SCIENCE

14 July 1967

Vol. 157, No. 3785

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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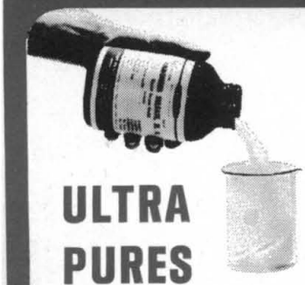

ULTRA PURES for RESEARCH

When it comes to purity for enzyme and related work the only source to obtain your requirements is MANN RESEARCH. These are but a few of the ULTRA PURES we can offer . . . there are many more. Your inquiries invited.

Ammonium Acetate Ultra Pure, M.A.
Heavy Metals (as Pb) <0.0001%
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Sucrose-Density Gradient Grade, M.A.
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(previously called "Enzyme Grade")
Mn 0.01PPM
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Fe — Not detectable

FREE WORKING SAMPLES OF THE ABOVE ULTRA PURES UPON REQUEST. FOR PROMPT DELIVERY, PLEASE USE THE COUPON OR CALL!

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Prepared aerosol Chromatographic Indicators Handy, stable, easy to use. You'll be more than pleased with the results.

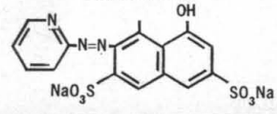
INDICATORS

A specific and sensitive colorimetric reagent for Niobium (Nb)

(2,7-Bis (2-Hydroxy-3-Sulfo-5-Chlorophenylazo) 1.8-Dihydroxy-Naphthalene-3,6 Disulfonic Acid, Tetrasodium Salt)

A useful, new metallochromic indicator of Nickel and Cobalt or a colorimetric reagent of Nickel, Cobalt and Copper.

2-(2-Pyridylazo) Chromotropic Acid, Disodium Salt.



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Recent studies have indicated Tetranitromethane shows promise as a highly selective, specific and mild reagent for the nitration of tyrosyl residues of protein at pH 8. To encourage further investigation **MANN RESEARCH** can now offer TNM.

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Four new P's in the Mettler pod: some stay level, some weigh backwards, and some even weigh conventionally

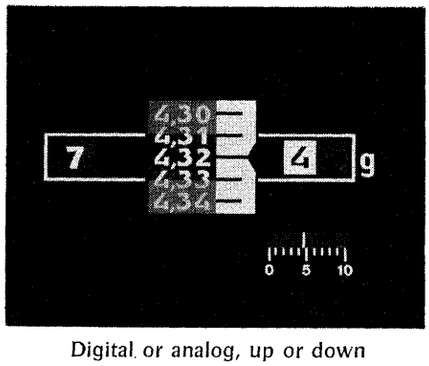
P160, P2000, P5 and P6 – these are the four new instruments we've added to our widely-accepted series of top-loading balances. They bring improved precision/capacity relationships while offering special advantages for particular applications.

WEIGH UP, WEIGH DOWN...

Perhaps the most unusual of the new group is the P160. It has the 160 g capacity of our finest analytical balances and the milligram precision of our best top-loader.

Its scale reads two ways. Operating conventionally, it tells you, with milligram precision, just how much weight you have on the pan.

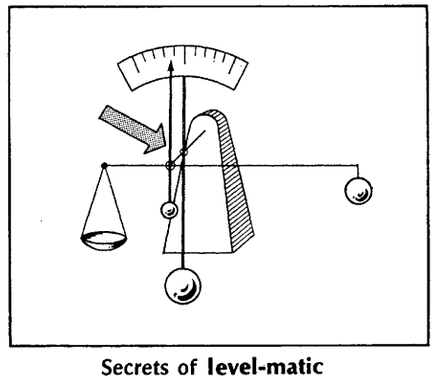
A turn of a knob wipes out all traces of conventionality – your scale now tells you, in positive values and with milligram precision, just how much weight the object on the pan has **lost**. This reversible scale is important in all work involving weight loss studies such as drying and evaporation experiments and determination of residues. It makes possible, for the first time, gravimetric titration, in which titrant is dispensed directly by weight instead of indirectly by volume. We have done some homework on this subject.[1]



Digital or analog, up or down

...BUT NEVER SIDEWAYS

Some of the new P balances have the exclusive Mettler **level-matic** feature. This automatically compensates for slight changes in balance level which are due to working on a less-than-ideal balance table. Essentially a fail-safe system, it protects the unwary balance operator against himself. If tilt exceeds its compensation range, **level-matic** automatically covers the readout scale. Faulty readings are impossible.



Secrets of **level-matic**

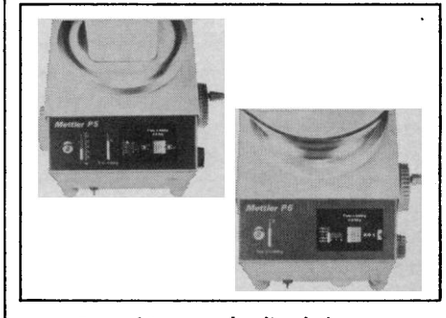
Level-matic, available as an option on the P160 and P2000 instruments, is supplied as an integral feature on the larger P5 balance.

TWO KILOS IN A ONE-KILO CASE

The model P2000 stands out by not really standing out. It is a remarkably compact unit that offers twice the capacity and 60% more taring than other instruments in its precision and size class. It has 2-kilo capacity with precision of ±0.05 g and readability of 0.1 g.

MEET THE BIG BOYS

The P5 and P6 are the higher-capacity members of the new breed of P's. With comparable capacities, 5000 g and 6000 g respectively, the two units distinguish themselves in terms of performance and precision.



P5 and P6 – top-loading balances

The P6 offers fully automatic operation – place the sample on the pan and read the result – across its full capacity. It provides precision of ±0.25 g.

The P5, on the other hand, provides about another decimal precision – ±0.05 g – with automatic operation over its 1000 g optical scale.

FOR PRODUCT LITERATURE...

All the new Mettler balances are described in a new 10-page booklet. Get your copy from your laboratory supply dealer or request it from Mettler Instrument Corporation, 20 Nassau Street, Princeton, New Jersey 08540.

Mettler®

1) We've found 44 citations which suggest useful applications for, or advantages of, dispensing titrant by weight. If you'd like a copy, ask for Technical Information Bulletin 1014, "Gravimetric Titrimetry – a Review of the Literature."

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SCIENCE

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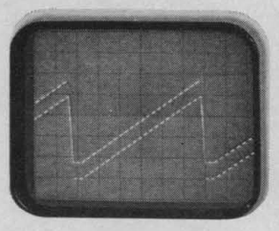
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

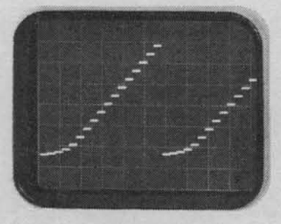
COVER

Portion of a linear accelerator for protons, now being designed at the Los Alamos Scientific Laboratory. Mean energy in the sector shown would be 300 Mev. This proton accelerator will produce 1 milliampere of protons at 800 Mev and will be a national facility for research into the structure of the nucleus. See page 145. [Bill Jack Rodgers, Los Alamos Scientific Laboratory]

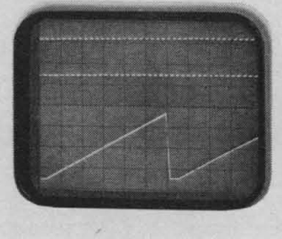
4 ways to view displays with the Tektronix Type 564 split-screen storage oscilloscope



Entire screen can be used for a stored display.



Entire screen can be used for a nonstored display.



Each half of split-screen can be used independently for stored displays.

Either half of the split-screen can be used for a stored display, the other half for a nonstored display. (Shown below).

The Tektronix Type 564 is virtually two instruments in one. It offers all the advantages of a storage oscilloscope plus those of a conventional oscilloscope.

Split-Screen Displays

An unique split-screen display area enables you to simultaneously use either half of the screen for storage and the other half for conventional displays, or use the entire area for stored or conventional displays.

Independent control of both halves of the screen permits you to take full advantage of the storage facilities. For example, you can use half the screen to store a reference waveform, the other half to display waveforms for comparison. You can erase or retain either half of the display area as you choose.

Bistable Storage Advantages

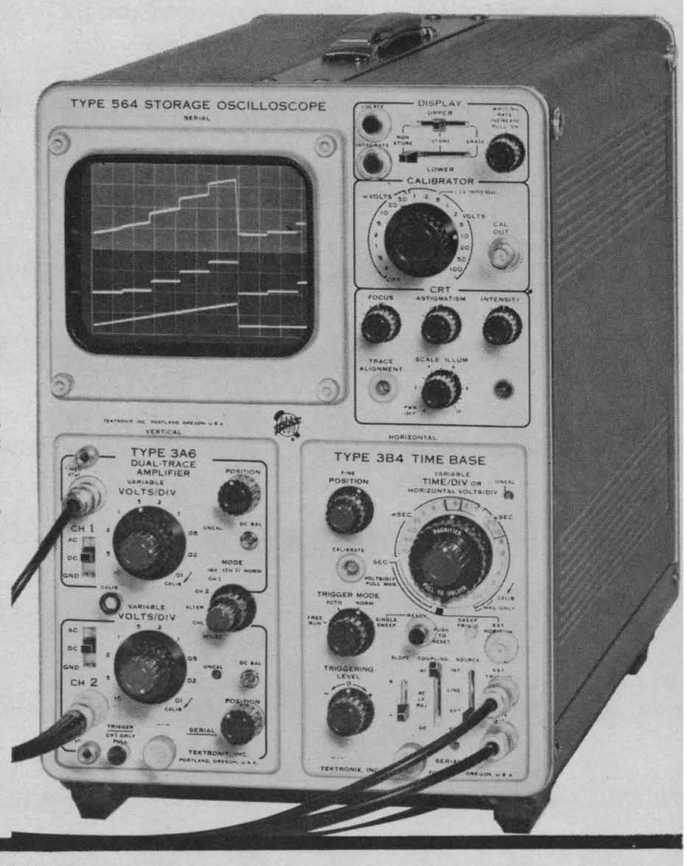
With bistable storage oscilloscopes, such as the Type 564 and Type 549, the contrast ratio and brightness of stored displays are constant and independent of the viewing time, writing and sweep speeds, or signal repetition rates. This also simplifies waveform photography. Once initial camera settings are made for photographs of one stored display, no further adjustments are needed for photographs of subsequent stored displays.

Storage time is up to one hour, and erase time is less than 250 milliseconds. An illuminated 8 cm by 10 cm graticule facilitates measurements and aids in taking photographs with well-defined graticule lines. Adding to the operating ease is a trace position locater that indicates, in a nonstore area, the vertical position of the next trace or traces.

Tektronix bistable storage cathode ray tubes are not inherently susceptible to burn-damage and require only the ordinary precautions taken in operating conventional oscilloscopes.

Plug-In Unit Adaptability

The Type 564 accepts Tektronix 2 and 3-series plug-in units for both vertical and horizontal deflection. Display capabilities of these units include single and multi-trace with normal and delayed sweep; single and multiple X-Y; low-level differential; dual-trace sampling; spectrum analysis, and many other general and special purpose measurements.



Type 564, without plug-in units	$875
Rack-Mount RM564 Similar electrical characteristics to Type 564. 7″ high.	$960
Type 3A6 Dual-Trace Amplifier Unit DC to 10 MHz from 10 mV/div to 10 V/div. 5 display modes. Internal signal delay line.	$525
Type 3B4 Time Base Unit Sweep speeds from 0.2 μs/div to 5 s/div. Single sweep. Up to X50 direct-reading magnifier extends fastest sweep to 50 ns/div.	$400

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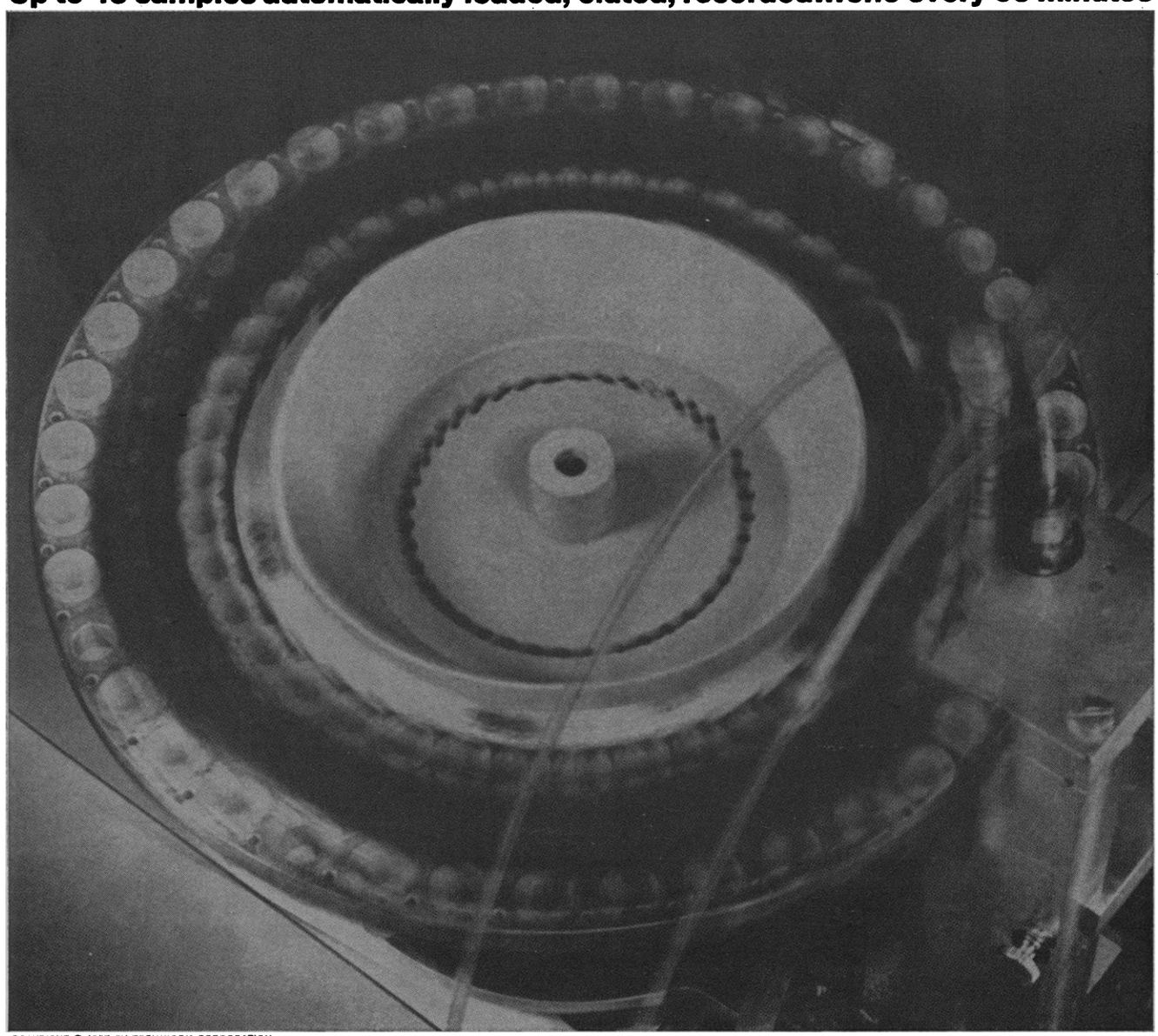
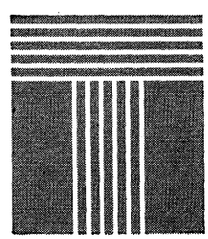


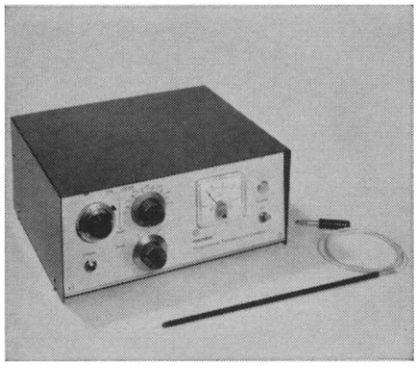
A new automatic sampling unit and a new programmer selector valve bring complete automation to our liquid chromatography system. Ion-exchange resin in special cartridges, one pair per sample, absorbs and concentrates the amino acids. The cartridges are presented automatically and sequentially, in pairs, to two analytical columns (one acidic-neutral, the other basic) and become, in effect, extensions of the columns. The new programming valve selectively changes buffers and elutes both columns; our extremely stable ninhydrin reagent is insensitive to air oxidation and requires no special handling. For brochure, write Dept. F, Technicon Corporation, Ardsley, New York 10502.



July, 1967

FISHER PRODUCT REPORT

News about instruments, apparatus and reagent chemicals that make your work quicker, surer, safer and easier.

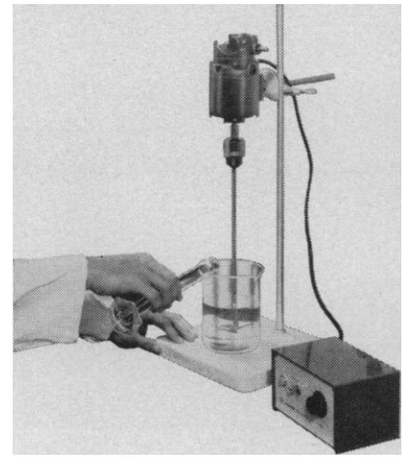


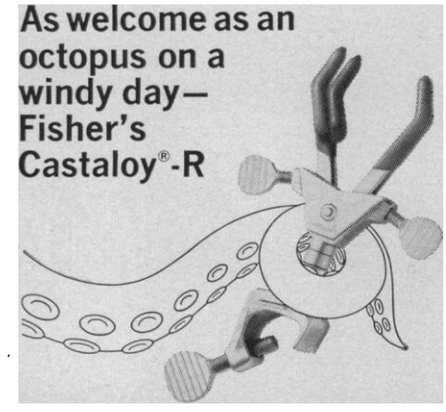
Fisher's Proportional Temperature Control keeps your ups and downs down to ±0.01°C

The Fisher Proportional Temperature Control will accurately and reliably control laboratory bath temperature to ±0.01°C. The control is usable up to 250°C and settings are reproducible to ±0.02°C. A thermistor probe and solid-state proportional controller automatically increase or decrease the power to the bath heater, enabling temperature control to be maintained uniform and constant without overshoot. The Proportional Temperature Control is important in such applications as precision viscosity measurements, thermometer calibration or enzymatic studies, when fluctuation of temperature around the control point cannot be tolerated. The price: $285. Probes (your choice 0°-150°C or 80°-250°C) are $20. Our brochure is ready for you. (a) ☐

Stir things up around your lab with a Fisher Dyna-Mix® Stirrer. It never slows down.

The Fisher Dyna-Mix is a low-cost, high-powered stirrer that mixes the most difficult slurry or the most dilute aqueous solution with equal efficiency. It provides high torque throughout its infinitely adjustable ranges of 0-300 rpm and 0-6000 rpm. The control is a solid-state electronic unit that will not generate heat and waste power like conventional rheostat controllers. The sealed, permanently lubricated, ball-bearing stirring motor is quiet-running and will have a long, serviceable life. And the Fisher Dyna-Mix will never slow down. It just keeps stirring. Price: $110. Our product catalog is waiting. (b) ☐





Fisher Castaloy-R clamps, holders and supports are as helpful as an extra pair of arms. They last almost a lifetime, are strong, versatile, durable, corrosion-resistant and attractive. For extra safety, their jaws have a heavy, nonskid vinyl coating bonded to the metal. Fisher currently offers 42 different kinds of clamps and holders, from three-finger microclamps to chain clamps that will hold a 6½-inch cylinder—every one as useful as an octopus, and twice as pretty. See for yourself. Get our fully illustrated Castaloy-R catalog. (c) ☐

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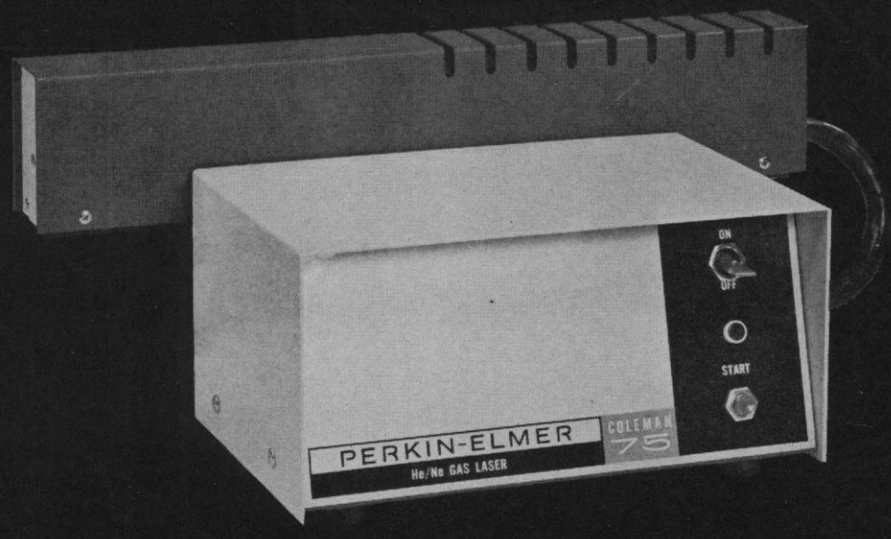

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Coleman Instruments bring you the perfect device for fascinating studies in coherent light, monochromaticity, diffraction and other optical phenomena. Its full name: The Perkin-Elmer Helium-Neon Gas Laser, Coleman Model 75.

The laser head is detachable from the solid-state power supply for dramatic demonstrations in physics. A separate tripod may be used, but is not required. An experiment kit, including an instructor's manual, will be available. One milliwatt output makes the laser as safe as your other laboratory light sources. Model 75 emits a continuous, TEM_{oo} single mode, red (6328Å) beam in the visible spectrum that throws an intensely bright spot for hundreds of feet. Actual beam divergence is less than 0.4 milliradians half-angle.

Behind this instrument is the vast laser research experience of The Perkin-Elmer Corporation. Highly skilled Delmar Scientific glassblowers shape the laser tube, sealing on pure quartz resonator reflectors. The tube is guaranteed for 1000 hours of use. There are no external optics, no complex adjustments, no maintenance. Just plug the power supply into your line, flip the switch, and you've entered the laser era.

Only $295 brings you Coleman Model 75, complete with operating directions. For full information, send for Coleman Bulletin S-316.

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A Division of The Perkin-Elmer Corporation

The Hasselblad EL
it could be one of the most important research tools you ever buy.

In previous advertisements we have discussed the many and varied applications for which the Hasselblad System can be used in the scientific and industrial field. We would now like to discuss a unique combination of Hasselblad components and some of the rather unique applications to which they can be put.

The camera in question is the Hasselblad EL, an electrically driven 2¼" square, single lens, reflex camera, powered by one or two rechargeable batteries, each battery good for 1000 exposures on a single charge. The film is wound on and the shutter cocked automatically after each exposure. Exposures can be made manually or by remote control, using either long release cables or a radio release.

The Hasselblad EL accepts practically all the accessories that are available for the Hasselblad 500C (the standard body in the the Hasselblad System), including the 120-12 exposure magazine, the 220-24 exposure magazine, and, of particular interest with the EL, the 70mm-70 exposure magazine. The Hasselblad EL also accepts all seven lenses available in the Hasselblad System, from the extreme wide angle Zeiss Distagon of 40mm focal length, 88° angle of view, with maximum aperture f/4, to the Zeiss Tele-Tessar of 500mm focal length, 9° angle of view, maximum aperture f/8.

Listed below are five particular and diverse applications for the EL.

General Instrument Recording

Many Hasselblad EL cameras are already proving their worth, in industrial and research institutions all over the world, as recording devices for the constant surveillance of instrument banks and oscilloscope screens on a 24 hour basis.

By the use of the EL with a lens of the appropriate focal length, and the 70 exposure 70mm film magazine, banks of cameras, using the Hasselblad remote control timer, can make a number of exposures between 2 and 60 intervals for each of 3 time ranges—seconds, minutes or hours.

Thus, many valuable man hours can be saved which would otherwise be wasted making manual photographic records.

Hydraulic Engineering and Fluid Flow Research

The Hasselblad EL is particularly suited to many forms of fluid flow research and in the solving of river current and flow location problems. Banks of up to 20 Hasselblad ELs are suspended over a scale model of the river bed or sections of the ocean floor to be studied. By floating numbers of white polystyrene balls down the model and illuminating them by mercury vapor lamps, a series of tracks is formed on the negatives against the black of the river bed. By computing the distance of the tracks against a speed scale included in the photograph, flow speeds can be calculated.

By using much smaller plastic chips and the same photographic techniques, current patterns are formed at mouths of rivers, in bays and around structures in the river.

Obviously, the remote control features of the Hasselblad make it extremely useful for this kind of work, and the use of either the 70mm-70 exposure, or 220-24 exposure magazine, allows the researcher to make many exposures before bringing the camera down from the roof of the building. And, unless the building has an extremely high roof, (in which case the 80mm-Planar could be used) the 40mm Distagon will allow the maximum area to be covered by each camera.

Materials Testing

Other than the more regular forms of material testing which are usually carried out under ideal laboratory conditions, there are certain times when photographs of fractures or breakages of materials are needed. Yet, the structures are inaccessible to a photographer e.g., the inspection of blast furnaces or large capacity wine storage casks, both containing large quantities of toxic gas. In these instances, the lowering of the EL into the structures to be tested and the operation of the camera by remote control, provides the solution to the problem. Once again, the use of the 70mm magazine is desirable if numerous exposures are required.

Because of the confined space of the structures, the wide angle lenses available for the Hasselblad, the 40mm Distagon, with its 88° angle of view, or the 50mm Distagon, with its 75° angle of view, would be most useful.

Cave Photography & Speleology

A great deal of photography in cave and cavern research and its related sciences, palaeontology, anthropology and prehistory, is being done with the Hasselblad EL.

Working conditions are usually so bad—mud, water and of course, constant darkness—that film changes are not only undesirable but usually impossible. Use of either the 220-24 exposure or the 70mm-70 exposure magazine will reduce the number of film changes to the absolute minimum. Because of the spacial limitations of a cave, a wide angle lens is indispensable. Either the 40mm Distagon, with its 88° angle of view, or the 50mm Distagon, with its 75° angle of view, cannot be bettered.

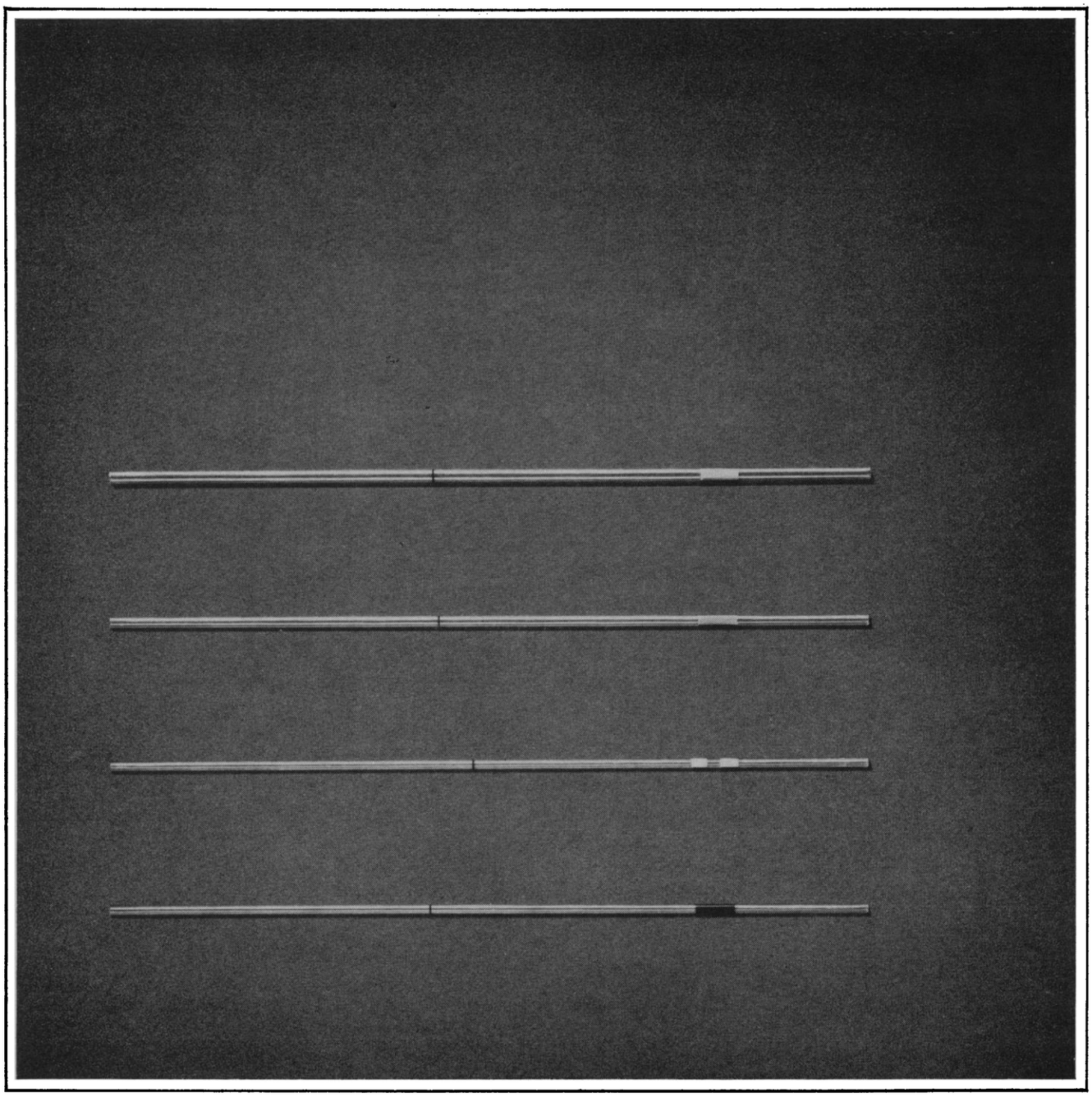
Aerial Photography

The Hasselblad EL is also ideally suited for many phases of aeronautical research. In most aerial research photography the camera is not handled by a skilled photographer, but usually by a flight test engineer or even, in the case of a single seat airplane, by the pilot himself. These people do not have the time to be concerned with manual operations such as exposing, winding on or changing film.

Flight instrumentation recording by remote control operation of the pre-focused Hasselblad EL allows for the reconstruction of flight conditions at pre-determined intervals during the test flights.

Numerous accessories are available for the Hasselblad EL. These are fully outlined in a 40 page illustrated booklet which we would be happy to send to you on request. If you also have any particular problems of a photographic nature, please address your enquiries to our Technical Director . . . Paillard Inc., 1900 Lower Road, Linden New Jersey 07036.

HASSELBLAD



To duplicate the accuracy of a YANKEE® DISPOSABLE MICROPET™ Lambda Pipette ...use another one

Use lots of them. They're guaranteed accurate to ±1%. And they're used only once—no cross-contamination between samples or reagents.

Available in the four most frequently used sizes—20, 25, 50 and 100 lambda—YANKEE DISPOSABLE MICROPET pipettes are color-coded at the top.* The cardboard vials they're packed in are also color-coded to correspond to the pipettes.

Take the top off the vial and you've got 200 pipettes at your fingertips. The specially designed vial holds the pipettes upright so that they do not fan out and the vial may be recapped easily. In each vial there's an 18" rubber suction tube designed to fit all four pipette sizes—without an adapter.

Measure accurately—and economically—with YANKEE DISPOSABLE MICROPET lambda pipettes.

*According to the draft recommendations of Technical Committee No. 48 of the International Organization for Standardization (ISO).

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cytochrome
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RNA
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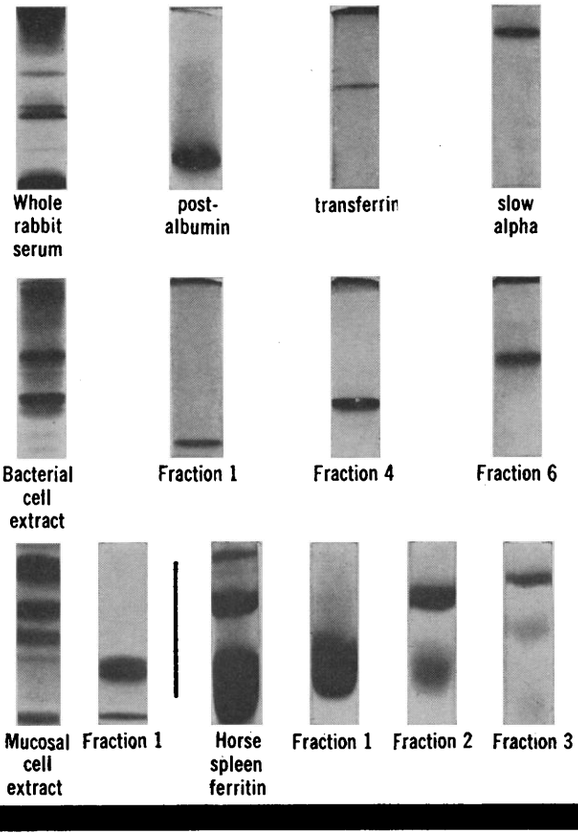
EVIDENCE: Shown here are typical examples, in the form of high-resolution analytical-Disc Electrophoresis patterns, of separated fractions taken from Prep-Disc columns. Each set shows starting material, plus one or more purified components separated from it.



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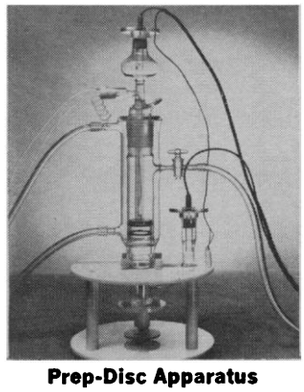

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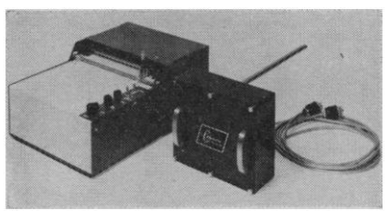

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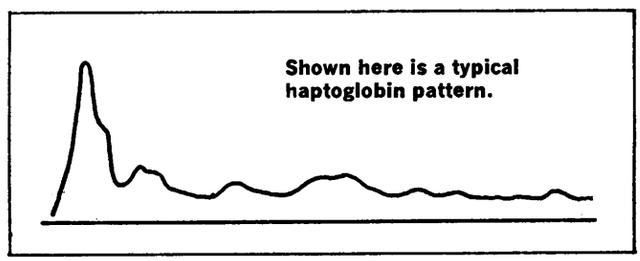

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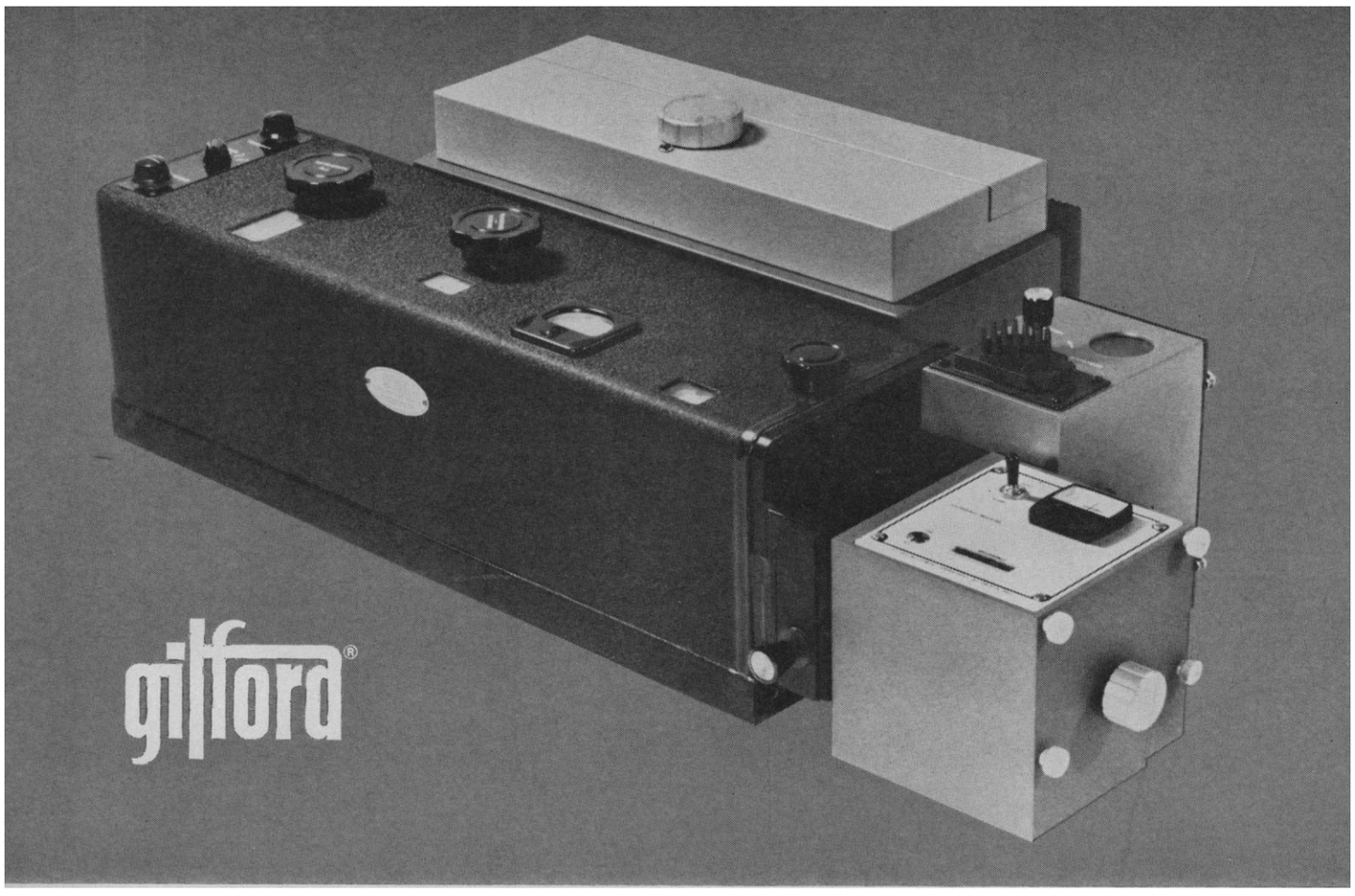

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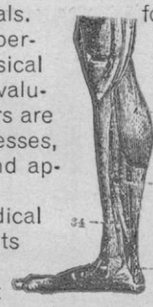

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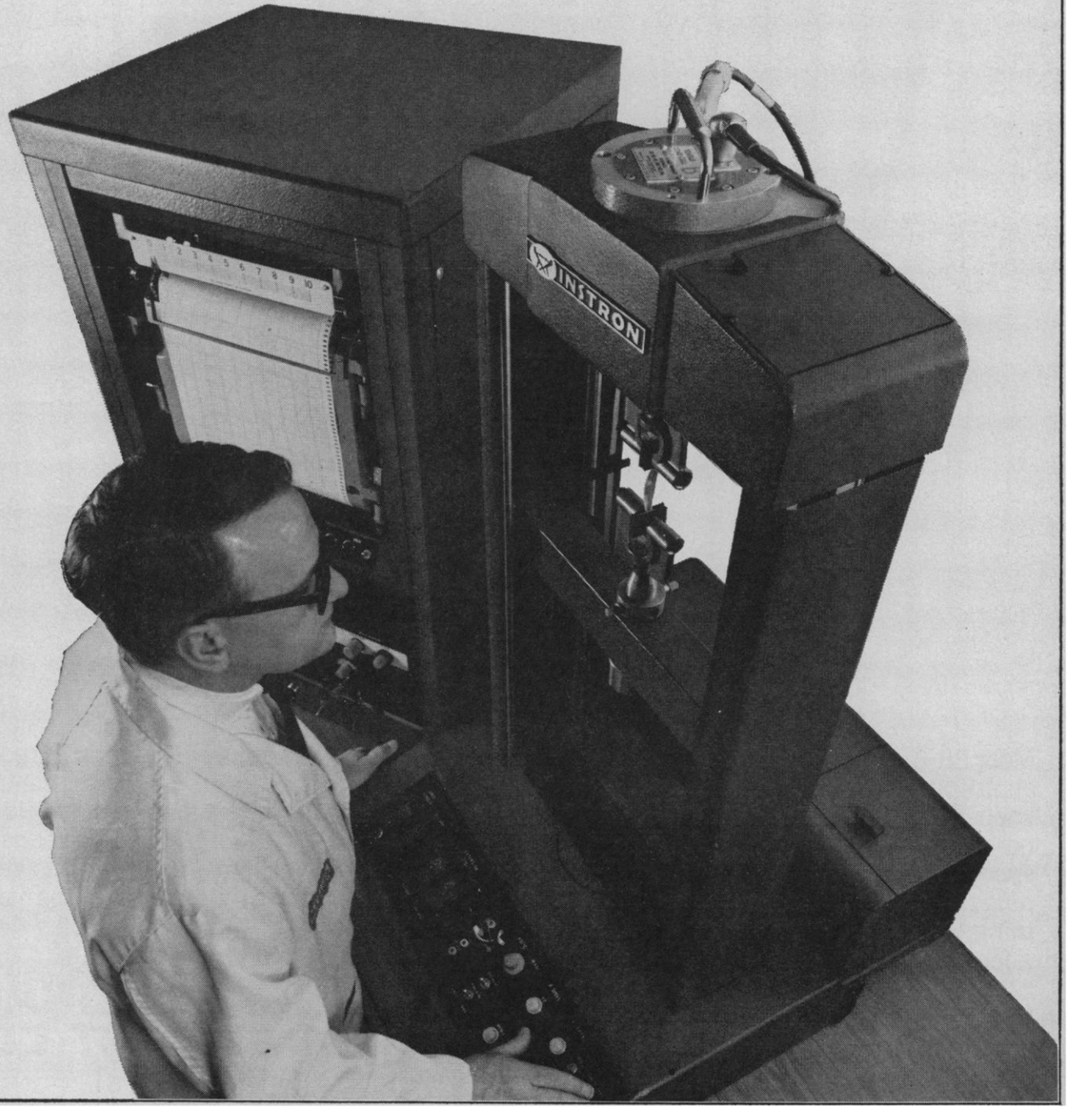

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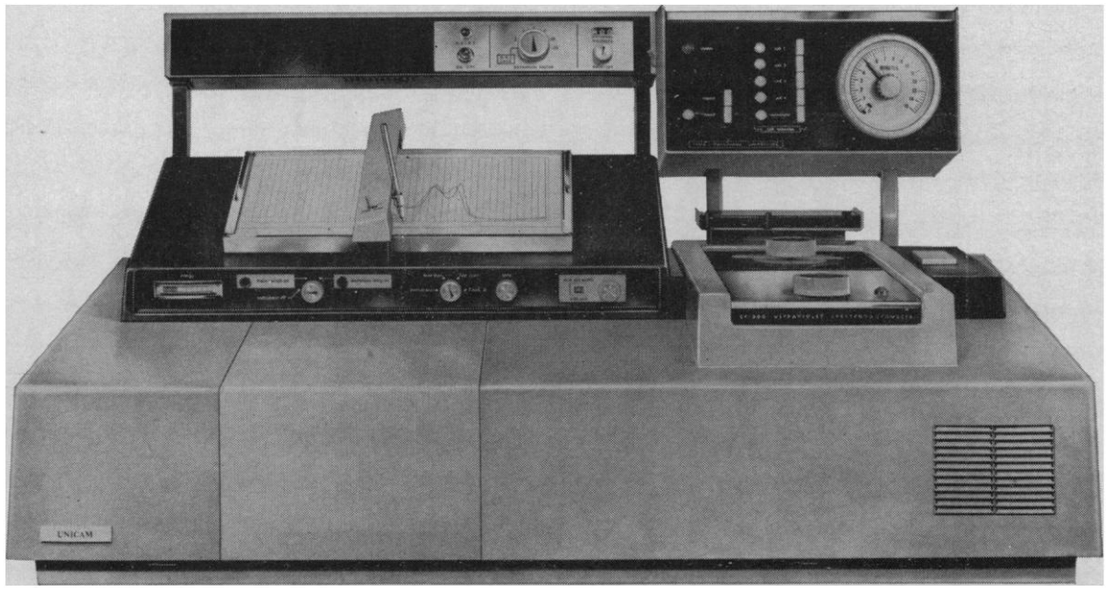

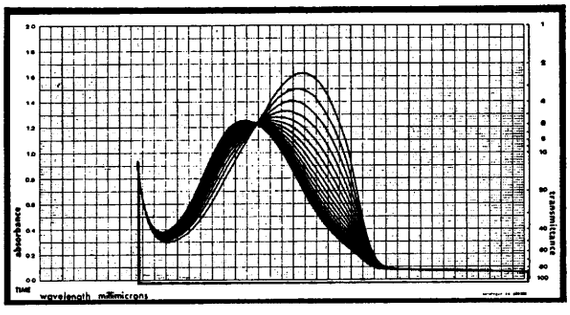

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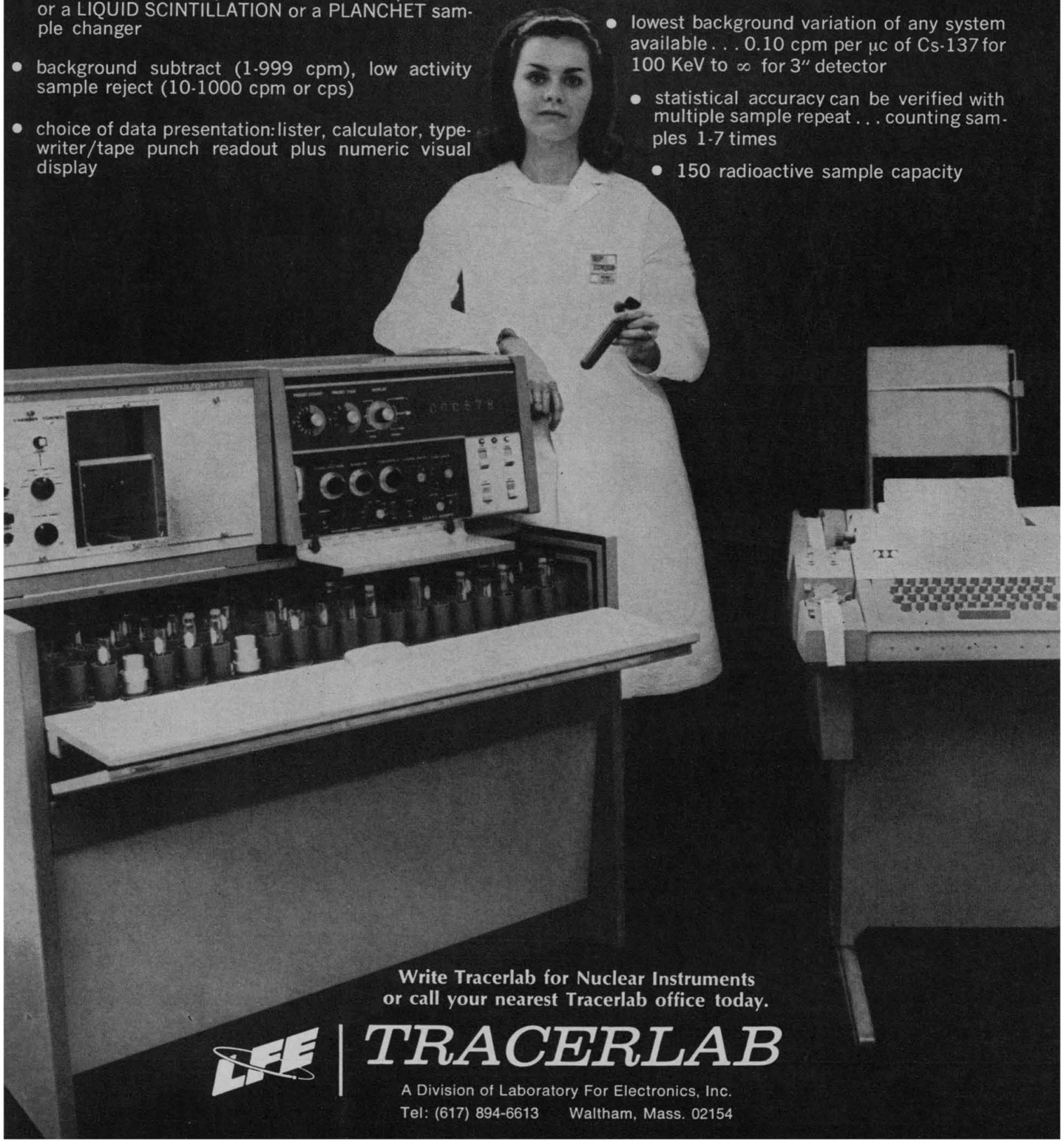

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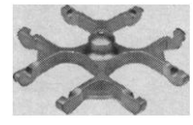

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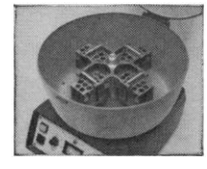

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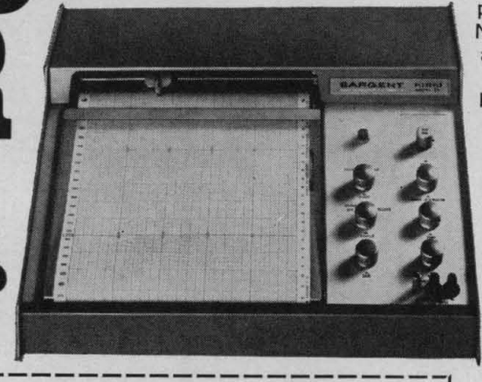

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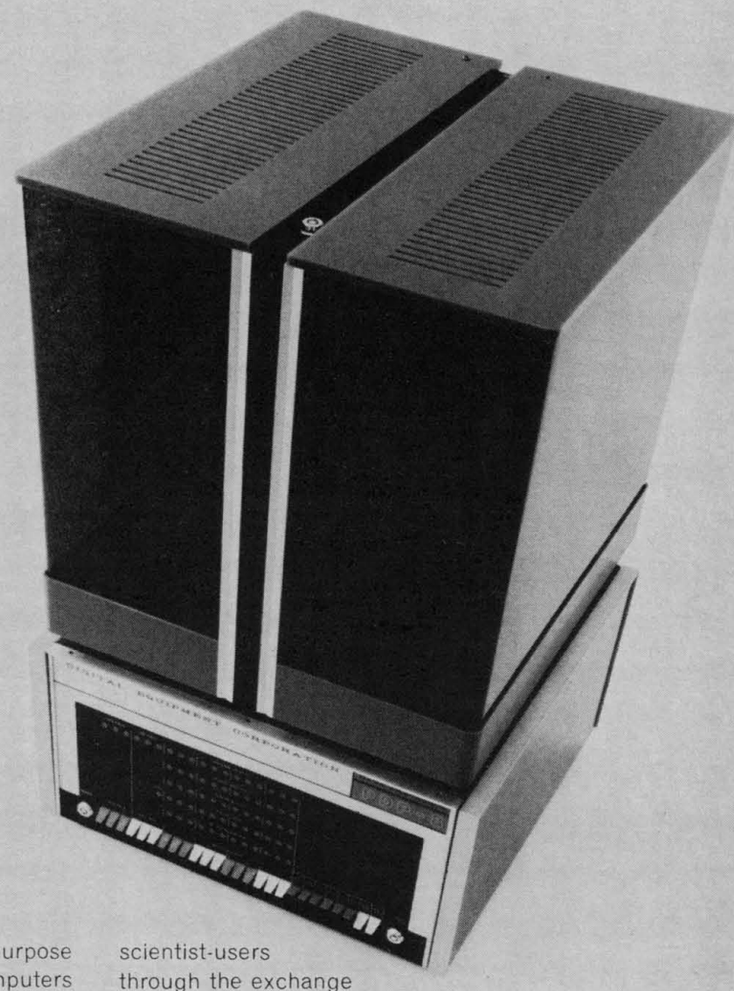

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because it changed man's attitude toward himself. I wonder if this is a practical application?

Supporters of democracy share the opinion that scientists ought to feel obligated to explain to taxpayers (and, even more important, to themselves) why their work should go on. But Greenberg's peculiar twists of the subject suggest to me that he may not yet know what basic research is all about. DuBridge's remark that adequate support for research can be nothing less than that which gives every competent researcher adequate support can only be qualified in terms of societal affluence. Such qualification becomes complicated only when it becomes divorced from adjusting standards of competence. Is there an imaginative person anywhere who would not be depressed that growing societal complexity might foster increasing bureaucratic tendencies to look askance at scientific endeavors just because they lack visible technical applications at their inception?

When Greenberg speaks of "the profession" of science, I wonder if he knows what is conveyed by the singular? I would suggest, incidentally, that democracy, in which education, citizen participation, and therefore communication (as between scientists and nonscientists) and self-correction, are at their best, is probably as close to science as one can get in politics. Paraphrasing George Simpson again, science is just a self-correcting method of learning about the universe, and the data of science are observations that any normal person can understand. I certainly include in that understanding the why as well as the what and how. When Greenberg intimates, as many scientists also have, that the American public cannot understand basic research, and therefore when we go to the public for support we must define basic research by making it "mission-oriented," this is an insult, a dismal prospect, and a step backward, both politically and scientifically. There is no "issue of whether too much basic research is disengaged and remote from practical application," for basic research is not defined in terms of its proximity to practical application.

Bennett is quoted as saying that when nonscientists argue that too much basic research is disengaged, this cannot be labelled as "special pleading." For the very reason that they are taxpaying nonscientists, it *can* be labelled as special pleading. We have indeed been reluctant, in basic research, to "make qualitative judgments," "set priorities," or "jettison excess baggage." The only error in this is when it has taken the form of reluctance to identify individual incompetence. Priorities cannot otherwise be imposed appropriately or profitably from the outside. Can biochemists decide about the competence of people in biological systematics (or vice versa) —or can either group decide that the whole field is a waste of time, and therefore, *by definition*, no one in the field is competent? The best we can do to accomplish proper focus in basic research is to make absolutely certain that we are doing the best possible job of selecting and promoting competence in every field. The best "selective mechanism" is then automatically operative, for trivial questions are identified and effectively put aside by competent investigators.

RICHARD D. ALEXANDER
Department of Zoology,
University of Michigan, Ann Arbor

Greenberg's article notes that various scientific bodies now have formed or are considering forming committees on public affairs. The American Society for Pharmacology and Experimental Therapeutics has had a very active committee on public affairs since August 1965.

It is worthy of notice, however, that if such committees concern themselves only with public relations and the matter of research support that should be available for the disciplines they represent they will not be performing their proper role. A public affairs committee of any scientific, or other organization, should be cognizant of, study, and then provide advice and counsel on all types of legislative proposals falling within its realm to the legislative and executive branches of government, whether on the federal, state, or local level. The committee on public affairs of the Pharmacology Society has functioned in this way. Once the usefulness of a scientific discipline in this realm is recognized, I do not think it will be difficult to convince those responsible for appropriating public funds that it is in the public interest to support research at a respectable level. After all, it is the proper function of government to promote the general welfare of its citizenry.

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The purpose of the article in question was to *describe* a significant change of opinion among persons who occupy influential positions in the federal government's dealings with the scientific community. I believe it is desirable for scientists to be informed of such changes, and I also believe it is important for them to recognize a distinction between description and advocacy.

—D.S.G.

Exporting Ph.D's: Is It Profitable?

If the process of growing brains were put into the same category as a tree crop such as nuts or oranges, I think we would find that the export side of the industry, properly planned and managed, would have an attractive economic potential for a number of underdeveloped countries. These overpopulated areas traditionally seek new industries which use lots of labor, very little land, and which can cater to the export market. The education industry meets all three criteria. An educational institution is extremely labor intensive, with perhaps 80 percent of the total costs going directly into payroll while the remaining 20 percent stimulates rather directly such labor intensive industries as building and publishing. As for the exportability of the products, markets seem to be expanding in Europe and North America for mathematicians, scientists, engineers, and medical personnel. Unlike nuts or oranges, we have to consider the desires of the product—whether or not significant numbers of degree holders wish to be exported. Ample evidence indicates they do.

By producing such educational products for both domestic consumption and export, the country could benefit from a good return on its investment in the export side of the industry, and from economies of scale, that is, cheaper unit costs on the domestic side. To estimate a proper return on the investment, an accountant would use much the same procedures as he does for a tree crop. He would include in the cost everything which the family and the community spend on a young person between the completion of compulsory education and the bestowing of the degree. He would also include an allowance for income foregone (on a monetary investment that might otherwise have been drawing interest), for crop insurance (for those students that fall by the wayside), for income tax foregone (had the young man started working in his early teens), and so forth.

A rough calculation indicates that it might cost about $4000 to produce a Ph.D., f.o.b., at the international airport in Taipei or Bombay. Given suitable employment in the United States, it ought to be easy for him to pay back the $4000 plus interest and profit at a rate of at least $500 to $750 a year within 10 years.

It would not be surprising to discover that most of the students already send home this much money without any compulsion. Perhaps the problem is that they pay it all to the family, ignoring the government's investment. In a properly managed education-for-export industry the returns on the investment could be allocated rationally. And the employer of our Ph.D. might be persuaded to contribute.

If returns on investments were very good, foreign capital might wish to invest in the education-for-export industry. Parents of potential exportees would be willing to invest more of their own money in their advanced education. Such investors would then worry lest their products could not be exported, and, like surplus oranges, rot. The main problem is not that a brain drain is innately uneconomic for the underdeveloped country, but that it is uneconomic if badly managed.

The complaints most frequently heard relate to the exportation of brains which are not surplus to domestic requirements, a serious form of bad management. Just how uneconomic this is can be comprehended by considering the cost of an imported expert. To replace an essential Ph.D. in Taiwan or India, earning about $1000 to $3000 a year, by an expert from the United Nations, might cost about $25,000 a year in terms of salary, travel, allowances, and U.N. overhead. (Much of this amount would come ultimately from the developed countries which contribute heavily to the U.N.) Some other foreigner might be found who would cost less.

If our essential Ph.D. who emigrates is not replaced and, as a result, a power plant cannot operate or the Prime Minister gets bad advice, the economic loss would be much greater than the cost of his replacement; exactly how great we have no way of knowing.

Too much discussion on the economics of the brain drain seems to

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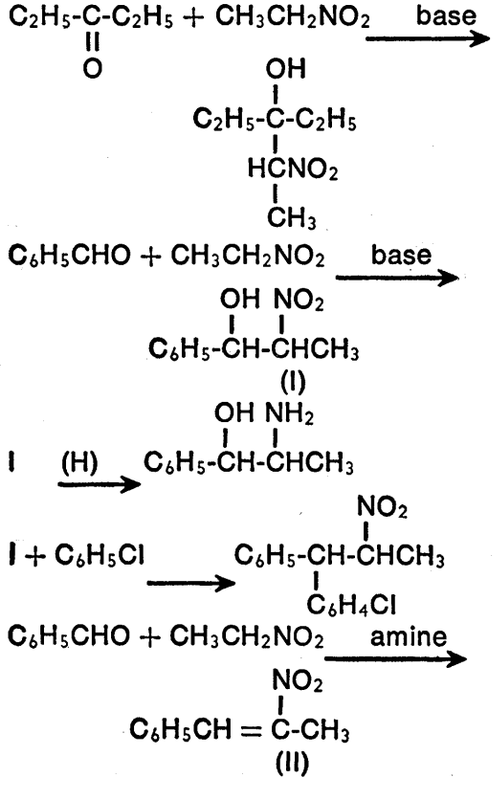
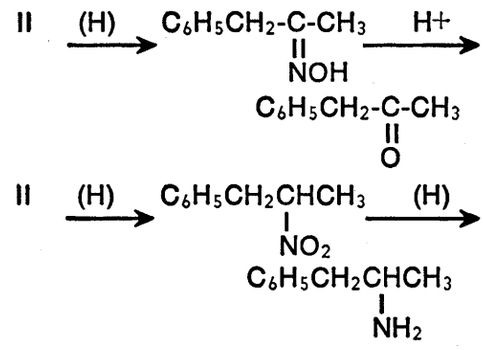
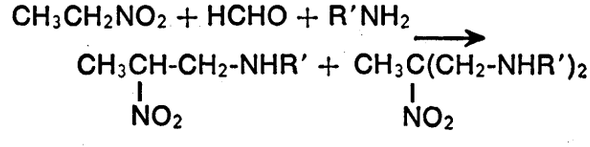
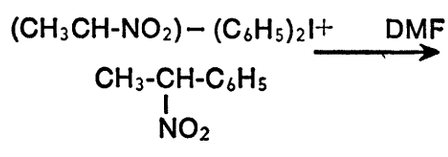




2 Mannich Base Formation



3 Phenylation on the Alpha-Carbon



Properties of Nitroethane:

Molecular weight	75.07
Freezing point	–90° C
Boiling point at 760 torr	114.0° C
Specific gravity at 20/20° C	1.052
Viscosity at 25° C	0.668 cp
Solubility in water at 20° C	4.5% by vol.
Solubility parameter	11.1

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have been devoted to attempting to show that the brain drain either is, or is not, an economic loss to the underdeveloped country, or is, or is not, moral. Too little is related to how a brain flow could be arranged to benefit all parties concerned. This is a subject worthy of our ingenuity. Such ingenuity on the part of the Turkish government converted its labor, which was being drawn to Germany, from an insignificant source of foreign exchange to a very important one (*1*). In 1965 remittances were slightly less than Turkey's second ranking commodity export —tobacco—and slightly more than the third—nuts.

ALICE W. SHURCLIFF
1661 Crescent Place, NW,
Washington, D.C. 20009

Reference

1. R. H. Eldridge, *Middle East J.* **20**, 296 (1966).

Captain Levy and the Army System

The review of the court-martial of Captain Levy ("News and Comment," 9 June, p. 1346) deals fairly with the matter of ethics but leaves open for discussion the eternal question of accepting responsibility for the ultimate use that is made of one's research, teaching, or other activities. What is glossed over too lightly is the question of whether the "system over which he had no control" not only had the "power to put him in jail," but actually went out of its way to do so.

During my years of army service I learned that the military had several methods of protecting itself against unusual individuals who would not fit into the system. The simplest was not to take them in the first place. The most common was to assign the nonconformist to some remote installation or to unpleasant duties. Finally, there was the administrative discharge for the unpleasant character who kept getting into minor difficulties with authority or simply would not adapt to military life.

In the case of Howard Levy, it appears that the United States Army chose to ignore the usual courses of action and deliberately placed the Captain in a position where he would quite obviously be in technical violation of military law and would be subject to prosecution.

Although the court material was conducted properly, the entire episode not only restricted his rights as an individual but cast a cloud over the rights of all of us under the First Amendment. Certainly the spectacle of placing Doctor Levy in handcuffs can only serve to reinforce the impression that a special case was being made in order to intimidate others who might think of questioning our current policies in either foreign or domestic affairs.

It is impossible to believe that Levy as an individual poses a threat to the security of our country. If we were not so actively involved in protecting the rights of nations around the world, Doctor Levy would not be in a position where his individual rights would be endangered. If it is impossible to fulfill our international commitments without restricting our basic freedoms at home, perhaps it is time to reconsider these commitments. In a democracy it is not the function of the military to enforce adherence to certain political beliefs.

LAWRENCE BERGNER
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Langer closes her report with the following statement:

> The most unsettling thing about Howard Levy's trial was the fact that a system over which he had no control, whose purposes were not his purposes, and whose values were not his values had sufficient power to put him in jail for committing crimes that to him were the opposite of crimes.

Is Langer suggesting that the only type of trial that she would not find "unsettling" is one in which the defendant admits that he has committed a crime or in which he accepts the purposes and values of the system that is trying him? If so, how does she feel about the Nuremberg war crimes trials? Since the defendants certainly did not consider it a crime to murder millions of human beings, and even more certainly did not accept the purposes and values of the victorious powers, there presumably was little basis for a trial by her criteria.

With all due respect for Captain Levy's opinions, surely even the most democratic society cannot be expected to let each individual decide for himself what constitutes a crime.

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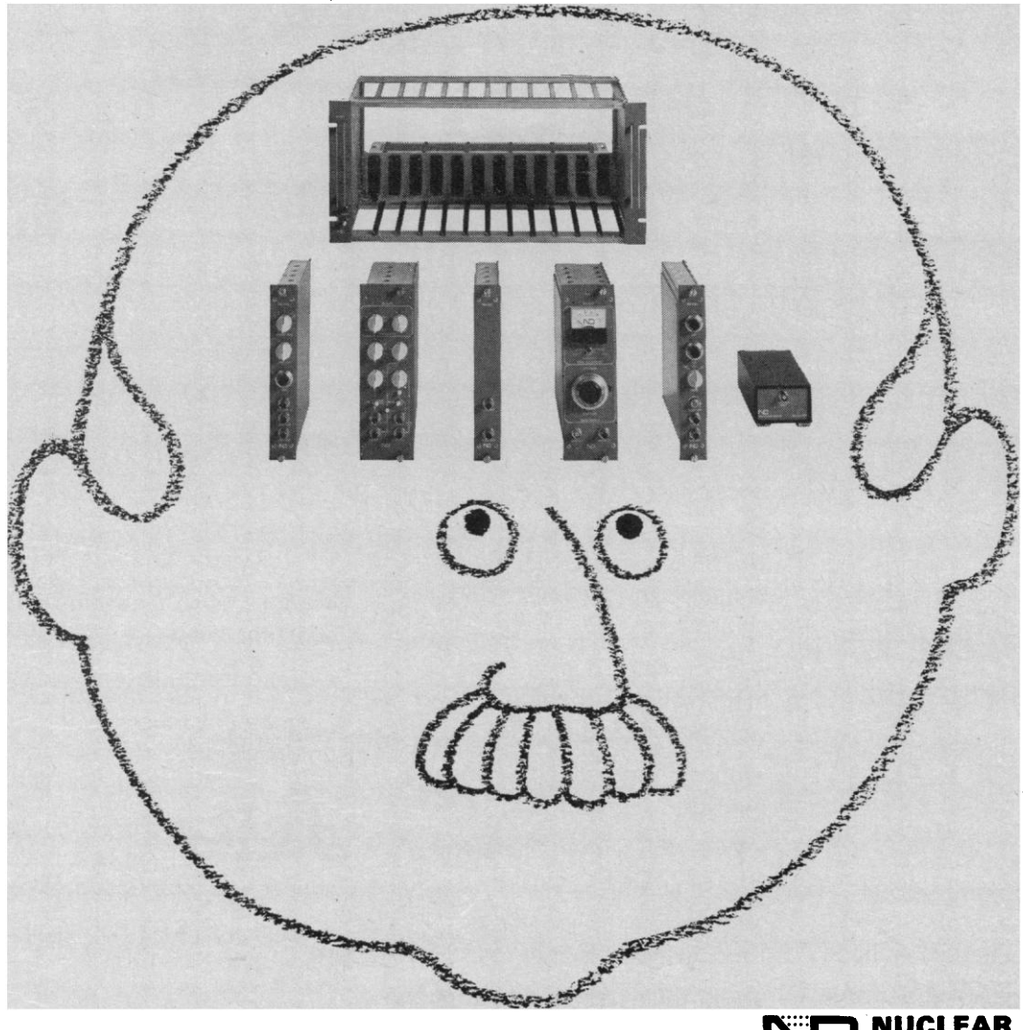

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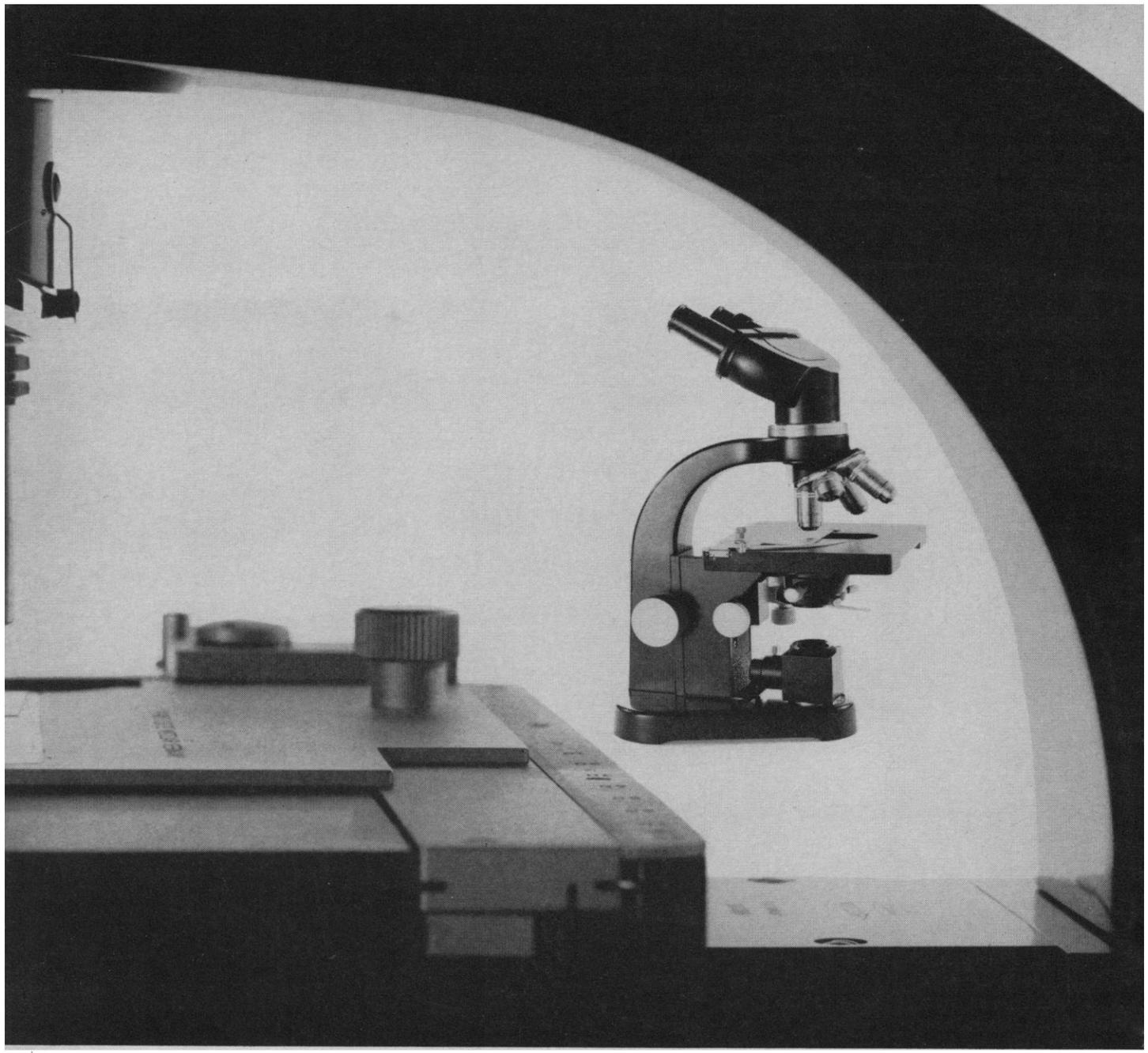

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14 July 1967, Volume 157, Number 3785 **SCIENCE**

Clinical Investigator, Patient, Pharmaceutical Industry, and Federal Agencies

There has always been need for a responsible relation among clinical investigators, patients, federal government, and the pharmaceutical industry.

Two questions of special concern are, (i) how the environment can be improved to provide better clinical evaluation of drugs, and (ii) how the patient and investigator can be protected against the many hazards inherent in such experiments. These questions were the concern of a conference held in Bethesda, Maryland, on 27 August 1966 and reported in the June 1967 issue of the *American Journal of Cardiology*. Some highlights follow.

Where feasible, the research project should be approved by an appropriate panel of peers before it begins, but such approval does not lessen or limit the responsibility of the investigator, or the rights of the participants. Consent is not implied and, therefore, must be explicit and specific if (i) the physican employs original, untested, or experimental substances, procedures or dosages; (ii) new substances or procedures are being investigated; or (iii) there is no obvious or justifiable benefit to the patient.

The investigator must keep adequate records, with safeguards such as coding of names, to protect the privacy of the patient. Timely submission of adequate reports to sponsors is mandatory. Records should be retained for the period required by law and should be available for review by legally authorized agents.

For mutual protection, the pharmaceutical manufacturers should provide either the cost of liability insurance or indemnification of the investigator for any damages incurred from alleged claims of injury due to the investigation.

For its part, industry must continue to move beyond the present standards of demonstrated "safety" and "efficiency" toward a basic understanding of drug interactions in human beings. Animal testing procedures should be improved so that they become more predictive of safety and effectiveness in man, to cut down on extensive, costly studies of dubious value.

The Food and Drug Administration is urged to continue to allow close association by industry and FDA technical people on specific drug problems, because only in this manner will new therapeutic agents be rapidly and efficiently evaluated. The FDA should keep the public informed through the usual news media, but should explore the possibility that some statements of policy or actions be released initially only to the medical and scientific press. This would avoid public condemnation of drugs, too often based on ignorance fostered by sensational news reporting. The FDA should try to keep the public aware that progress in medicine requires that some inherent risks be taken.

Responsible individuals should work actively toward broad understanding of the importance of preserving the present overall patent system in the drug field. It has been a major stimulus to the drug-research effort. There needs to be liberalization of the government patent policy on developments occurring in projects financed, in part, by government grants, and active encouragement of scientific collaboration among pharmaceutical company, government, and academic scientists toward a speedup of drug development. A great industry must not be allowed to languish because of past mistakes and their correction by punitive actions.—IRVINE H. PAGE, *Cleveland Clinic*

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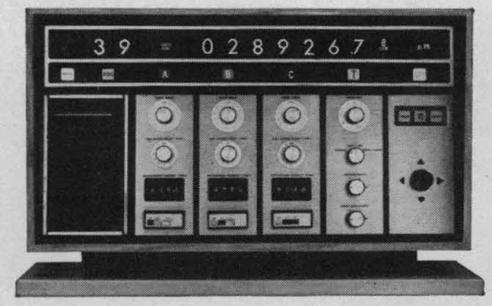

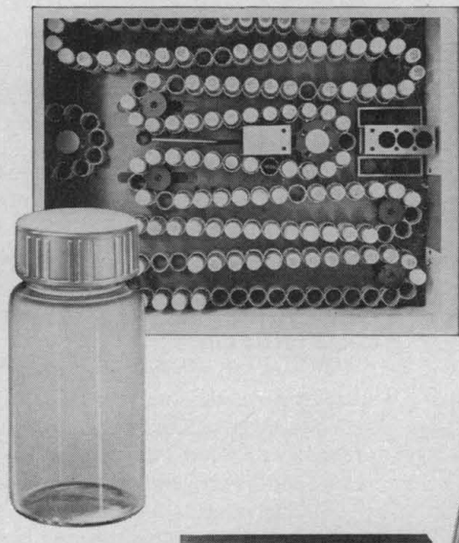

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Regarding the consequences of saving lives of people with various genetically determined defects which then run the possibility of being passed on to posterity, Peter Medawar (National Institute for Medical Research, London) was optimistic in believing that progress in medicine was sufficiently speedy to compensate for the enzymatic and genetic defects that are capable of being perpetuated.

Thomas Starzl (University of Colorado, Denver) urged prompt reporting of bad results and failure in the transplantation of organs, no matter how awkward or embarrassing such confessions might be. Such information could forestall repetition of mistakes by others.

Rene Dubos (Rockefeller) saw some incongruity in allowing free range for physicians and scientists to limit their research to what personally happens to interest them while many health problems of serious public importance are being ignored. Dubos cited as two recent examples the long-term effects of pesticides as first popularized by Rachel Carson and the safety of automobiles questioned by Ralph Nader. Dubos doubted that either of these fields would be popular research ventures for young scientists in spite of the importance of these subjects as acknowledged through a series of congressional investigations.

The Honorable Warren E. Burger (Judge of the United States Court of Appeals, Washington, D.C.) emphasized the tendency of the law to lag behind public consensus. The judge urged physicians and scientists to take more initiative in keeping the public informed of advances in knowledge which justify changes in the law.

MARSEILLE SPETZ, M.D.
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Calendar of Events

July

31–4. **Mammalian Oviduct**, symp., Pullman, Wash. (E. S. E. Hafez, Reproduction Lab., Washington State Univ., Pullman 99163)

31–4. Association for the Advancement of **Medical Instrumentation**, annual mtg., San Francisco, Calif. (J. J. Post, Box 314, Harvard Sq., Cambridge, Mass. 02138)

31–4. **Particulate Matter** Systems, conf., Milwaukee, Wis. (United Engineering Center, 345 E. 47 St., New York 10017)

August

6–9. **Heat Transfer**, 10th conf., Seattle, Wash. (ASME, 345 E. 47 St., New York 10017)

7–9. **Cryobiology**, 4th annual mtg., Washington, D.C. (V. P. Perry, Tissue Bank, NMRI-NNMC, Bethesda, Md. 20014)

7–11. Engineering of Unconventional **Protein Production**, conf., Santa Barbara, Calif. (Engineering Foundation, 345 E. 47 St., New York 10017)

7–11. **Topological Dynamics**, symp., Fort Collins, Colo. (J. Auslander, Dept. of Mathematics, Univ. of Maryland, College Park 20740)

9–11. Applications of **X-Ray Analysis**, 16th annual conf., Denver, Colo. (J. B. Newkirk, Metallurgy Div., Univ. of Denver, Colo. 80210)

10–12. **Lessons from Revolution**, symp., San Francisco, Calif. (W. J. Monihan, Univ. of San Francisco, San Francisco 94117)

13–16. **Soil Conservation** Soc. of America, 22nd annual meeting, Des Moines, Iowa. (7515 NE Ankeny Rd., Ankeny, Iowa 50021)

13–17. **Energy Conversion** Engineering, 2nd conf., Miami Beach, Fla. (ASME, 345 E. 47 St., New York 10017)

14–16. **Astrodynamics**, Guidance, and Control, conf., Huntsville, Ala. (American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

14–17. National **Medical** Assoc., St. Louis, Mo. (S. C. Smith, 520 W St., NW, Washington, D.C. 20001)

15–18. American **Dietetic** Assoc., Chicago, Ill. (R. M. Yakel, ADA, 620 N. Michigan Ave., Chicago)

20–23. American **Phytopathological** Soc., Washington, D.C. (J. P. Fulton, Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville 72701)

20–25. American **Crystallographic** Assoc., Minneapolis, Minn. (T. Zoltai, Dept. of Geology and Geophysics, Univ. of Minnesota, Minneapolis 55455)

20–25. American Soc. of **Parasitologists**, 42nd annual mtg., Tucson, Ariz. (D. V. Moore, Univ. of Texas, Southwest Medical School, Dallas 75235)

21–23. **Cryogenic Engineering**, conf., Palo Alto, Calif. (K. D. Timmerhaus, c/o Engineering Center, AD 1-25, Univ. of Colorado, Boulder)

21–25. American Assoc. of **Clinical Chemists**, 18th annual mtg., Philadelphia, Pa. (M. E. Rylan, 318 Rodman Ave., Jenkintown, Pa. 19046)

21–25. **Complex Problem Solving**, conf., Andover, N.H. (S. S. Cole, Engineering Foundation, 345 E. 47 St., New York 10017)

21–25. **Poultry Science** Assoc., 56th annual mtg., Durham, N.H. (C. B. Ryan, c/o Texas A&M Univ., College Station 77843)

23–25. **Estuarine Pollution**, natl. symp., Stanford, Calif. (R. M. Kennedy, Kennedy Engineers, 604 Mission St., San Francisco, Calif. 94105)

23–25. **Gas Dynamics** Symp., Evanston, Ill. (The Symposium, Northwestern Univ., Evanston)

23–25. Wave Propagation and Dynamic Properties of **Earth Materials**, symp., Albuquerque, N.M. (G. E. Triandafilidis,

Univ. of New Mexico, P.O. Box 188, University Station, Albuquerque 87106)

23–26. American **Physiological** Soc., fall mtg., Washington, D.C. (Executive Secretary, 9650 Wisconsin Ave., Bethesda, Md.)

24–26. **Phytochemical** Soc. of America, annual mtg., Madison, Wis. (T. J. Mabry, Univ. of Texas, Austin 78712)

25–1. American Soc. for **Pharmacology and Experimental Therapeutics**, fall mtg., Washington, D.C. (Executive Officer, 9650 Wisconsin Ave., Bethesda, Md.)

27. American Assoc. of **Electromyography and Electrodiagnosis**, annual mtg., Miami Beach, Florida. (M. K. Newman, 16861 Wyoming Ave., Detroit, Mich. 48221)

27–1. American Congr. of **Physical Medicine and Rehabilitation**, 45th annual session, Miami Beach, Fla. (Executive Director, 30 N. Michigan Ave., Chicago, Ill.)

27–1. American Inst. of Biological Sciences, 18th annual mtg., College Station, Tex. (AIBS, 3900 Wisconsin Ave., NW, Washington, D.C.)

The following societies will meet in conjunction with the AIBS. Additional information is available from AIBS or from the program chairmen listed below.

American **Bryological** Soc. (Secretary Treasurer, Box 36, S.W. Missouri State College, Springfield)

American Soc. for **Horticultural Science**. (Executive Director, 615 Elm St., St. Joseph, Mich. 49085)

American Soc. of **Human Genetics**. (c/o Division of Medical Genetics, Dept. of Medicine, Johns Hopkins Hospital, Baltimore 5, Md.)

American Soc. of **Naturalists**. (Executive Director, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

American Soc. of **Plant Physiologists**. (Secretary, c/o Dept. of Biology, Yale Univ., New Haven, Conn. 6520)

American Soc. of **Plant Taxonomists**. (Secretary, c/o Botany Dept., Univ. of California, Berkeley)

Botanical Soc. of America. (Secretary, c/o Botany Dept., Indiana Univ., Bloomington)

Ecological Soc. of America. (Secretary, c/o Ecology Section, Health Physics Div., Oak Ridge National Lab., Oak Ridge, Tenn.)

Genetics Soc. of America. (Executive Director, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

Mycological Soc. of America. (Secretary-Treasurer, c/o Pioneering Res. Div., Natick Labs., Natick, Mass.)

28–30. Gatlinburg Conf. on Special Topics in **Nuclear Education and Research**, Gatlinburg, Tenn. (J. E. Mott, Oak Ridge Associated Universities, Box 117, Oak Ridge, Tenn. 37830)

28–30. Preparation and Properties of **Electronic Materials**, 9th annual conf., New York, N.Y. (L. R. Weisberg, RCA Labs., David Sarnoff Research Center, Princeton, N.J. 08540)

28–30. **Space** Program Issues of the 70's, conf., Seattle, Wash. (AIAA, Meetings Manager, 1290 Sixth Ave., New York 10019)

28–31. **Clay Minerals** Soc., 16th natl. conf., Golden, Colo. (L. G. Schultz, U.S.

Geological Survey, Bldg. 25, Federal Center, Denver, Colo. 80225)

28–1. **Electron Microscope** Soc. of America, 25th annual mtg., Chicago, Ill. (Executive Director, c/o School of Chemical Engineering, Olin Hall, Cornell Univ., Ithaca, N.Y. 14850)

28–2. **Alaska Science** Conf., 18th, College. (P. Morrison, Inst. of Arctic Biology, Univ. of Alaska, College 99735)

29–31. Association for **Computing Machinery**, 22nd natl. conf., Washington, D.C. (T. Willette, Box 6, Annandale, Va. 22003)

29–1. **Electron Microscopy** Soc. of America, annual mtg., Chicago, Ill. (A. V. Loud, Pathology Dept. College of Physicians and Surgeons, Columbia Univ., 630 W. 168 St., New York 10032)

31–2. American **Physical Soc.**, Seattle, Wash. (Executive Secretary, 538 W. 120 St., New York 10027)

31–6. American **Psychological** Assoc., annual mtg., Washington, D.C. (APA, 1200 17th St., NW, Washington 20036)

International and Foreign Meetings

August

6–9. International Union Against the **Venereal Diseases and the Treponematoses**, 25th general assembly and technical conf., Munich, Germany. (G. A. Canaperia, Via Salaria 237, Rome, Italy)

7–12. **Computers and Human Development**, Kuala Lumpur, Malaysia. (C. C. Yoon, Dept. of Mathematics, Univ. of Malaya, Kuala Lumpur)

7–12. Hungarian Soc. of **Mechanical Engineers**, Intern. Spectroscopy Colloq., Debrecen, Hungary. (L. Prockl, The Society, Szabadság tér 17, Budapest V, Hungary)

7–19. **Sedimentology**, 7th intern. congr., Reading, England, and Edinburgh, Scotland. (Sedimentology Research Lab., Dept. of Geology, Univ. of Reading, Whiteknights Park, Reading, Berks., England)

8–12. Acta **Endocrinologia**, 6th congr., Helsinki, Finland. (B. A. Lamber, University Central Hospital, Haartmaninkatu 4, Helsinki 29)

9–11. Association of American **Feed Control** Officials, 57th annual, Toronto, Canada. (B. Poundstone, Agricultural Experiment Sta. Bldg., Univ. of Kentucky, Lexington 40506)

10–17. World Congr. of the **Deaf**, 5th, Warsaw, Poland. (Polish Assoc. of the Deaf, The Principal Board, 1-3, Jezuicka Str., Warsaw 40)

11–17. **Apiculture**, 21st intern. congr., College Park, Md. (J. I. Hambleton, Univ. of Maryland, College Park 20742)

13–17. Canadian **Pharmaceutical** Assoc., annual mtg., Toronto, Ont., Canada. (175 College St., Toronto 2B)

13–19. Social **Psychiatry**, 2nd intern. congr., Amsterdam, Netherlands. (M. S. Jones, Intern. Assoc. of Social Psychiatry, Dingleton Hospital, Melrose, Scotland)

14–17. Controlled **Fusion and Plasma Physics**, 2nd European conf., Stockholm, Sweden. (Mrs. B. Törnell, Div. of Plasma Physics, The Royal Inst. of Technology, Stockholm 70)

14–18. Australian **Spectroscopy**, 6th conf., Brisbane. (D. James, Univ. of Queensland, St. Lucia, Brisbane, Queensland)

14–18. **Operations Research** Around the World Mtgs., Kyoto and Tokyo, Japan. (J. E. Walsh, Systems Development Corp., Santa Monica, Calif.)

14–19. International Federation for **Medical and Biological Engineering**, 7th conf., Stockholm, Sweden. (Secretary-General, The Conference, Stockholm 60)

14–22. Rehovoth Conf. on **Health Problems in Developing States**, Jerusalem and Rehovoth, Israel. (A. Manor, P.O.B. 150, Rehovoth)

16–18. Colloqium on the **Gravitational N-Body Problem**, Paris, France. (G. M. Clemence, Yale Univ. Observatory, Box 2023, Yale Station, New Haven, Conn. 06520)

16–23. International Assoc. of **Scientific Hydrology**, symp. on computation of maximum floods, Leningrad, U.S.S.R. (World Meteorological Organization, 41, av. Giuseppe Motta, Geneva, Switzerland)

19–25. International Union of **Biochemistry**, 7th intern. congr., Tokyo, Japan. (Secretariat, c/o Dept. of Chemical Pathology, Guys Hospital Medical School, London S.E.1, England)

19–26. International **Geological** Congr., 23rd, Prague, Czechoslovakia. (M. A. Dudek, Ustredni Ustav geologicky, Malostranske nam. 19, Prague 1, Czechoslovakia)

20–23. American Soc. of **Agricultural Engineering**, Quebec City, Canada. (M. Y. Chartier, Faculté d'Agriculture, Univ. Laval, Cité Universitaire, Québec 10e)

20–24. Society for **Industrial Microbiology**, annual mtg., London, Ont., Canada. (S. Rich, Dept. of Plant Pathology and Botany, Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven 06504)

20–24. **Biological Photographic** Assoc., 37th annual mtg., Toronto, Ont., Canada. (S. Klosevych, Terminal A, P.O. Box 33, Ottawa 2, Ont.)

20–25. **Biometrics**, 6th intern. conf., Sydney, Australia. (H. L. Leroy, Laboratory for Biometrik and Populationsgenstik, EIDG. Tech. Hochschule, Zurich, Switzerland)

21–24. **Entomological** Soc. of Canada, Ste. Anne de Bellevue, P.Q., Canada. (R. Blais, Forest Entomology and Pathology Laboratory, P.O. Box 35, Sillery, P.Q.)

21–24. World Meeting on **Medical Law**, Ghent, Belgium. (R. Dierkens, Apotheekstraat 5, Ghent)

21–25. **Microscopy**, 14th intern. symp., Cambridge, England. (Mrs. S. Graft, MICRO-67, McCrone Research Inst., 451 E. 31 St., Chicago, Ill. 60616)

21–26. **Psychotherapy**, 7th intern. congr., Wiesbaden, Germany. (Secretary General, Westfalisches Landfskrankenhaus, 483 Gutersloh, Germany)

21–2. New Theories in **Medical Practice**, intern. congr., Merano, Italy. (W. Grune, Kongressbüro der Bundesärztekammer Haedenkampstr. 1, 5000 Köln-Lindenthal, Germany)

22–25. Institute of **Management Sciences**, 14th annual intern. mtg., Mexico City, Mexico. (C. Gibson, Ford Foundation, Reforma 243-7 Piso, Mexico 5, D.F.)

22–25. **Nematology**, 9th intern. symp., Warsaw, Poland. (H. Sandner, c/o Inst. of Ecology, Dept. of Applied Biology, Nowy Swiat 72, Warsaw)

22–31. International **Astronomical Union**, 13th general assembly, Prague, Czechoslovakia. (Asst. Secretary-General, Astronomical Institute, Czechoslovak Acad. of Sciences, Budecska 6, Prague)

23–25. Canadian Assoc. of **Physical Medicine and Rehabilitation**, 15th annual mtg., Winnipeg, Man., Canada. (Secretary-Treasurer, 153 Lyndhurst Ave., Toronto 4, Ontario)

23–25. **Computational Linguistics**, intern. conf., St. Martin-Dheres, France. (A. H. Roberts, Center for Applied Linguistics, 1717 Massachusetts Ave., NW, Washington, D.C. 20036)

24–28. **Anaesthesia**, 3rd intern. symp., Poznan, Poland. (W. Jurczyk, Ul. Dluga ½, Poznan)

24–28. **Marine Biology**, 2nd European symp., Bergen, Norway. (H.O. Brattstrom, Biological Station, Univ. of Bergen, Bergen)

25–30. Hyperfine Interactions Detected by **Nuclear Radiation**, intern. conf., Pacific Grove, Calif. (K. E. Sebrell, Lawrence Radiation Lab., Univ. of California, Berkeley 94720)

25–31. **Physical Medicine**, 5th intern. congr.; Montreal, P.Q., Canada. (B. Talbot, 6300 Darlington Ave., Montreal 26)

25–1. First Intern. **Health** Conf., Copenhagen, Denmark. (P. A. Wells, 90 Buckingham Palace Rd., London, S.W. 1, England)

25–2. **Logic, Methodology and Philosophy of Science**, 3rd intern. congr., Amsterdam, Netherlands. (Congress Secretariat, c/o Holland Organizing Centre, 16, Lange Voorhout, The Hague, Netherlands)

25–3. **Epidemiological** Assoc., 5th intern. mtg., Krakow, Poland. (R. M. Acheson, Dept. of Epidemiology and Public Health, Yale Univ. Medical School, 60 College St., New Haven, Conn. 06510)

27–1. Laurentian **Hormone** Conf., Mont Tremblant, P.Q., Canada. (The Conference, 222 Maple Ave., Shrewsbury, Mass. 1545)

27–2. **Ionization Phenomena in Gases**, 8th intern. conf., Vienna, Austria. (F. Viehbock, Osterreichische Studiengesfllschaft fur Atomenergie, Lenaugasse 10, 1082 Vienna VIII)

28–29. **Oxidation**, intern. symp., San Francisco, Calif. (T. Mill, Stanford Research Inst., Menlo Park, Calif. 94025)

28–29. International **Theoretical Physics** Conf. on Particles and Fields, Rochester, N.Y. (R. E. Marshak, Dept. of Physics and Astronautics, Univ. of Rochester, Rochester 14627)

28–30. American **Mathematical** Soc., Mathematical Assoc. of America, 72nd joint summer mtg., Toronto, Ont., Canada. (Executive Director, SUNY at Buffalo, Univ. of Buffalo, Buffalo, N.Y.)

28–30. Canadian Inst. of **Mining and Metallurgy**, 6th conf. of Metallurgists, Kingston, Ont., Canada. (The Inst., 906–1117 St. Catherine St., W., Montreal 2)

28–1. **Atomic Masses and Related Constants**, 3rd intern. conf., Winnipeg, Man., Canada. (H. E. Duckworth, Univ. of Manitoba, Winnipeg 19)

28–1. Reactions of **Oxygen with Organic Compounds**, intern. symp., San Francisco, Calif. (T. Mill, Stanford Research Inst., Menlo Park, Calif. 94025)

28–2. Canadian **Mathematical** Congr., Toronto, Ont., Canada. (The Congress, 985 Sherbrooke St., W., Montreal, Que.)

BOOKS RECEIVED

(Continued from page 184)

Early Cultures and Human Ecology in South Coastal Guatemala. Michael D. Coe and Kent V. Flannery. Smithsonian Press, Washington, D.C., 1967 (order from Superintendent of Documents, Washington, D.C.). 179 pp. Illus. Plates. $3.50. Smithsonian Contributions to Anthropology, vol. 3.

The Earth Beneath the Continents. A volume of geophysical studies in honor of Merle A. Tuve. Johns S. Steinhart and T. Jefferson Smith, Eds. American Geophysical Union, Washington, D.C., 1966. 683 pp. Illus. $16.50. Forty-three papers.

Essentials of Learning: An Overview for Students of Education. Robert M. W. Travers. Macmillan, New York, ed. 2, 1967. 574 pp. Illus. $7.95.

Estuary and Coastline Hydrodynamics. Arthur T. Ippen. McGraw-Hill, New York, 1966. 762 pp. Illus. $28.50.

Famine—1975! America's Decision: Who Will Survive? William Paddock and Paul Paddock. Little, Brown, Boston, 1967. 286 pp. Illus. $6.50.

Ferns. Robert H. Mohlenbrock. Feffer and Simons, London; Southern Illinois Univ. Press, Carbondale, 1967. 207 pp. Illus. $8. The Illustrated Flora of Illinois Series.

Field Theoretical Methods in Many-Body Systems. D. A. Kirzhnits. Translated from the Russian edition (1963) by A. J. Meadows. D. M. Brink, Ed. Pergamon, New York, 1967. 410 pp. Illus. $17.

Forest Hydrology. Proceedings of a National Science Foundation Advanced Science Seminar (University Park, Pa.), August–September 1965. William E. Sopper and Howard W. Lull, Eds. Pergamon, New York, 1967. 829 pp. Illus. $45. Eighty-five papers.

Geography and Manufacturing. Gunnar Alexandersson. Prentice-Hall, Englewood Cliffs, N.J., 1967. 160 pp. Illus. Paper, $1.95. Foundations of Economic Geography Series.

Greater London: An Industrial Geography. J. E. Martin. Univ. of Chicago Press, Chicago, 1967. 304 pp. Illus. $6.

Guide to the NMR Empirical Method: A Workbook. Roy H. Bible, Jr. Plenum Press, New York, 1967. 317 pp. Illus. $9.50.

Handbook of Chemistry. Compiled and edited by Norbert Adolph Lange and Gordon M. Forker. McGraw-Hill, New York, ed. 10, 1967. 2015 pp. Illus. $12.

Health-Seekers in the Southwest, 1817–1900. Billy M. Jones. Univ. of Oklahoma Press, Norman, 1967. 268 pp. Illus. $5.95.

Heteroatom Ring Systems and Polymers. H. R. Allcock. Academic Press, New York, 1967. 413 pp. Illus. $16.50.

The Imperial Order. Robert G. Wesson. Univ. of California Press, Berkeley, 1967. 561 pp. $10.

Inborn Disorders of Sphingolipid Metabolism. Proceedings of the Third International Symposium on the Cerebral Sphingolipidoses (New York), October 1965. Stanley M. Aronson and Bruno W.

Volk, Eds. Pergamon, New York, 1967. 529 pp. Illus. $20. Thirty-four papers.

Inorganic Hydrides. B. L. Shaw. Pergamon, New York, 1967. 152 pp. Illus. Paper, $3.75; cloth, $6. Commonwealth and International Library.

Institution and Outcome: A Comparative Study of Psychiatric Hospitals. Leonard P. Ullmann. Pergamon, New York, 1967. 213 pp. Illus. $7.50.

Instrumentation in the Chemical and Petroleum Industries. vol. 3. Proceedings of the Seventh National Chemical and Petroleum Instrumentation Symposium (San Francisco), May 1966. John T. Ward, Ed. Plenum Press, New York, 1967. 205 pp. Illus. $12. Twenty-two papers.

Introduction to Radio Astronomy. Roger C. Jennison. Philosophical Library, New York, 1967. 168 pp. Illus. $4.75.

Introduction to Semimicro Qualitative Analysis. C. H. Sorum. Prentice-Hall, Englewood Cliffs, N.J., ed. 4, 1967. 287 pp. Illus. $4.95. Prentice-Hall Chemistry Series.

Introduction to the Special Theory of Relativity. Claude Kacser. Prentice-Hall, Englewood Cliffs, N.J., 1967. 237 pp. Illus. Paper, $2.60.

Les Isotopes à l'Usage du Médecin Practicien. André G. Frère. Éditions Arscia, Bruxelles; Librairie Maloine, Paris, 1966. 159 pp. Illus.

Liquid-Phase Oxidation of Hydrocarbons. Nikolai Markovich Emanuel, Evgenii Timofeevich Denisov, and Zinaida Kushelevna Maizus. Translated from the Russian edition (Moscow, 1965) by B. J. Hazzard. Plenum Press, New York, 1967. 364 pp. Illus. $22.50.

The Living Stream: Evolution and Man. Sir Alister Hardy. Harper and Row, New York, 1967. 292 pp. Illus. $6.95.

Many-Body Description of Nuclear Structure and Reactions. Course 36, International School of Physics "Enrico Fermi." C. Bloch, Ed. Academic Press, New York, 1966. 607 pp. Illus. $26.50. Twenty-three papers.

Measuring the Southern Forest. Thomas D. Keister, Ed. Louisiana State Univ. Press, Baton Rouge, 1967. 196 pp. Illus. $5. Twelve papers.

Mental Illness and Social Processes. Thomas J. Scheff, Ed. Harper and Row, New York, 1967. 336 pp. Illus. Paper, $3.95. Readers in Social Problems Series. Twenty papers.

Metallurgical Thermochemistry. O. Kubaschewski, E. LL. Evans, and C. B. Alcock. Pergamon, New York, ed. 4, 1967. 515 pp. Illus. $11.75. International Series of Monographs in Metal Physics and Physical Metallurgy, vol. 1.

Methods in Computational Physics: Advances in Research and Applications. vol. 7, *Astrophysics.* Berni Alder, Sidney Fernbach, and Manuel Rotenberg, Eds. Academic Press, New York, 1967. 276 pp. Illus. $14.50. Five papers.

More Spectroscopic Problems in Organic Chemistry. Archibald J. Baker, Geoffrey Eglinton, Frank J. Preston, and Thomas Cairns. Heyden, London, 1967. Unpaged. Illus. Paper, $4. Spectroscopy in Education Series.

Morne-Paysan: Peasant Village in Martinique. Michael M. Horowitz. Holt, Rinehart and Winston, New York, 1967. 126

pp. Illus. Paper, $1.75. Case Studies in Cultural Anthropology Series.

Motor Fuels: Performance and Testing. William A. Gruse. Reinhold, New York, 1967. 287 pp. Illus. $12.

My Friends the Wild Chimpanzees. Jane Van Lawick-Goodall. Natl. Geographic Soc., Washington, D.C., 1967. 204 pp. Illus. $4.25.

The Nature of Human Nature. Alex Comfort. Harper and Row, New York, 1967. 230 pp. Illus. $5.

Nervous and Hormonal Mechanisms of Integration. A symposium (St. Andrews), September 1965. G. M. Hughes, Ed. Published for the Company of Biologists on behalf of the Society for Experimental Biology. Academic Press, New York, 1966. 573 pp. Illus. $16.50. Symposia of the Society for Experimental Biology, vol. 20. Twenty-one papers.

The Origins of Chemistry. Robert P. Multhauf. Oldbourne, London, 1966. 412 pp. Illus. 70s.

The Palladium Hydrogen System. F. A. Lewis. Academic Press, New York, 1967. 190 pp. Illus. $9.

Petroleum Microbiology. J. B. Davis. Elsevier, New York, 1967. 618 pp. Illus. $40.

Physical Chemistry: An Advanced Treatise. vol. 2, *Statistical Mechanics.* Henry Eyring, Ed. Academic Press, New York, 1967. 577 pp. Illus. $17.50. Physical Chemistry Series, vol. 2. Nine papers.

The Physical Sciences: An Introduction. Stephen S. Winter. Harper and Row, New York, 1967. 427 pp. Illus. $8.95.

The Physician. Russel V. Lee, Sarel Eimerl, and the Editors of *Life.* Time Inc., New York, 1967. 200 pp. Illus. $3.95.

Physico-Chemical Processes in Mixed Aqueous Solvents. Felix Franks, Ed. Elsevier, New York, 1967. 160 pp. Illus. $15.

Proceedings of the 13th International Conference on High-Energy Physics (Berkeley, Calif.), August–September 1966. Sponsored by International Union of Pure and Applied Physics, United States Atomic Energy Commission, and University of California. Edwin M. McMillan, Ed. Univ. of California Press, Berkeley, 1967. 344 pp. Illus. $12.50. Twelve reports.

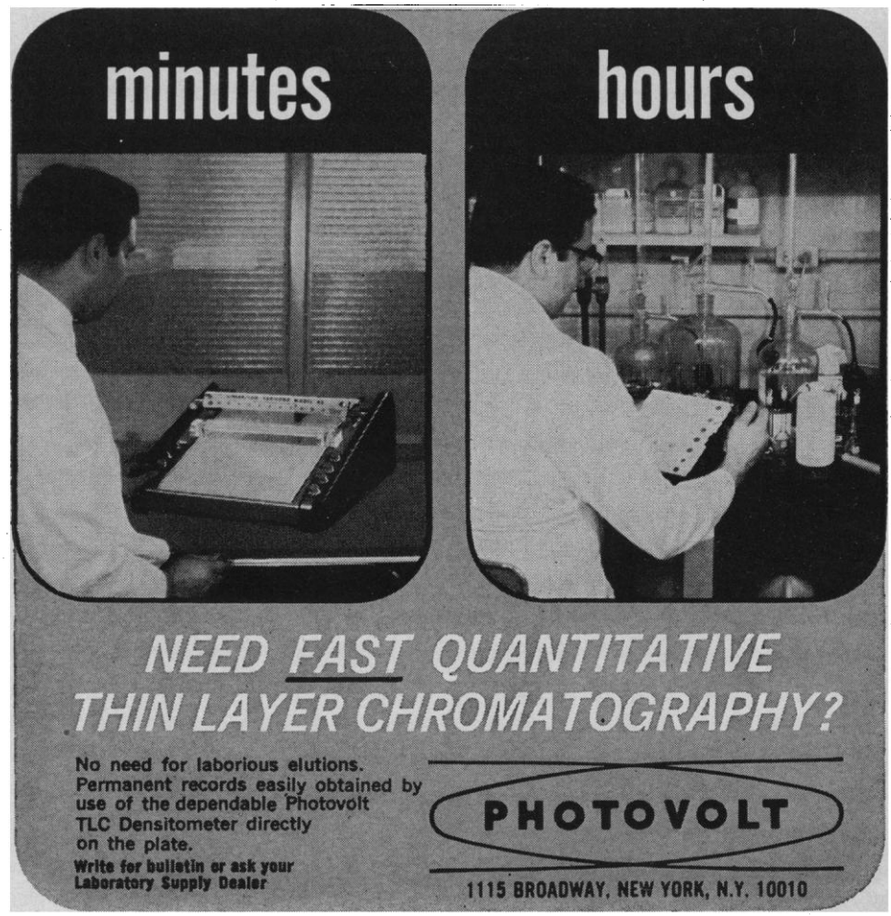
Programmed Instruction and the Hospital. A conference (Chicago), March 1965. Eleanor C. Lambertsen *et al.* Hospital Research and Educational Trust, Chicago, 1967. 163 pp. Illus. $6. Ten papers.

Progress in Biophysics and Molecular Biology. vol. 17. J. A. V. Butler and H. E. Huxley, Eds. Pergamon, New York, 1967. 400 pp. Illus. $18.50. Eight papers.

Progress in Nucleic Acid Research and Molecular Biology. vol. 6. J. N. Davidson and Waldo E. Cohn, Eds. Academic Press, New York, 1967. 448 pp. Illus. $16.50. Eight papers.

Progress in Physical Organic Chemistry. vol. 4. Andrew Streitwieser, Jr., and Robert W. Taft. Interscience (Wiley), New York, 1967. 313 pp. Illus. $15.50.

Rarefied Gas Dynamics. Proceedings of the Fifth International Symposium on Rarefied Gas Dynamics (Oxford, England), 1966. vol. 1. C. L. Brundin, Ed. Academic Press, New York, 1967. 899 pp. Illus. $18.50. Fifty-four papers.



Rayleigh and Lamb Waves: Physical Theory and Applications. Igor Aleksandrovich Viktorov. Translated from the Russian edition (Moscow, 1966). Plenum Press, New York, 1967. 166 pp. Illus. $9.50.

Reflections on Research and the Future of Medicine. A symposium (New York), May 1966. Charles E. Lyght, Ed. McGraw-Hill, New York, 1967. 218 pp. Illus. $9.95. Ten papers.

Residue Arithmetic and Its Applications to Computer Technology. Nicholas S. Szabó and Richard I. Tanaka. McGraw-Hill, New York, 1967. 254 pp. Illus. $12.50. McGraw-Hill Series in Information Processing and Computers.

Research Design in Clinical Psychology and Psychiatry. J. B. Chassan. Appleton-Century-Crofts, New York, 1967. 300 pp. Illus. $5.75. The Century Psychology Series.

The Rock Art of Texas Indians. Paintings by Forest Kirkland, text by W. W. Newcomb, Jr. Univ. of Texas Press, Austin, 1967. 253 pp. $12.50.

The Royal Society: Concept and Creation. Margery Purver. M.I.T. Press, Cambridge, Mass., 1967. 264 pp. Illus. $7.

A Scientific Autobiography of Joseph Priestley (1733–1804). Selected scientific correspondence edited with a commentary by Robert E. Schofield. M.I.T. Press, Cambridge, Mass., 1967. 431 pp. Illus. $13.50.

Sensory Inhibition. Georg von Békésy. Princeton Univ. Press, Princeton, N.J., 1967. 277 pp. Illus. $8.50.

Le Soufre. Clément Duval. Presses Universitaires de France, Paris, 1967. 128 pp. Illus. Paper. Que Sais-Je?, No. 1254.

Sourcebook of Laboratory Exercises in Plant Pathology. Sourcebook Committee of the American Phytopathological Society. Arthur Kelman, chairman. Freeman, San Francisco, 1967. 415 pp. Illus. $8.50.

Space Science. Heinz Haber. Golden Press, New York, 1967. 154 pp. Illus. $3.95.

Specifications and Criteria for Biochemical Compounds. R. Stuart Tipson, Ed. Natl. Acad. of Sciences–Natl. Research Council, Washington, D.C., ed. 2, 1967. 540 pp. Illus. $10.

Spectral Analysis of Time Series. Proceedings of an advanced seminar (Madison, Wis.), October 1966, conducted by the Mathematics Research Center, U.S. Army and the Statistics Department, University of Wisconsin. Bernard Harris, Ed. Wiley, New York, 1967. 329 pp. Illus. $7.95. Eleven papers.

Spectrometric Identification of Organic Compounds. Robert M. Silverstein and G. Clayton Bassler. Wiley, New York, ed. 2, 1967. 266 pp. Illus. $9.95.

Statistical Methods. Allen L. Edwards. Holt, Rinehart and Winston, New York, ed. 2, 1967. 480 pp. Illus. $8.95.

Statistical Thermodynamics: An Introduction to Its Foundations. H. J. G. Hayman. Elsevier, New York, 1967. 266 pp. Illus. $17.

Taxonomy: A Text and Reference Book. Richard E. Blackwelder. Wiley, New York, 1967. 714 pp. Illus. $19.95.

Techniques of Autoradiography. Andrew W. Rogers. Elsevier, New York, 1967. 347 pp. Illus. $20.