instrument offers no obstruction to the fluid, thus eliminating pressure drop caused by the measuring means. Flow in the range of 1000 to 4000 gal/min is measured with an accuracy of 1 percent. A 5-v electric output is provided for feeding into standard telemetering and recording systems. (Gulton Industries, Inc., Dept. S263)

■ **REFRACTOMETER** used in conjunction with a monocular microscope and illuminator operates on the basis of the Rayleigh method of interferometry. Differences in refractive index in the fifth decimal place are measured with a range of 0.002. Sample volume is 1.6 ml. (American Instrument Co., Dept. S316)

JOSHUA STERN

National Bureau of Standards

# PERSONNEL PLACEMENT

**CLASSIFIED:** 18¢ per word, minimum charge \$3.60. Use of Box Number counts as 10 additional words.

**COPY** for classified ads must reach **SCIENCE** 2 weeks before date of issue (Friday of every week).

**DISPLAY:** Rates listed below — no charge for Box Number. Monthly invoices will be sent on a charge account basis — provided that satisfactory credit is established.

Single insertion	\$22.00 per inch
13 times in 1 year	21.00 per inch
26 times in 1 year	20.00 per inch
52 times in 1 year	19.00 per inch

For **PROOFS** on display ads, copy must reach **SCIENCE** 4 weeks before date of issue (Friday of every week).

Replies to blind ads should be addressed as follows:

Box (give number)  
Science  
1515 Massachusetts Ave., NW  
Washington 5, D.C.

## POSITIONS OPEN

(a) **Analytical Chemist**, Ph.D., to direct group of analytical chemists; new research center, large industrial company, California. (b) **Pharmacologist**, Ph.D., research laboratory, pharmaceutical company; \$7500-\$10,000. (c) **Biochemist or Nutritionist** with some experience as science writer; duties include surveying literature for various departments, pharmaceutical company; \$7000-\$10,000; Midwest. (d) **Physiologist, Biophysicist, and Biochemist**, Ph.D.'s; research institute now under development; quarters adequate for present; emphasis on cardiovascular research; scope to be increased to other research fields; \$10,000-\$12,000; Midwest. (e) **Toxicologist**; although Ph.D. in pharmacology preferred, one with doctorate in biochemistry acceptable; industrial toxicology laboratory, large company; experience in industrial toxicology advantageous; \$10,000. (f) **Clinical Physiologist**, preferably one whose background has been in respiratory physiology; M.D. or Ph.D.; university medical center; West. S5-1 Medical Bureau, Burneice Larson, Director, North Michigan Avenue, Chicago. X

**Biochemist**, Ph.D. to supervise clinical chemistry section of laboratory in 550-bed county hospital, metropolitan Detroit. About 55,000 chemical tests in 1956; about one-third of time for development of methods and one-third of time for original investigation. Salary \$6723, annual increases \$240; 40-hour week. Civil Service benefits, pension, social security, 12 holidays, liberal vacation, sick allowance, group hospitalization, and life insurance. Send photograph, résumé of training and experience, and references to Dr. S. E. Gould, Director of Laboratories, Wayne County General Hospital, Eloise, Michigan. 4/19, 26; 5/3

**Biophysicist**, Ph.D. preferred, for fundamental research in cardiac electrophysiology. University of Tennessee. Write Dr. Daniel A. Brody, 858 Madison Ave., Memphis 3, Tennessee. 5/3, 10, 17

**New World-Wide Summer Placement Directory:** 1000's of summer jobs in 48 states, over 20 foreign lands. Study awards, ranches, resorts, earning trips abroad, camps, and so forth. Jobs are filled early so don't wait, send \$2 now. **CRUSADE**, SCI, Box 99, Station G, Brooklyn 22, N.Y. eow

**Pharmacist-Manufacturing Development**. Technical department of major pharmaceutical manufacturer located in Philadelphia desires development pharmacist with B.S. in Pharmacy, M.S. in pharmacy, chemistry, biology, and 4 to 5 years' industrial experience. Liberal benefit program. Send complete résumé. Box 136, **SCIENCE**. 5/10

**Teaching Position in Botany**. Open September 1957. Rank and salary dependent on qualifications and experience. Write Chairman, Department of Biology, College of St. Thomas, St. Paul 1, Minnesota. 4/26; 5/3

**Technician**. Electronic-mechanical to assist heart physiology research project, \$4000-\$4500. Physics or biology degree helpful. Small modern medical physics laboratory in Montana. Box 127, **SCIENCE**. 4/26; 5/3, 10

## POSITIONS OPEN

### PHYSIOLOGISTS PHARMACOLOGISTS

Ph.D.'s in physiology, pharmacology, or biochemistry with orientation in cardiovascular and/or nutrition fields; or C.N.S. functions and clinical application of neuropharmacologic agents, to assist in evaluating new chemotherapeutic compounds for use in the treatment of mental illness.

### ORGANIC CHEMISTS— NATURAL PRODUCTS

M.S. degree or equivalent in organic chemistry with some botanical training and experience to evaluate scientific data in natural products research program.

### ORGANIC CHEMISTS— GENERAL

M.S. or equivalent in organic chemistry with strong background in biological science to collaborate in analyzing and evaluating experimental data in research program.

Applicants who desire to become associated with well-established, progressive eastern pharmaceutical laboratory with liberal benefit program should submit résumé with full information to

Box 140, **SCIENCE**

**POSITIONS REQUIRING DEGREES IN MEDICINE OR SCIENCE** (a) **Director of Clinical Investigations**; experienced pharmacologist to follow up clinical trials, initiate new trials, medical correspondence; \$18,000; noted eastern pharmaceutical concern. (b) **Biochemist**, M.S. experienced clinical chemistry to head department, approved 150-bed general hospital; \$6500; southern community, 25,000. (c) **Bacteriologist**; Ph.D. trained virology, bacteriology for research, administrative appointment; supervise five to six in department; \$7200; midwestern university medical center. (d) **Chemist**; administrative-minded Ph.D. as principal chemist, state health department; large city, industrial center; East. (e) **Bacteriologist**, B.S., M.S. to head department, very large general hospital; \$5000; New York City area. (f) **Virologist**; M.D., D.V.M., Ph.D. to join new research group now being established as part of outstanding eastern pharmaceutical concern; experienced vaccine research and/or production; substantial income. (g) **Biochemist**; fully approved 300-bed general hospital; California coastal city. (h) **Instructor in Pharmacology-Physiology**; outstanding eastern university medical school; to about \$5500. (i) **Bacteriologist** and (j) **Biochemist**; Ph.D.'s or equivalent experience to fill key positions, new hospital laboratory; 200-bed facility; eastern medical center. Ann Woodward, Director, Woodward Medical Personnel Bureau, 185 N. Wabash, Chicago. X

## X-RAY DIFFRACTION AND FLUORESCENCE

Opening for responsible individual to take charge of new well-equipped X-ray laboratory. Experience and interest required in metallurgical, corrosion, general diffraction problems and fluorescence applications. Submit résumé and salary requirements to:

**EMPLOYMENT DEPARTMENT PP  
GOODYEAR ATOMIC  
CORPORATION  
P.O. Box 628  
PORTSMOUTH, OHIO**



**SAVE TWO-THIRDS**—A large Eastern University cut its replacement costs by two-thirds after it switched to PYREX brand No. 3046 graduated cylinders.

## Test at large university shows how to erase two-thirds of your graduated cylinder breakage

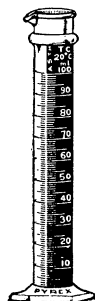
When one of the largest schools of technology in this country decided to find out how true are the claims we make for PYREX brand graduated cylinders, it came up with this result:

*Just one PYREX cylinder ends up in the "broken glass" pail for every three of the leading competitive brand.*

The university based its test on the cylinder-breaking ability of two large groups of chemistry students. One group used only PYREX No. 3046 cylinders for a full semester. The other group used only the competitive brand.

### Why do you get such low breakage?

No magic involved—just forty-and-some years of know-how that's built into the design of the PYREX No. 3046 cylinder and the glass it's made of.



*These* design features, for example: Reinforced bead strengthens cylinder, helps prevent breakage if cylinder tips over.

Hexagonal base—a Corning first—with extra base width to resist tipping. Also prevents rolling when you set cylinder on its side.

### Permanent graduations

You also get LIFETIME RED graduations on No. 3046 cylinders. Etched right into the glass through a permanent layer of red, they can't wear off.

No. 3046 cylinders are available in sizes 10 thru 250 ml. For more information on these and other PYREX volumetric ware, consult your Laboratory Supply Dealer or your Laboratory Glassware Catalog LP36. If you don't have this catalog of Corning glassware, we'll be glad to send you a copy.



**CORNING GLASS WORKS**  
75-5 Crystal St., Corning, N.Y.

*Corning means research in Glass*



**PYREX® laboratory ware**

*... the tested tool of modern research*



High operating temperatures, i.e. up to 450° C

Six separately controlled 200-watt heaters

Fume duct support adjustable to take flasks from 10 to 100 ml, and tubes of various sizes, at any desired angle

Corrosion-resistant throughout

## Thomas-LABCONCO HIGH TEMPERATURE KJELDAHL DIGESTING APPARATUS

**KJELDAHL DIGESTING APPARATUS, Micro, Electric, Thomas-Labconco.** With six 200-watt heaters, each with separate rheostat control, pilot lamp and "on-off" switch, for completely independent operation at temperatures up to 450° C. Controls are mounted in a Stainless steel housing, and finish is corrosion resistant throughout. With fume duct of Pyrex brand glass. Support is adjustable to accommodate Kjeldahl flasks 10 ml, 30 ml or 100 ml capacity, making the apparatus suitable for micro or semimicro analysis. Heat production is adequate for larger Kjeldahl flasks\* or for pressure digestions using sealed tube procedures. Fume duct is in accordance with "Recommended Specifications for Microchemical Apparatus," Division of Analytical Chemistry, American Chemical Society; see *Analytical Chemistry*, Vol. 23, No. 3 (March, 1951), p. 524.

The disc-shaped heaters, consisting of heating elements embedded in refractory cement, are spaced 3 inches from center to center on the transite top of the Stainless steel housing and are separated from the controls by a ventilated air chamber 1½ inch high, beneath which is a second transite strip. Each heater has a removable, circular top of Stainless steel with opening 26 mm diameter and concavity for supporting the bottom of a 30 ml Kjeldahl flask. Readily insert-

able wire gauze discs are available for use in openings of heater tops to support 10 ml Kjeldahl flasks and tubes less than 26 mm in diameter.

Individual switches, pilot lamps and temperature control knobs, with dials graduated in 10 arbitrary divisions, are mounted on front panel and are insulated by a transite panel from the six 50-ohm rheostats mounted in ventilated rear compartments. Housing is 19⅛ inches long x 7⅝ inches deep x 10⅜ inches high to tops of heaters.

Fume duct, 516 mm long x 51 mm outside diameter, has six openings 22 mm diameter for flask necks and slopes toward center for drainage through the central outlet tube, ⅞-inch outside diameter. The fume duct is held in position by the Stainless steel, spiral springs of two slotted aluminum clamps supported by wing-shaped brackets at the back corners of the housing. The flexible attachment of the clamps to L-shaped slots in the brackets by two bolts with wing-nuts and washers permits easy adjustment to support flasks or test tubes up to 12 inches long at any preferred angle over a wide range.

**7498-E. Kjeldahl Digesting Apparatus, Micro, Thomas-Labconco, Electric**, as above described, with six independently controlled 200-watt heaters. Complete with six heater tops to support 30 ml Kjeldahl flasks, fume duct made of Pyrex brand glass, two clamps to support duct, two additional bolts for locking clamps in desired position, and 4 ft., 3-wire connecting cord with 2-prong attachment plug cap and grounding tail. For use on 115 volts, a.c. or d.c. Maximum power consumption 1200 watts..... **242.25**

\*For use with Kjeldahl flasks 100 ml or larger, the Apparatus can be furnished at same price with heater tops to fit in place of the tops regularly furnished.



### ARTHUR H. THOMAS COMPANY

More and more laboratories rely on Thomas / Laboratory Apparatus and Reagents

VINE ST. AT 3RD • PHILADELPHIA, PA.