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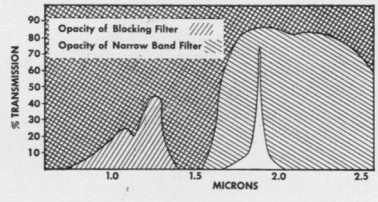
Filters: plea and offer

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 1.4μ. But if you find it necessary to specify a wavelength between 1.4μ and 4.5μ as a narrow transmission band or *any* wavelength above 1.4μ 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 nigh 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 3½ 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 metercandle 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.

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Kodak
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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. Rappaport, 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.

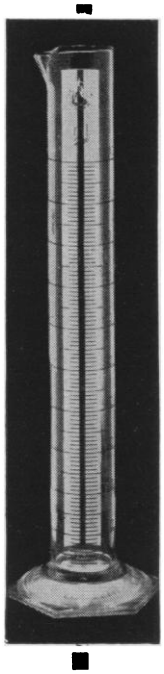
I would recommend that, if we desire action based on the recommendations, we should lobby for it. The AAAS should bring into being a political arm, should set up a lobbying group in Washington, should see to it that its members constantly relay to the public, through meetings, talks, and propaganda,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

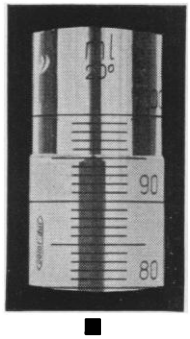
We should not be ashamed of this activity; we scientists have as much right to try to impose our views on the public as do other interest-groups. Only in this way can we make sure that not only our own interests but what we think are the interests of the country can be forcefully brought to the attention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





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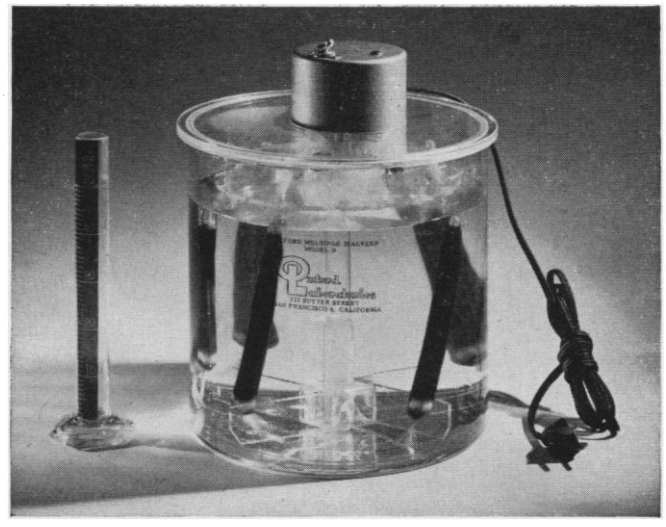

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engineering or science because of the salary level, which does not yet compare favorably with that of other professions and trades attained after a comparable number of years of experience. It is also widely felt that the engineering shortage is a 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 RABBINER
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 Wolfle, 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

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 "mischievous" 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

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

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^2. 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 μ-Hg in 5 min; a pressure of 3×10^{-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)

■ 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 ¾ 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 α-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 NH_4^+, Mg^{++}, K^+, Rb^+, Cl^-, NO_3^-, and 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

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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

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

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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 1⅛ 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 insertable 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 10$^{3}/_{16}$ 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, $^{7}/_{16}$-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.

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