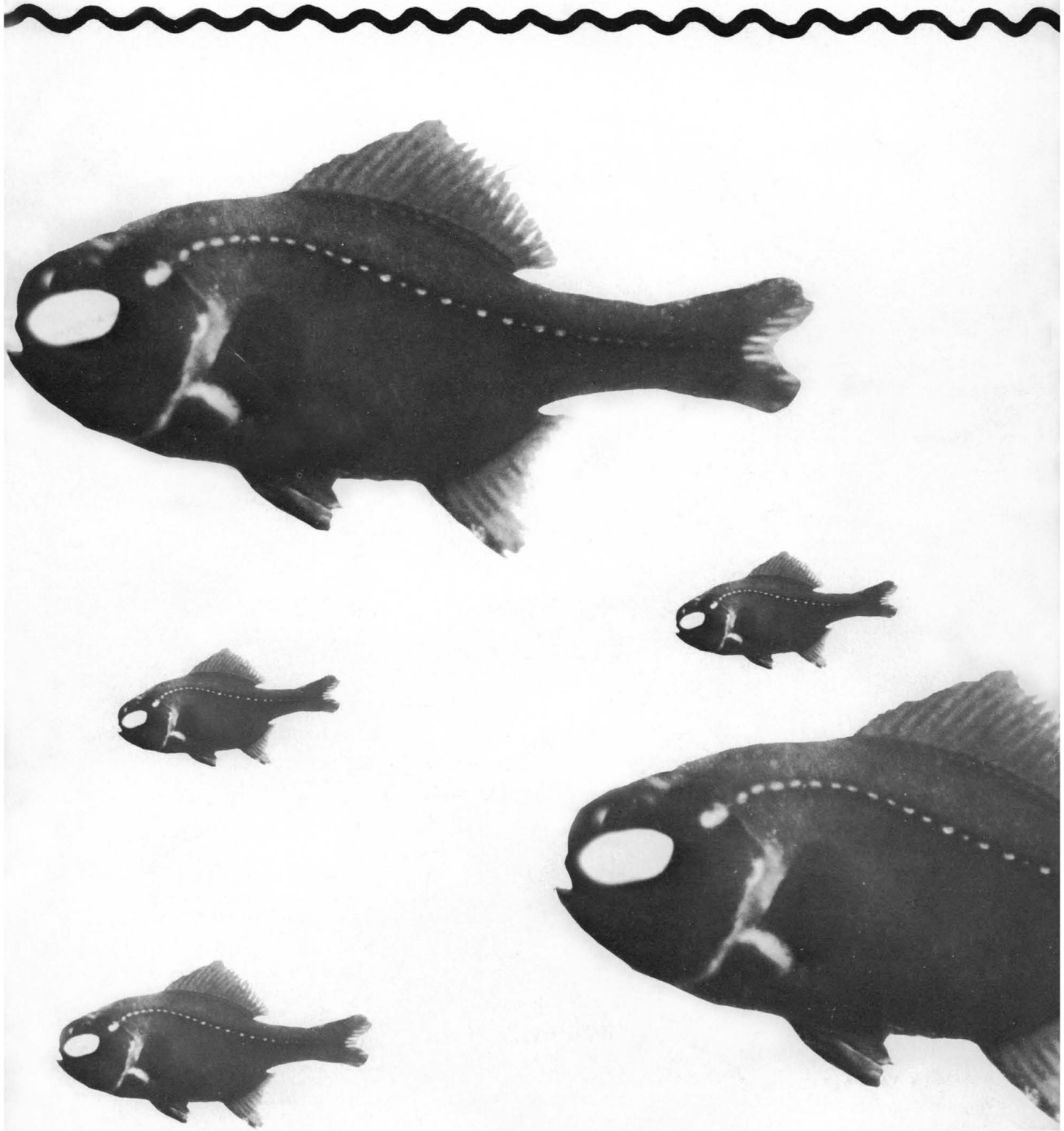
SCIENCE

9 July 1971

Vol. 173, No. 3992

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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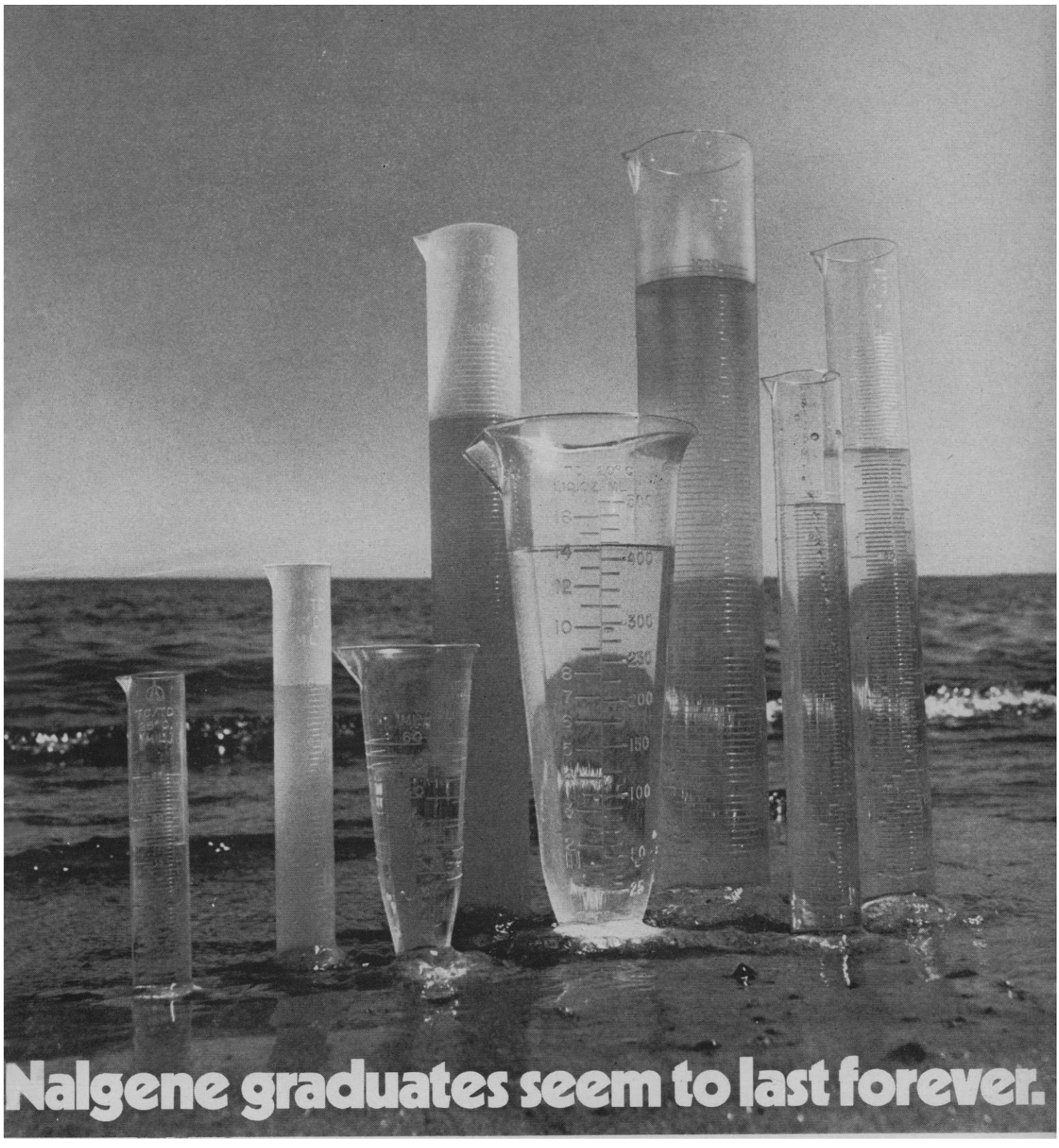

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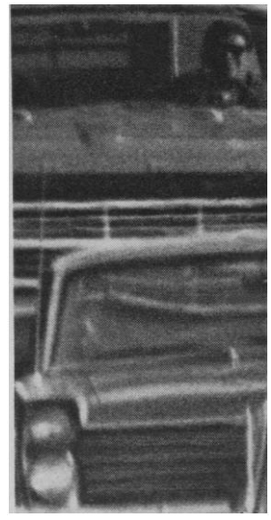
COVER

Swimming *Photoblepharon*. One of two rare species of luminous fish from the Banda Islands, Indonesia, swimming with light shining from the exposed light organs. An organ is located in a depression beneath each eye. Luminescence is controlled by raising a black fold over the organ, which contains symbiotic luminous bacteria. Usual size of the fish is between 80 to 100 millimeters from tip of snout to tail base. See page 143. [Y. Haneda, Yokosuka City Museum, Yokosuka, Japan]



Some things are changing for the better.

Updating the ancient art of surveying with a beam of infrared light.

The surveyor's way of measuring distance—a method that had not really changed since the days of the Pharaohs—is finally changing for the better.

The painstakingly slow and centuries-old method of using an engineer's chain or surveyor's tape as a ruler is no longer the only accurate way to do the job. A new HP instrument called the 3800A Distance Meter now makes it possible for the surveyor to be free of his ancient chain.

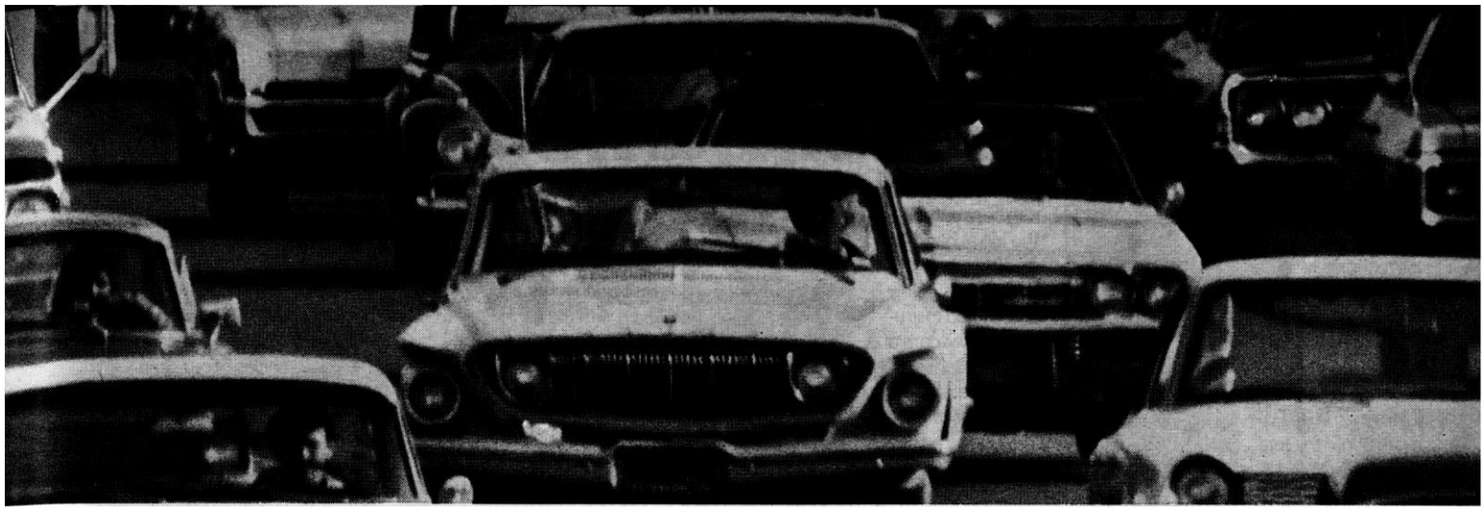
As a result, a surveyor can precisely measure distances up to two miles in one-tenth the time, with a crew of two rather than three men. The advantages of electronic distance measuring are obvious: it takes fewer people to do more work, and they do it with first order accuracy.

Basically, the HP Distance Meter works by comparing the unknown distance being measured to the precisely known wavelength of a modulated beam of infrared light. The 3800A measures the length of time it takes the light beam to travel to a reflector and back, converts this elapsed time into distance, and produces the measurement—in feet or meters—on a digital display.

The 3800A's unique method of modulating the light beam with four different frequencies provides unambiguous measurements, internally corrected for air temperature and pressure, with an accuracy of 0.01 feet. Since the 3800A automatically calibrates distance 30 times a second, readings are not affected by momentary interruptions caused by traffic or pedestrians moving through the light beam.

While designed primarily for surveying and photogrammetric applications, the 3800A also can be used to detect the sway of buildings, the movements of glaciers and other tasks requiring accurate distance measurement.

The new instrument weighs only 34 pounds with its battery power pack, and costs $4,110.



Affordable radar—for the family car, and many other uses.

A new technology within a technology has made radar feasible for the family car and a host of brand-new uses in such diverse fields as industry, safety, navigation and security.

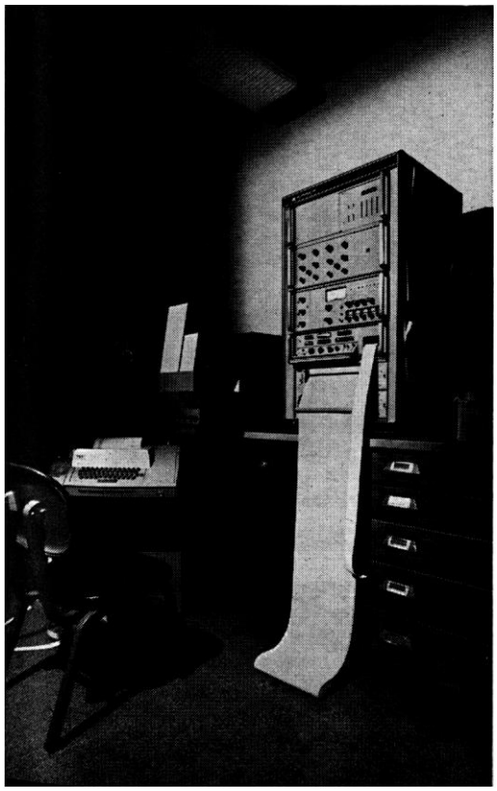
The HP 35200A Doppler Radar Module, about the size of a deck of cards and one-third the cost of previous radar units, can be produced in volume for less than $100. This makes radar inexpensive enough to perform motion-detecting and velocity-measuring tasks that formerly were impractical because of size and cost limitations.

Auto safety engineers, for example, can seriously contemplate designing a radar system to detect approaching vehicles and automatically avoid collisions. The six-ounce HP radar module has a range of some 2,000 feet and is capable of measuring speed within one-hundredth of a percent. That's the equivalent of clocking a car speeding 1,000 miles an hour with an accuracy of 1 mph.

But automobile radar is just one of many possible applications of the HP device. Others include navigational radar for boats, automatic landing systems for small aircraft, intrusion alarms, speedometers for rapid transit railroad trains, and systems for controlling the flow of traffic. Industrial uses range from regulating the speed of assembly lines to controlling the flow of steel through rolling mills.

These innovations are possible because of a successful marriage of two electronic technologies. HP combined the low cost and high reliability of integrated circuits (IC's) with the performance advantages of microwave frequencies. The resulting products are called "thin film hybrid IC's."

The microwave component capability which led to the radar module has been a reality at HP for more than two years. Details on either our thin film capability or the 35200A Doppler Radar Module are yours for the asking.



Around-the-clock analysis through automation: instantly, or a step at a time.

Gas chromatography, a process whereby a vaporized organic material is separated into its constituent compounds, is the fastest and most accurate way to reveal both the identity and exact quantity of the separated parts of a mixture. Therefore, a gas chromatograph (GC) is the most important single analytical tool at the chemist's command. But, since most laboratories operate on an eight-hour day, the typical GC sits idle the majority of the time.

That was yesterday. Now a modular series of HP instruments can enable a GC lab to operate 24 hours a day, without increasing its staff. And this can be done a step at a time, as the flow of work and budgetary limitations allow.

The first step is the HP 7670A Automatic Sampler. By injecting up to 36 consecutive samples, it can keep a GC going around the clock. So a lab can make well over 200 runs a week, and significantly increase its price/performance ratio.

Manual GC tests take 30 minutes, and cost about $5.00 for the operator's time. Adding the next building block—a 3370A Integrator—automatically measures, computes, and prints out a chromatograph report in 20 minutes at an operator cost of some $3.33.

The third and most decisive step toward full automation is a 3360A GC Data Processing System. This uses an HP computer, fully programmed for GC, which can simultaneously process data from eight GC's and immediately produce a complete typewritten report of each analysis. A full GC test report can be written in one minute, at the dramatically low cost of only 17 cents.

The system boosts a GC lab's capability to 6,000 samples a month. Even if you use it for as few as 1,000 samples per month, it saves more than 300 hours for your staff and pays for itself in just over six months.

The ability to make these analyses faster, and at less cost, is a significant contribution to the fields of pollution control, quality assurance, process control, and analyses in the fields of chemistry, agriculture, food, medicine, and drugs. If you'd like more information on the economics of HP's step-by-step automation of GC labs, write for the Fall 1970 issue of Analytical Advances.

For information on the technological advances or products mentioned in this ad, address your inquiry to Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304; Europe: 1217 Meyrin-Geneva, Switzerland.

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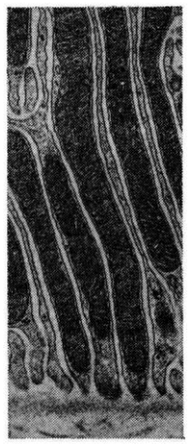
How to add up this column.

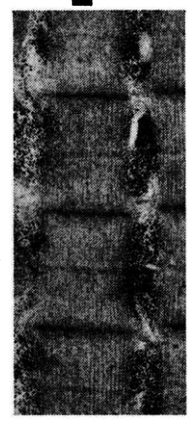
1. The JEM-100B. An amazing electron microscope. It's technically sophisticated, yet easy to operate. The column, for instance, is pre-aligned. No need to fool with adjustments. To learn more about the total package proceed to Fig. 2.



2. The Kidney. Donated by a common mouse. We show it here at direct magnification of 3000X. The picture is distortion free. All our pictures are distortion free at both high and low magnification.

3. The operator. He can concentrate on the job at hand and on all kinds of jobs at that. This highly automated instrument takes care of the rest. Consider the operator a viewer. Go to Fig. 4.

4. The specimen chamber. Contamination ceases to be a dirty word here. The specimen chamber accommodates six holders at once. Holders pass through an air lock. You can pass on to Fig. 5.

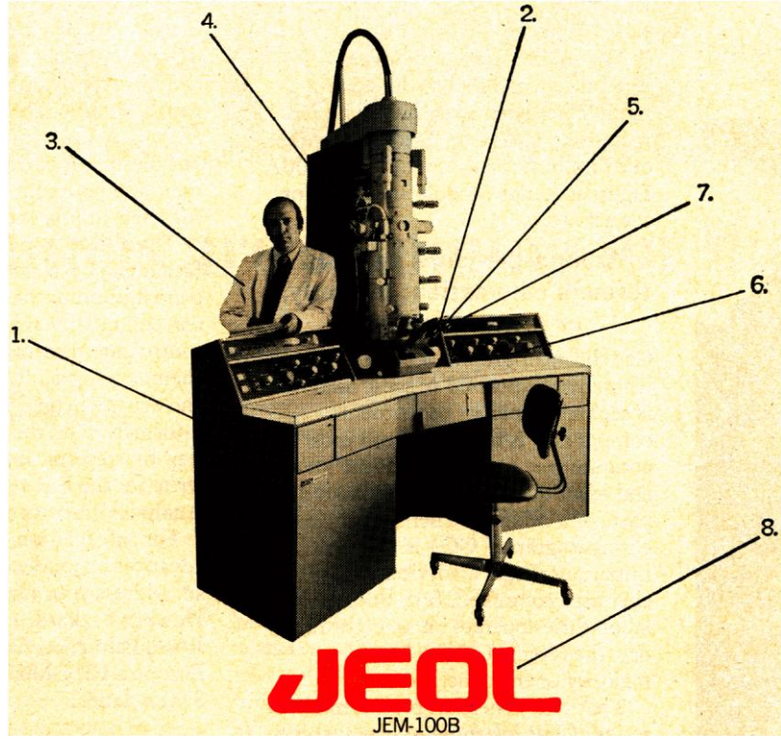


5. The muscle. Shown at 15,000X magnification. View whatever you want and expect a sharp image. In fact, we invite you to bring your own samples and come for a demonstration. This instrument is tough. It will take what you can dish out.

6. The switch. Go from 90X to 500,000X with just a flick. Expect 3.5 Å resolution routinely, even with the goniometer stage. Your next stage is Fig. 7.

7. The mouse. See Fig. 2.

8. See. The JEM-100B is greater than the sum of its parts. Learn more and arrange a demonstration. Also, ask us about new capabilities of our scanning attachment. From JEOL, 477 Riverside Ave., Medford, Mass. 02155, Tel. (617) 396-6021. Reconsider Figs. 1-7. It all adds up.



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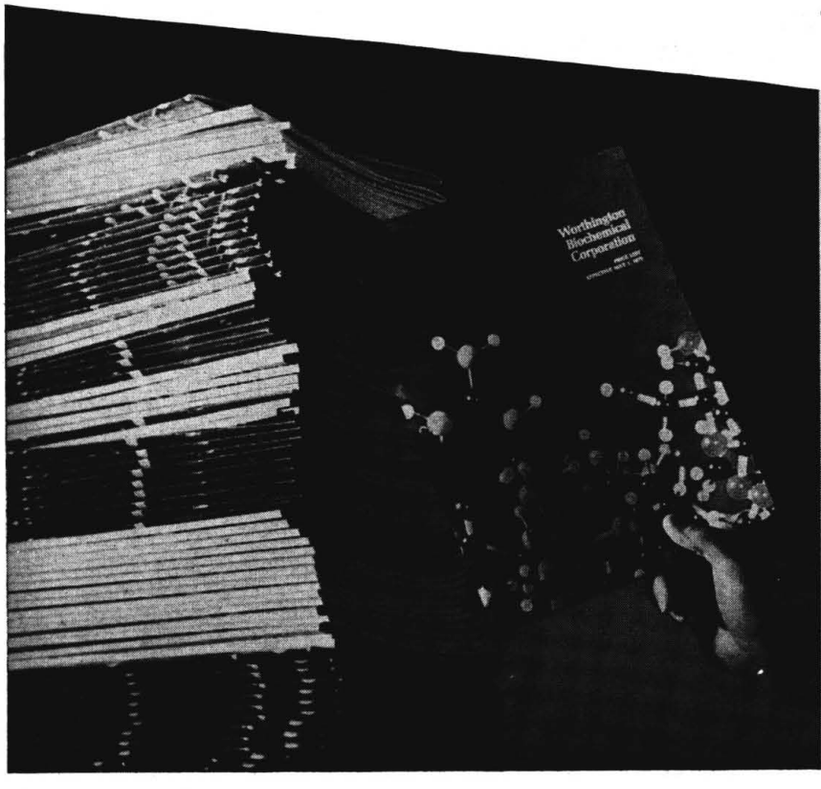

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Doing two jobs well is its job.

The Model PAX Digital-Indicating pH/Activity Meter. $995.

Job No. 1 — the measurement of pH.

Which the Model PAX accomplishes as both a full-range (0 to 14 pH) instrument *and* as an expanded-scale meter (span: 1.999 pH).

How well does the Model PAX do here? Its accuracy over the 0-14 pH range is 0.01 pH. When used as an expanded-scale meter, the Model PAX reads to 0.001 pH (especially useful where changes of a few thousandths of a pH unit are of critical interest).

Further, the Model PAX functions as a high-impedance millivoltmeter, giving direct indication of electrode potentials to 1 mv in the 0 to ± 1999 mv range.

Job No. 2 — the measurement of activity.

With proper reference and ion-selective electrodes, the Model PAX derives and displays ionic activity over a range of three decades (1:1000).

In this switch-selectable operating mode, the Model PAX exhibits an accuracy of ± 0.25% (reference conditions). And perhaps most importantly, activity readout is digital and direct, requiring no subsequent calculations.

And more.

The Model PAX also gives you all this: a true-tracking, four-place, luminescent display free from lag and jitter; wide-range, locking slope and intercept controls; manual temperature compensation with ATC optional for the 0 to 14 pH range; single-cycle, two-point calibration in all modes without repetitive "successive approximation"; both analog and digital (B. C. D., 8-4-2-1 code) outputs; and push-button operation of the more frequently used controls.

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The Model PAX, the all-purpose digital meter for pH and specific ion potentiometry, costs only $995, about half of what you would expect to pay for a meter doing the same job(s). Investigate—ask your Sargent-Welch representative. Or write. 1-211

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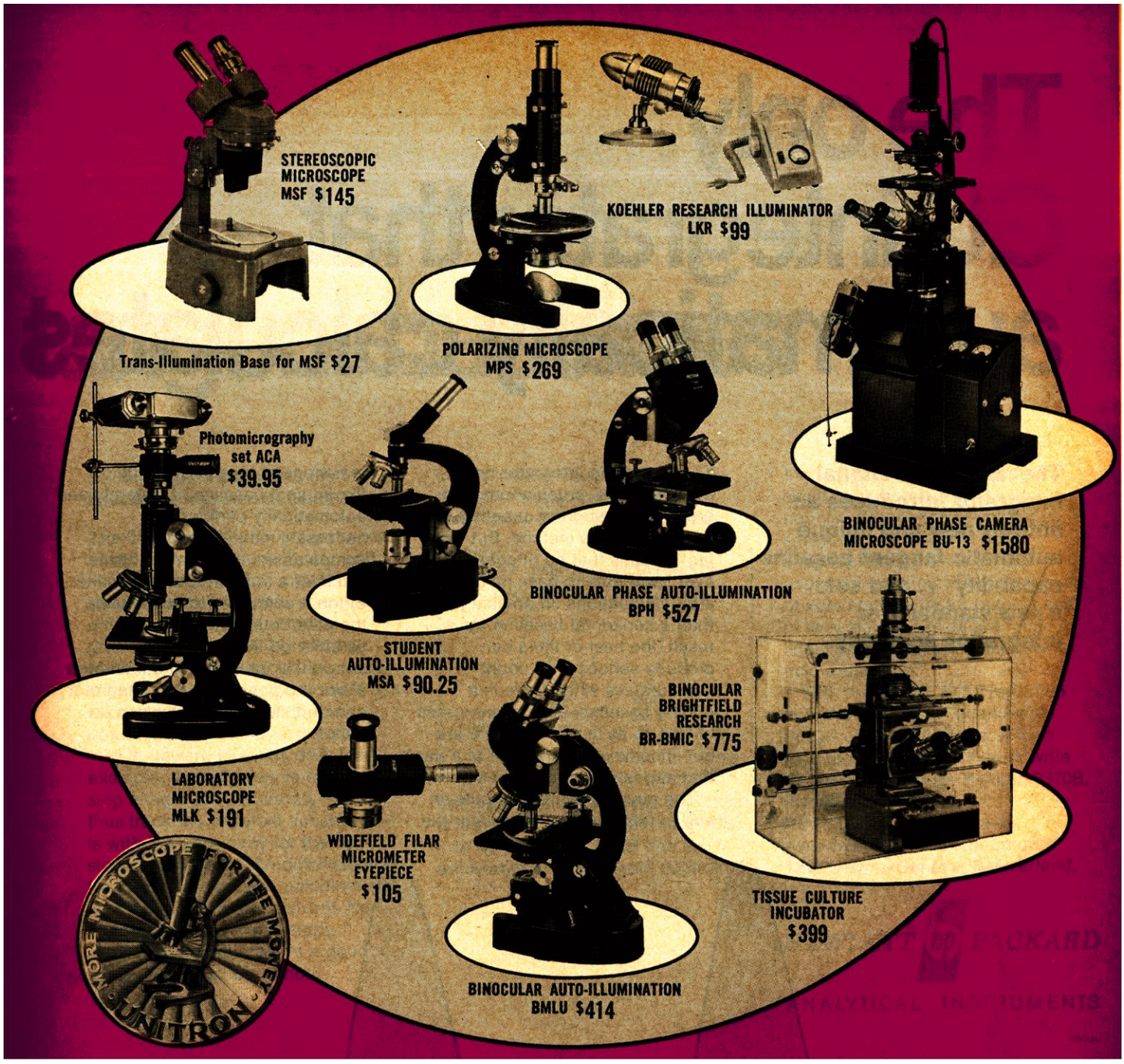

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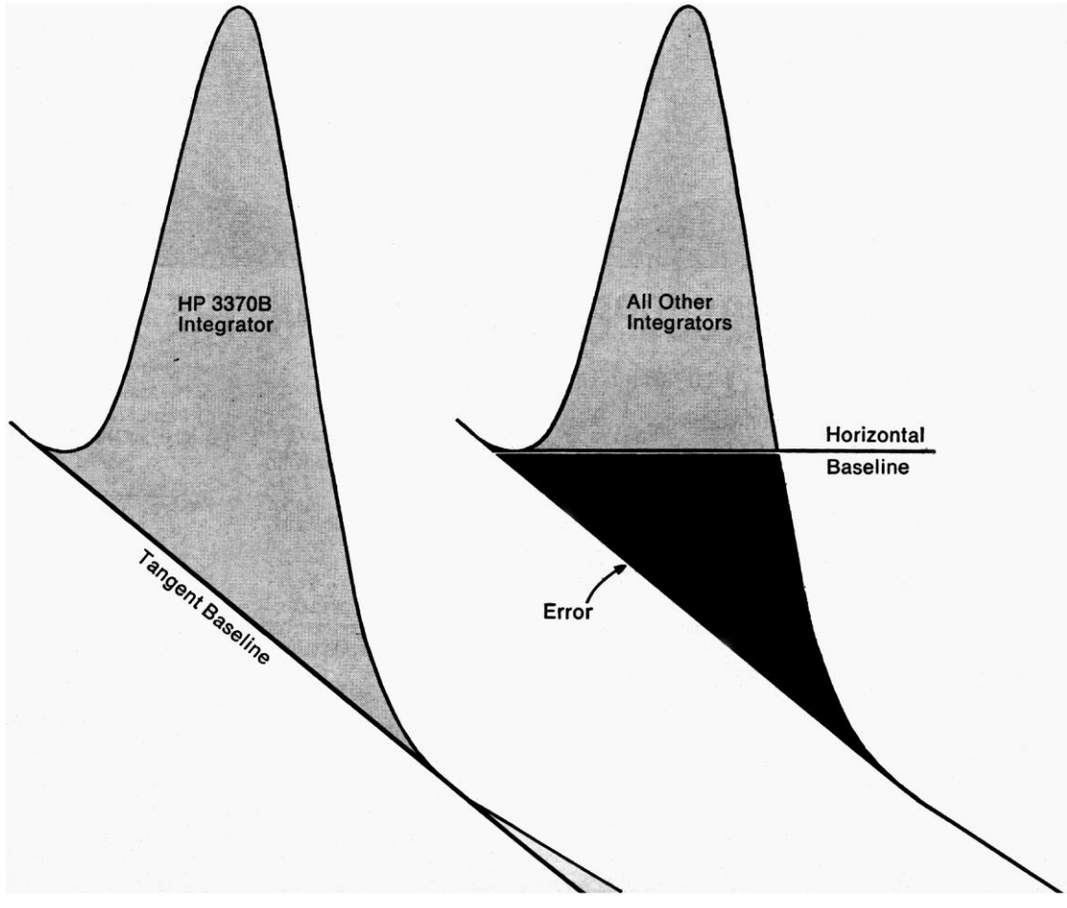
The only GC integrator that automatically calculates

The new 3370B Digital Integrator introduces an entirely new and unique automatic tangent baseline capability . . . and sets a new standard for integration accuracy.

The electronic integrator has automated GC calculations and greatly improved the quantitative accuracy of the method. But the fact remains that no integrator has ever been able to base its peak area calculations on anything other than a horizontal baseline. As a result, the best of them can produce serious area count inaccuracies when there is a drifting baseline: area count losses of 10% to as much as 1000% are not uncommon in the case of a peak that appears on the tail of a solvent.

The new 3370B literally puts an end to this problem. Whenever the rear slope of a peak drops below the original baseline, it instantly and automatically performs the necessary mathematical computations that enable it to discover a tangent to the baseline. Since it continues to accumulate the area count until it has established the tangent, it accurately integrates the total area under the peak. No other integrator can do this; no computer can do better.

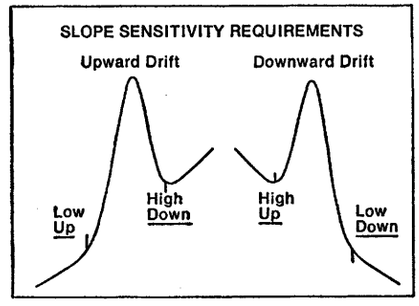


tangent baselines

. . . and accurately tracks the baseline under all drift conditions

The 3370B's ability to integrate peak areas accurately doesn't stop with its unique automatic tangent baseline capability. It is also the only integrator (except for its predecessor, the 3370A) that can track the baseline accurately under all drift conditions . . . because it has separate, independent *up* and *down* slope sensitivity controls.

With upward baseline drift, for example, the only way to start and stop integration accurately—and thus track the baseline accurately—is with low sensitivity for the *up* slope and high for the *down* slope. Precisely the opposite combination is required for downward drift. No integrator with a single slope sensitivity control can do a good job on the *up* slope without compromising its ability to handle the *down* slope properly, and vice-versa. Gross baseline errors



can therefore occur in the one case or the other, except with the 3370B.

In addition, the 3370B has an adjustable area threshold control that automatically eliminates any small peak from 1 to 1000 area counts, without compromising its sensitivity. Its range of noise suppression has been greatly expanded to allow integration even of very noisy detector outputs and of very slow peaks as are found in liquid chromatography and amino acid analysis.

With the 3370B, GC integration enters a new era of quantitative accuracy. Get all the facts from your local HP sales office or write for our new 10-page Bulletin 3370B. Prices start at $5300. Hewlett-Packard, Route 41, Avondale, Pa. 19311. In Europe: 1217 Meyrin-Geneva, Switzerland.

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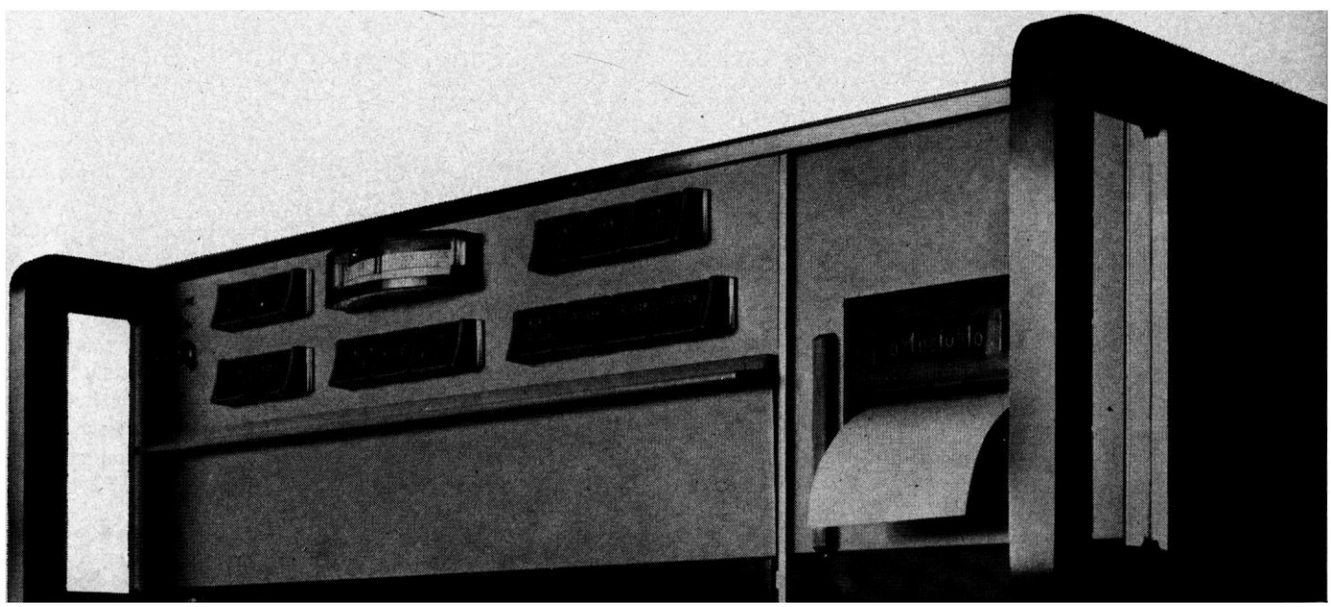

IEC presents the Continuous Flow Zonal Rotor

IEC adds a new performance dimension to its low-speed PR-6 and PR-J Refrigerated Centrifuges with the *Continuous Flow Zonal Rotor*. This totally new and unique rotor will process such particles as mitochondria, nuclei, protozoa, unicelled algae, chloroplasts, bacteria, yeast, spores, blood cells, polyhedral insect viruses, and latex. Applications range from medical and industrial research to probings into the ecological balance.

The Continuous Flow Zonal Rotor utilizes density gradient techniques to concentrate and purify large volumes of dilute particle suspensions (100-plus liters of 1-micron diameter particles in one 8-hour day). Suspension of the concentrate in a density gradient provides isopycnic zones free of any impurities (gaussian distributions with a standard deviation of 5 ml in a banding zone have been obtained). It also provides an ideal environment for fragile biological organelles—phyto-plankton, for example—allowing such life processes as respiration and photosynthesis to remain unimpaired. (Previous methods requiring contact with filters and rotor walls often destroyed the delicate organelles.) It even minimizes the damage from organelle-to-organelle contact, as occurs in "packed" concentrates.

The new rotor will also operate in the conventional continuous flow mode without a density gradient, providing up to 550 ml of packed particles of all densities. Or choose a limited rate separation, or a differential separation scheme. Particles are captured or passed through a rotor depending upon their sedimentation coefficient; decrease flow rate through the rotor or increase rotor speed, and particles of lower sedimentation rate are captured.

The new Continuous Flow Zonal Rotor is in production and ready for immediate delivery. For more details, write to International Equipment Company, 300 Second Avenue, Needham Heights, Massachusetts 02194.

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the caveats so fully spelled out on earlier occasions (*1*). Besides, to have discussed at all adequately the prospective benefits, risks, and quandaries of possible eugenic programs would have required another occasion. Even more recently, in an address entitled "What man can be," I tried especially to emphasize the grave difficulties in the realm of value judgments which the new biological reproductive possibilities might bring about, and concluded:

> I have asked many questions which cannot at present be answered. I have predicted a future in which many cherished values of our society and many ethical standards may be questioned or superseded. It is not sufficient to have a few scientists raise such issues. Only a prolonged and profound attention by many of the wisest men of our time, men of philosophy and religion, students of society and government, and representatives of the common interests of men throughout the world, together with scientists, may achieve a wise and sober solution of the crisis evoked in our world by scientific discoveries and their applications (*2*).

Let me suggest that there are rather better ways to judge a man's opinions than by reading his countenance or observing his gestures.

There is a more important point raised by the objections of Kass. He has ignored altogether the possibility that the introduction of eugenic measures through prenatal adoption will proceed on a voluntary basis. The experimental approaches used by R. G. Edwards in England are based on the voluntary consent and participation of women whose oviducts are blocked but who, together with their husbands, deeply desire to have children. My own files contain many letters from women who have indicated their hopes to have a child by such a method, whether because they are sterile or because of knowledge that in their families there are hereditary factors that might inflict a lifelong burden upon a child of their own. I think it quite clear that if such practices are introduced in countries of the Western World it will occur first through voluntary action. That is why genetic counseling must be greatly improved and rendered far more accessible to those who need it. The idea that, in the conceit of their ignorance, boards of experts will decide who may reproduce and who may not, is as repugnant to me as to Kass. Nevertheless, under a Nazi type of dictatorship, it might become a reality with which the world would need to reckon. The biological developments indeed make the "brave new world" credible.

In the matter of the right of every child to be born "with a sound physical and mental constitution, based on a sound genotype . . . the inalienable right to a sound heritage," I shall not retreat. Incumbent on every prospective parent is the duty of ascertaining whatever is possible regarding the probabilities that his or her child will be mentally and physically sound. Since detection of heterozygous carriers is now possible for about 60 recessive genetic defects, and since chromosome defects, such as the extra chromosomes that produce mongolism (Down's syndrome) or a variety of serious sex deviations from the norm, such as the XYY condition, are detectable by amniocentesis, the way lies open to voluntary constraint in reproduction and to voluntary induced abortion in those states where the laws permit. I, for one, regard the New York abortion law as more significant in opening up the possibility of voluntary eugenic practice than in protecting the life of the mother in a few cases or in disposing of unwanted children in lieu of contraception.

BENTLEY GLASS

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2. ———, *Educ. Rec.* **48**, 101 (1967).

Restoring Bacterial Toxigenicity

The report by M. W. Eklund *et al.* (30 Apr., p. 480) on the restoration of toxigenicity by phage infection to nontoxic strains of *Clostridium botulinum* brings to mind a paper published 78 years ago on a closely related subject. Francesco Sanfelice's name is best known for his isolation of the pathogenic fungus *Cryptococcus neoformans;* however, in 1893 (*1*) he reported studies on anaerobic bacteria, including *Clostridium tetani* and related organisms that he regarded as indistinguishable except for their having lost the ability to produce toxin. In support of this evolutionary view, he studied the effect of culturing the nontoxic strains in sterile filtrates of the toxic bacteria. His crude assay methods

were far from compelling, but they did indeed point to a toxic conversion quite analogous to that described in the recent report. Neither bacteriophages, nor their fascinating attributes of transduction or lysogenic conversion had yet been discovered; nor had toxins been purified. He may be forgiven for the naive speculation that the toxin itself was the active agent.

As far as I am aware, Sanfelice's experiment was never subjected to further verification, and it thus played no part in the further history of bacterial genetics. However, it was conceptually similar to the pneumococcus transformation, reported by Griffith 35 years later (a latent period familiar to geneticists). It is now a reasonable surmise that his observations were correct.

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Reference

1. F. Sanfelice, *Z. Hyg. Infektionskr.* **14**, 339 (1893).

Nomenclative Etiquette

Plumb suggests (Letters, 19 Feb.) the suppression of the term centigrade so that "at some time in the future, degrees Celsius will be a natural expression." Why? Degrees centigrade is already a "natural expression" which furthermore describes the system as one of 100 degrees between reference points. Not so long ago, a perfectly understandable unit like cycles per second was changed to hertz, and spectroscopists are now forced to use nanometers when everyone has always understood millimicrons. Furthermore, I challenge anyone to demonstrate how "torr" is any more understandable than "mm-Hg." All this useless arbitrary pedantry torr my heart out. It hertz so much it gave me a fever, which steadfastly, I shall always measure in degrees centigrade.

BARRY M. AUSTERN
Environmental Protection Agency, Water Quality Office, Ohio Basin Region, Cincinnati 45226

It is not hard to understand why the medical people are switching to centigrade degrees rather than to Celsius. For centuries the doctors suffered under eponymic names: Prowazek-Greeff bodies (trachoma bodies), the Achard-Castaigne test (methylene blue),

Vleminckx solution (sulfurated lime), the Vicq d'Azyr bundle (thalamomammillary), the Minkowski-Chauffard syndrome (hemolytic jaundice), Higoménakis's sign (clavicular), von-Recklinghausen-Appelbaum disease (hemochromatosis), and so on *ad nauseam.* At length they decided that this flagellation had gone on long enough, and that thenceforth they would use descriptive names, like centigrade, wherever possible. So at least the doctors are coming down to earth, and I profoundly hope that our editors will come along with them. . . . I wish the Emily Posts of nomenclative etiquette could realize, at long last, that the intelligent way to honor the memory of Celsius—a champion of sound common sense—is to leave his sensible temperature scale with the sensible name that he gave it.

D. A. Ross
214 North Purdue Avenue,
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Peer Review System

One of this country's most successful collaborative operations which links the entire health-oriented scientific community to the federal government, namely the National Institutes of Health (NIH) and National Science Foundation's system of research grant evaluation by peer review, is now undergoing serious attacks and is in danger of dissolution.

Opponents of the peer review system argue that the larger, better staffed and equipped universities and research institutions are more successful in the competition than are the smaller less distinguished ones, and that there is considerable geographic imbalance in distribution of research funds. This is not a valid argument against the present national competitive system if our goal remains high-quality scientific achievement, since much of the most imaginative and high-quality research is coming from the established institutions. It is an argument, however, for providing institutional funds for universities in less populated areas so that they may attract high-quality teaching faculty and build their resources. Grants of this nature have been provided in the recent past by the National Science Foundation, and it is to be hoped that this type of support will be continued, but not substituted for the present system.

Opponents also argue that the study sections do not concern themselves with "relevance" but recommend support purely on the basis of scientific merit. The corollary argument is that basic research has no goal and is "undirected." An imaginative, well-designed research project always has a significant goal, and usually in the long run becomes more obviously relevant. Clearly defined and biologically significant goals and the asking of important and pointed questions are prime criteria in the present evaluation system. It is a mistake to give priority to a project of third-rate scientific merit aimed directly at a difficult problem of human disease over a high-quality proposal directed toward an understanding of a basic biochemical mechanism. This country can well afford the modest investment in the latter but can ill afford the entrenchment of mediocre investigators in a socially "relevant" area. The argument for quality in science, both basic and applied, must outweigh all others if we are ever to answer our more difficult "relevant"" medical problems.

Perhaps the greatest threat to the present system of standing committees for grant review at the national level is the growth of NIH center grants and contracts which are not now reviewed by study sections. Despite sincere assurances from responsible senior officials that the individual project grant and the study section systems are not under attack, they will attenuate spontaneously because it is much easier and safer for individual investigators to come in under the large umbrella. Applications for research grants and fellowships will automatically fall off, and diminishing demand will be used to justify a diminishing program.

If we must live with center grants and contracts, they should be reviewed rigorously by the regular standing study sections and advisory panels composed of working scientists, using the same criteria of merit as are applied to individual applicants. Multidisciplinary applications can be reviewed piecemeal and in toto by appropriate study sections and pruned accordingly. One wonders whether the current complaint of "bureaucratic interference" leveled at the NIH is not simply part of the effort to bypass the present system of quality control.

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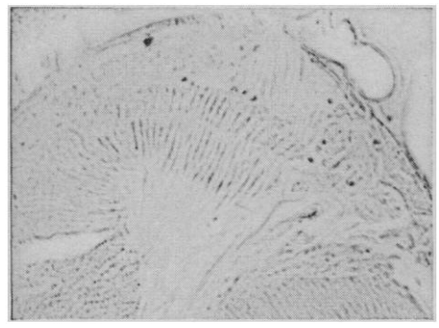

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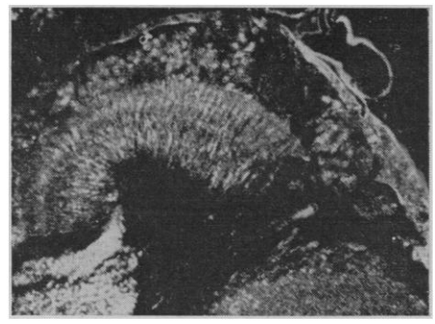

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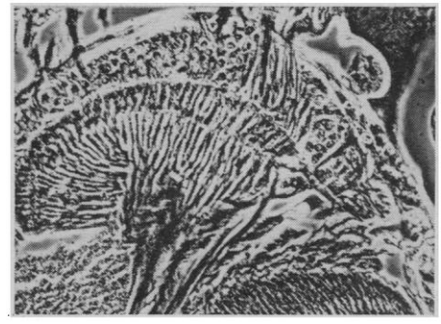

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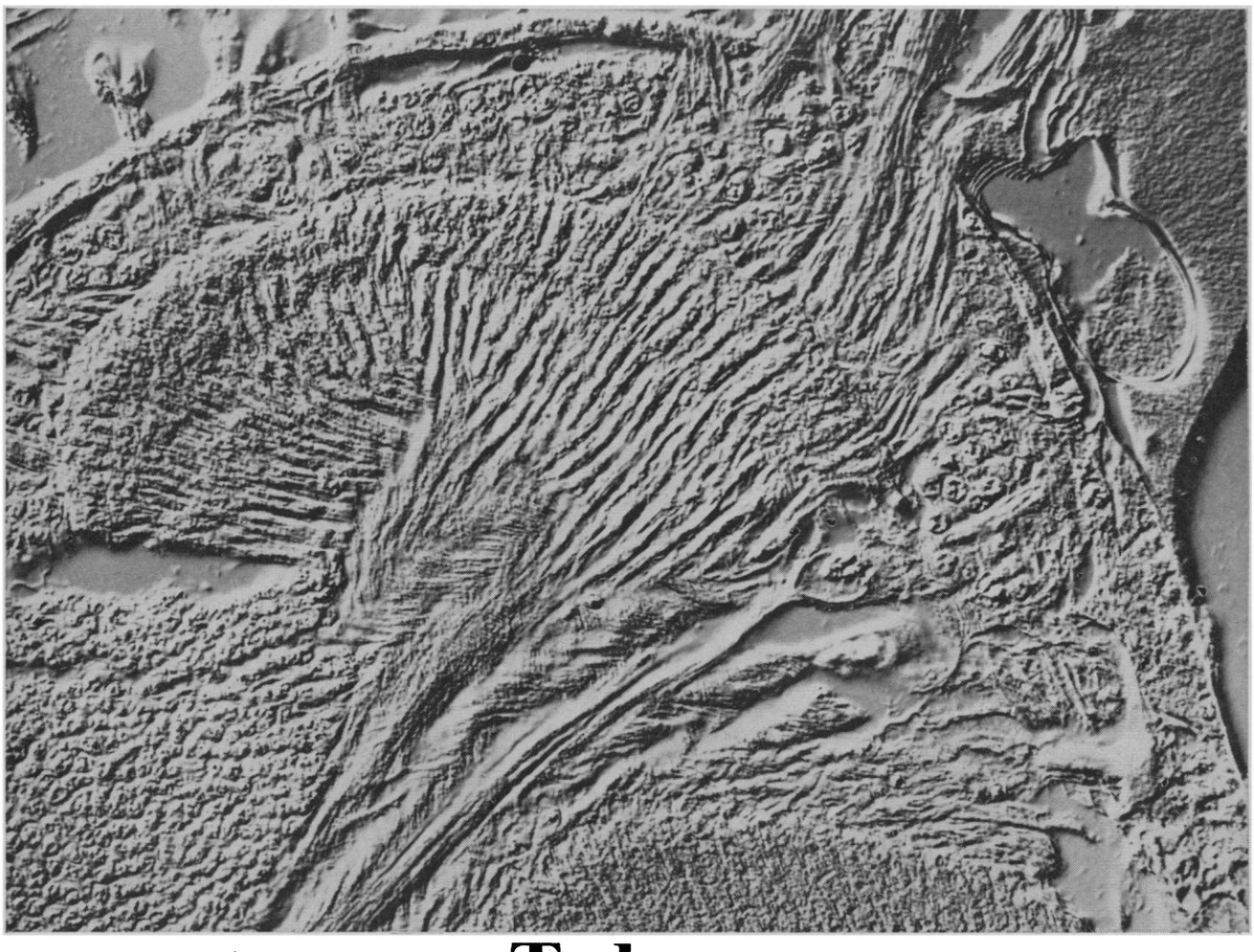

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SCIENCE

The Supernatural Department

The American university department has served science well. It has been a congenial unit, fostering esprit among its members and becoming the strongest unit in academic politics. The department has permitted more flexibility and innovation in both teaching and research than were possible under the Germanic model of a single professor, and a retinue of assistants, in each field. Together with an isomorphic structure of scientific and scholarly societies, meetings, and journals, it has administered the reward systems for young scientists to encourage them to apply a reductionist approach to problems that lie close to the front of their departmental interests. Reductionism has advanced science—Nobel Prizes are awarded for the best of such work—and has effectively prepared future faculty members for appointment to departments that carry on the traditions under which they were educated.

But new conditions have arisen. Reductionism is not the only way to advance science. Most doctorates of the next two decades will not be employed by universities similar to those in which they earned their degrees; the majority will enter other kinds of work for which a different education preparation may be more suitable. The department has lived a useful life, but the time has come to honor its history and achievements with a ceremonial and sentimental retirement party.

In terms of public interest, the most urgent problems do not fit into departmental boundaries. Those multiplex problems require synthetic as well as analytic studies and call for close collaboration of scholars from several disciplines—disciplines as far apart as genetics and law, or engineering and sociology.

In terms of science itself, the successes of reductionism have undermined some disciplinary boundaries. The corresponding departmental walls are no longer comfortable boundaries but have become barriers to the collaboration of scholars whose specialized knowledge and techniques defy traditional compartmentalization.

In terms of student interests, departmental boundaries are as much a nuisance as an aid to intellectual and vocational identification. Even at the Ph.D. level there is much field switching. In round numbers, 20 percent of American doctorates have moved out of their degree fields by 5 years after the doctorate. By 15 years, the percentage rises to 30, and by 25 years, to 40.*

In terms of the university's ability to improve its own programs and to adapt constructively to the financial, political, and other pressures beating upon it, a strong case can be made that the principal centers of curricular, research, and planning responsibility should be fewer in number and broader in interest than the department.

For all these reasons—public interest, scholarship, students, and university organization—the university now needs divisions larger than the department, divisions that will accommodate a variety of subgroups, long-lived and short-lived; pure, applied, or mixed; unidisciplinary and multidisciplinary; for teaching, research, or both.

Of course there wll be resistance to this proposal. There would be resistance at any time, but the 1970's offer an unusual opportunity for university reorganization. In the current buyer's market, young Ph.D.'s will respond to nontraditional opportunities in good universities. Growth in size will continue through the decade, and thus new appointments can be made. Universities are under severe financial, political, and intellectual stress; disadvantageous as that stress is in other respects, it is in times of crisis that new procedures and organizational forms are likely to be accepted, for it is then that outworn habits are most easily broken.—DAEL WOLFLE, *University of Washington, Seattle*

* Lindsey R. Harmon, *Profiles of Ph.D.'s in the Sciences* (National Academy of Sciences–National Research Council, Washington, D.C., 1965).

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nisms (*3*). In the noncecectomized, germfree rat, this advantage appears to be negated by the enlargement of the cecum.

Because they provide a picture of functional and cellular decline that is unadulterated by invading bacteria, germfree rodents are eminent models in the study of healing wounds and kidney pathology. On the other hand, they make it possible to obtain an even clearer picture of the effect of associated microbes on such functions. The posttraumatic, ischemic kidney appears to have retained its function much better in germfree rats than in conventional rats. It appeared possible, however, to obtain a comparable improvement in kidney function by orally treating conventional rats with a mixture of nonabsorbable antibiotics. These rats, although harboring an adjusted intestinal microflora, also showed other characteristics of germfree rats—such as cecal enlargement and more liquid cecal contents, with elevated colloid osmotic value—indicating reduction or absence of at least some functional aspects of the conventional microflora.

Association of the originally germfree animal with selected pathogens has done much to clarify the etiology of infectious disease. The oral administration of virulent cultures of *Pasteurella haemolytica* to gnotobiotic lambs has resulted in the production of fibrinous pleuritis and pneumonia. This syndrome is similar to cases of neonatal lamb pneumonia that occur in nature. Establishing a tracheostomy and occluding the anterior portion of the trachea prior to the oral inoculation demonstrated that the infection of the lung developed after intestinal invasion and subsequent bacteremia. Monoassociation with *Bacillus cereus* prior to administration of *Pasteurella haemolytica* prevented pneumonia.

It was also shown, however, that germfree mice could harbor large populations of *Shigella* and *Salmonella* species as monoassociates without any apparent ill effect. A similar observation had been made earlier in the case of monoassociation of rats with *Salmonella typhimurium*. It thus appears that a symbiosis between the host and its associated pathogen is possible without loss of pathogenicity when the reisolated bacteria are retested in a previously unchallenged susceptible host.

Germfree mice have been shown to harbor leukemia and mammary tumor viruses that are probably responsible

for specific forms of neoplasms but that do not induce inflammatory disease. However, congenital lymphocytic choriomeningitis can produce a viral carrier state in gnotobiotic offspring and appears to lead to overt degeneration, necrosis, and exfoliation of the epithelial cells of the intestinal villi. Germfree mice also proved more sensitive to Friend virus and responded with earlier development of pathological features such as hepatosplenomegaly. A similar reduced resistance was observed in studies of the intestinal pathology caused by Kilham virus in germfree rats.

The gnotobiote is obviously suitable whenever the study of inflammatory processes requires separation of the microbial variable from the systemic response. The meeting provided an opportunity not only to further define and describe the function and metabolism of the gnotobiotic animal, but also to indicate many of the fields in which this tool can be used to elucidate the numerous facets of the inflammatory response.

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1. *Technology in Germfree and Gnotobiotic Life Research*, M. Miyakawa and B. S. Wostmann, Eds. (Academic Press of Japan, Tokyo, 1969).
2. B. S. Wostmann, "The germfree animal as a research tool," in *The Use of Drugs in Animal Feeds* (National Academy of Sciences, Washington, D.C., 1969), pp. 123–134.
3. Monoassociation describes the intentional association with a defined microbial species. See, "Gnotobiotes: Standards and Guidelines for the Breedings, Care, and Management of Laboratory Animals," *Nat. Acad. Sci.–Nat. Res. Counc. Publ. No. ISBNO-309-01858-7* (1970).

Forthcoming Events

August

11–13. **Automatic Control** Joint Conf., St. Louis, Mo. (J. Lewis, Dept. of Electrical Engineering, Pennsylvania State Univ., University Park 16802)

12–17. American **Podiatry** Assoc., Denver, Colo. (Secretary, APA, 20 Chevy Chase Circle, NW, Washington, D.C. 20015)

12–3. Pacific **Science** Congr., 12th annual. Canberra, Australia. (A. Harvey, Australian Acad. of Science, Gordon St., Canberra City 2601)

14. **Viruses of South American Nonhuman Primates,** Mexico City, Mexico. (L. V. Melendez, New England Primate Research Center, Harvard Medical School, Southboro, Mass. 01772)

14–16. North American **Mycological** Assoc., Pellston, Mich. (Secretary, NAMA, 4245 Redinger Rd., Portsmouth, Ohio 45662)

15–18. **Drug Tolerance, Addiction, Abuse and Methadone Treatment,** intern. symp., New Orleans, La. (J. M. Singh, Xavier Univ. of Louisiana, 7325 Palmetto St., New Orleans 70125)

15–18. **Heat Transfer** Conf., Tulsa, Okla. (A. S. Rathbun, Jr., Westinghouse Electric Corp., Bettis Atomic Power Div., P.O. Box 79, West Mifflin, Pa. 15122)

15–18. **Soil Conservation** Soc. of America, 26th annual, Columbus, Ohio. (H. W. Pritchard, SCSA, 7515 NE Ankeny Rd., Ankeny, Iowa 50021)

15–19. American **Phytopathological** Soc., Philadelphia, Pa. (R. J. Green, Jr., Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind. 47907)

15–20. American Soc. of **Agronomy,** New York, N.Y. (M. Stelly, ASA, 677 S. Segoe Rd., Madison, Wis. 53711)

16–18. **Marine Technology** Soc., 7th annual, Washington, D.C. (R. W. Niblock, MTS, 1730 M St., NW, Washington, D.C. 20036)

16–18. Midwestern **Mechanics** Conf. 12th annual, Notre Dame, Ind. (A. A. Szewczyk, Dept. of Aerospace and Mechanical Engineering, Univ. of Notre Dame, Notre Dame 46556)

16–19. American **Physiological** Soc., Fall mtg., Lawrence, Kan. (R. G. Daggs, APS, 9650 Rockville Pike, Bethesda, Md. 20014)

16–19. **Poultry Science** Assoc., Fayetteville, Ark. (C. B. Ryan, Texas A&M Univ., College Station 77843)

16–19. Australian **Spectroscopy** Conf., 8th intern., Clayton, Victoria. (J. E. Kent, Dept. of Chemistry, Monash Univ., Clayton)

16–20. **Information Technology, Computer Impact on Developing Countries,** Jerusalem Israel. (U. Galil, Elbit Computers Ltd., 86 Hagiborim St., Haifa, Israel)

16–20. Symposium on **Oaks,** Morgantown, W.Va. (D. White, Div. of Forestry, West Virginia Univ., Morgantown 26506)

16–20. **Packaging and Transportation of Radioactive Materials,** 3rd intern symp., Richland, Wash. (Secretary, U.S. Atomic Energy Commission, Washington, D.C. 20545)

16–25. **Cosmic Rays,** 12th intern. conf., Hobart, Australia. (Meetings Officer, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

17–19. **Astrodynamics,** Fort Lauderdale, Fla. (J. M. Lewallen, Code ED13, NASA Manned Spacecraft Center, Houston, Tex. 77058)

17–20. **Illuminating** Engineering Soc., Chicago, Ill. (P. C. Ringgold, IES, 345 E. 47 St., New York 10017)

17–20. American **Scientific Affiliation,** Spokane, Wash. (H. H. Hartzel, ASA, 324½ S. 2 St., Mankato, Minn. 56001)

17–21. International Assoc. of **Milk, Food and Environmental Sanitarians,** San Diego, Calif. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind. 46176)

18–26. **Acoustics,** 7th intern. conf., Budapest, Hungary. (Secretary, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

19–21. Rocky Mountain **Radiological** Soc., Denver, Colo. (L. R. Wurtzebach, RMRS, 4200 E. 9 Ave., Denver 80206)

22–24. **Biometric** Soc., western North American regional, Fort Collins, Colo. (J. W. Kuzma, Dept. of Biostatistics, School of Public Health, Loma Linda Univ., Loma Linda, Calif. 92354)

22–25. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers,** Washington, D.C. (A. T. Boggs, III, ASHRACE, 345 E. 47 St., New York 10017)

22–26. American Soc. for **Pharmacology and Experimental Therapeutics,** Burlington, Vt. (E. B. Cook, ASPET, 9650 Rockville Pike, Bethesda, Md. 30014)

22–26. American Soc. of **Plant Physiologists,** Pacific Grove, Calif. (W. H. Klein, Smithsonian Radiation Biology Lab., 12441 Parklawn Dr., Rockville, Md. 20852)

22–27. American Soc. of **Parasitologists,** Los Angeles, Calif. (D. V. Moore, Dept. of Microbiology, Univ. of Texas Southwestern Medical School, Dallas 75235)

23. American Acad. of **Medical Administrators,** 14th annual, Chicago, Ill. (N. Barber, AAMA, 6 Beacon Street, Boston, Mass. 02108)

23–25. **Genetics** Soc. of America, Rochester, N.Y. (M. W. Shaw, Dept. of Biology, M. D. Anderson Hospital and Tumor Inst., Houston, Tex. 77025)

23–26. **Biometric** Soc., eastern North American regional, Fort Collins, Colo. (F. B. Cady, Jr., Dept. of Statistics, Univ. of Kentucky, Lexington 40506)

23–26. American **Hospital** Assoc., 73rd annual, Chicago, Ill. (E. L. Crosby, AHA, 840 N. Lake Shore Dr., Chicago 60611)

23–26. American **Statistical** Assoc., 131st annual, Fort Collins, Colo. (J. W. Lehman, ASA, 806 15th St., NW, Washington, D.C. 20005)

23–27. **Magnetic Resonance,** 4th intern. symp., Jerusalem, Israel. (D. Fiat, P.O. Box 26, Weizmann Inst. of Science, Rehovoth, Israel)

23–27. **Medical and Biological Engineering,** 9th intern. congr., Melbourne, Australia. (D. J. Dewhurst, Dept. of Physiology, Univ of Melbourne, Parkville, 2052 Victoria, Australia)

23–27. International Conf. on **Statistical Properties of Nuclei,** Albany, N.Y. (J. B. Garg, Nuclear Accelerator Lab., State Univ. of New York at Albany, 1400 Washington Ave., Albany 12203)

24–27. American **Astronomical** Soc. Amherst, Mass. (H. M. Gurin, AAS, 211 Fitzrandolph Rd., Princeton, N.J. 08540)

25–27. **Geoscience Electronics,** 3rd intern. symp., Washington, D.C. (R. Bernstein, IBM Corp., 18100 Frederick Pike, Gaithersburg, Md. 20760)

25–27. **High Polymer** Forum, 16th annual, Waterloo, Ont. Canada. (D. J. Worsfold, Chemistry Div., National Research Council, Ottawa, Ont.)

25–27. American **Physical** Soc., Seattle, Wash. (W. W. Havens, Jr., APS, 335 E. 45 St., New York 10017)

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2. Winer, A.D., J. Biol. chem., **239**, PC 3598 (1964)

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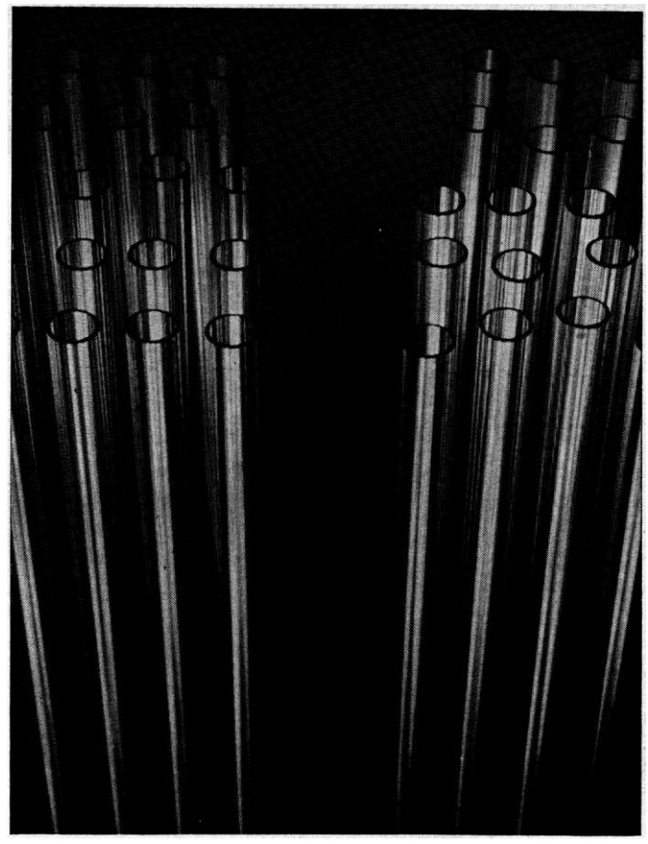

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25–28. **Pediatric Nephrology**, 2nd annual intern. symp., Paris, France. (R. Habib, Hôpital des Enfants Malades, 149 rue de Sevres, Paris 15°, France)

26–28. International **Cardiovascular** Soc., 10th intern. congr., Moscow, U.S.S.R. (A. D. Callow, 171 Harrison Ave., Boston, Mass. 02111)

26–28. National Council of **Teachers of Mathematics**, Duluth, Minn. (Secretary, NCTM, 1201 16th St., Washington, D.C. 20036)

26–29. United **Ostomy** Assoc., Miami Beach, Fla. (D. P. Binder, UOA, 1111 Wilshire Blvd., Los Angeles, Calif. 90017)

26–29. International **Pollution Control** Conf., Lund, Sweden. (S. Dedijer, Univ. of Lund, Lund)

26–29. Rural **Sociological** Soc., Denver, Colo. (H. M. Sauer, Dept. of Rural Sociology, South Dakota State Univ., Brookings 57006)

27–3. **Refrigeration and Air Conditioning** in the Service of Mankind, 13th intern. congr., Washington, D.C. (W. T. Pentzer, National Acad. of Sciences, 2101 Constitution Ave., NW, Washington D.C. 20418)

29–30. **Occupational Health**, Grand Teton Natl. Park, Wyo. (Secretary, Dept. of Occupational Health, American Medical Assoc., 535 N. Dearborn St., Chicago, Ill. 60610)

29–1. American Inst. of **Chemical Engineers**, 70th annual, Atlantic City, N.J. (P. W. Snyder, Mobil Research & Development Corp., Paulsboro, N.J. 08066)

29–1. Recent Advances in **Electronic, Optical, and Magnetic Materials**, 13th annual, San Francisco, Calif. (J. J. Tietjen, RCA David Sarnoff Research Center, Princeton, N.J. 08540)

29–3. American Inst. of **Biological Sciences**, Fort Collins, Colo. (J. R. Olive, AIBS, 3900 Wisconsin Ave., NW, Washington, D.C. 20016)

29–3. **Ecological** Soc. of America, Fort Collins, Colo. (W. A. Niering, Box 1511, Connecticut College, New London 06320)

29–3. International **Embryological** Conf., 10th congr., Glasgow, Scotland. (A. S. G. Curtis, Dept. of Cell Biology, Univ. of Glasgow, Glasgow, W.2)

29–3. Association for **Hydraulic Research**, 14th intern. congr., Paris, France. (J. C. Lebreton, Laboratoire National de Chatou, 6 Quai Watier, 78-Chatou, France)

29–4. Union of **History and Philosophy of Science**, 4th intern. congr., Bucharest, Roumania. (N. Rescher, Dept. of Philosophy, Univ. of Pittsburgh, Pittsburgh, Pa. 15213)

29–4. Society for **Industrial Microbiology**, Fort Collins, Colo. (W. W. Leathen, Gulf Research & Development Co., P.O. Drawer 2038. Pittsburgh, Pa. 15230)

29–4. **Pediatrics**, 13th intern. congr., Vienna, Austria. (H. Asperger, Universitats Kinderklinik, Spitalgasse 23, A-1090, Vienna 9)

29–4. **Soil-Water Physics and Technology**, Rehovoth, Israel. (Meetings Officer, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

30–1. Instrument Soc. of America, **Biomedical Instrumentation** Symp., Milwaukee, Wis. (J. Mortley, Div. 7334, Sandia Labs., Albuquerque, N.M. 87115)

30–1. **Mathematical** Assoc. of America, University Park, Pa. (A. B. Wilcox, MAA, 1225 Connecticut Ave., NW, Washington, D.C. 20036)

30–2. Society for **Cryobiology**, 8th annual, Washington, D.C. (A. B. Callahan, Code 444, Medicine and Dentistry Program, Naval Research Office, Arlington, Va. 21277)

30–2. Western Hemisphere **Nutrition** Congr., Bal Harbour, Fla. (Secretary, Council on Foods and Nutrition, American Medical Assoc., 535 N. Dearborn St., Chicago, Ill. 60610)

30–2. Society of **Photo-Optical Instrument Engineers**, 16th technical symp., North Hollywood, Calif. (Technical Program Committee, SPIE, P.O. Box 288, Redondo Beach, Calif. 90277)

30–2. American **Sociological** Assoc., Denver, Colo. (N. J. Demerath, ASA, 1001 Connecticut Ave., NW, Washington, D.C. 20036)

30–2. **Tritium** Symp., Las Vegas, Nev. (A. A. Moghissi, Southwestern Radiological Health Lab., P.O. Box 15027, Las Vegas 89114)

30–2. **Vacuum UV Radiation Physics**, 3rd intern conf., Tokyo, Japan. (Meetings Officer, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

30–3. International Symp. on **Chemical Education**, São Paulo, Brazil. (E. Glesbrecht, Instituto de Quimica, Universidade de São Paulo, Cala Postal 8105, São Paulo)

30–3. American **Mathematical** Soc., University Park, Pa. (G. L. Walker, AMS, P.O. Box 6248, Providence, R.I. 02904)

30–3. American **Ornithologists** Union, Seattle, Wash. (R. C. Banks, Bird and Mammal Labs., E-600, Natl. Museum of Natural History, Washington, D.C. 20560)

30–3. International Soc. of **Stereology**, 3rd intern. congr., Bern, Switzerland. (H. Giger, Anaomisches Institut, Buhlstrasse 26, 3000 Bern, Switzerland)

30–4. World Congr. on **Nuclear Medicine and Biology**, Montreal, P.Q., Canada. (J. Sternberg, Univ. of Montreal, Montreal)

30–4. **Sedimentology**, 8th intern. congr., Heidelberg, Germany. (G. Muller, Lab. Sedimentforschung, Min-Petr Inst., Univ. of Heidelberg, 69 Heidelberg Berliner Str 19, West Germany)

31–3. **Free Radicals**, 10th annual intern. symp., Lyon-Villeurbanne, France. (M. Peyron, Dept. of Chimie, Inst. Natl. des Sciences Appliquees, 60 Villeurbanne, France)

31–7. European **Population** Conf., 2nd, Strasbourg, France. (P. Hornecker, Council of Europe, Strasbourg)

September

1–6. **Ecology and Physiology of Root Growth**, 2nd intern. conf., Potsdam, Germany. (G. Hoffmann, Inst. fur Forstwissenschaften, Alfred-Moller-Strasse, 13 Eberswalde DDR Germany)

1–7. **Air Pollution Control and Noise Abatement**, 2nd intern. conf., Jonkoping, Sweden. (Secretary, ELMIA AB, Box 6066, 550 06 Jonkoping 6)

1–8. British Assoc. for the **Advance-**

ment of Science, Swansea, England. (J. M. Robertson, 3 Sanctuary Bldgs., 20 Great Smith St., London, S.W.1, England)

1–10. Federation of **Surveyors**, 13th intern. congr., Wiesbaden, Germany. (R. Steel, 47 Tothill St., London, S.W.1, England)

2–4. **Control of Human Aging**, intern. conf., Zurich, Switzerland. (J. G. Cartwright, Gottlieb Duttweiler Inst. for Economic and Social Studies, 8803 Ruschlikon-Zurich)

2–4. **Nucleic Acids and Proteins in Higher Plants**, Tihany, Hungary. (G. L. Farkas, Inst. of Plant Physiology, Hungarian Acad. of Sciences, Karolina ut 29, Budapest XI)

3–7. American **Psychological** Assoc., Washington, D.C. (T. G. Driscoll, Driscoll and Assocs., 7109 Masters Dr., Potomac, Md. 20854)

3–7. **Psychometric** Soc., Washington, D.C. (W. B. Schrader, Educational Testing Service, Princeton, N.J. 08540)

4–7. Society of **General Physiologists**, Woods Hole, Mass. (M. Lieberman, Duke Univ., Medical Center, Durham, N.C. 27706)

5–12. **Women Engineers and Scientists**, 3rd intern. conf., Turin, Italy. (Conference Secretariat, Corso Vinzaglio, 14 10121 Torino)

6–8. International League against **Epilepsy**, 4th European symp., Amsterdam, Netherlands. (O. Magnus, St. Ursula Kliniek, Wassenaar, Netherlands)

6–8. **Photochemistry**, 6th intern. conf., Bordeaux, France. (J. Joussot-Debien, Faculty of Sciences of Bordeaux, 351 Cours de la Liberation, 33 Talence, France)

6–10. **Atomic Masses and Fundamental Physical Constants**, 4th intern. conf., Teddington, England. (Meetings Officer, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

6–10. **Color Center in Ionic Crystals**, Reading, England. (J. J. Thomsen, Physical Lab., The University, Whiteknights, Reading RG6 2AF, Berkshire, England)

6–10. European Colloquium of **Geochronology**, Brussels, Belgium. (S. Deutsch, Facultes des Sciences, Université Libre de Bruxelles, 50, Ave. F. D. Roosevelt, Brussels)

6–11. **Human Genetics**, 4th annual intern. congr., Paris, France. (J. de Grouchy, Hôpital des Enfants Malades, 149 rue de Sevres, Paris 15°, France)

6–12. **Civilization Diseases, Nutrition and Living Conditions**, 17th intern., Montreux, Switzerland. (Secretary, Intern. Soc. for Research on Civilization Diseases and Vital Substances, 3 Hannover-Kirchrode, Bemerderstrasse 61, West Germany)

6–13. International Soc. of **Soil Science**, Stuttgart, Germany. (Secretary General, ISSS, c/o Royal Tropical Inst., 63 Mauritskade, Amsterdam, Netherlands)

6–16. **Peaceful Uses of Atomic Energy**, 4th intern. conf., Geneva, Switzerland. (D. S. G. Lewis, Geneva Conf. Secretary, 11 Charles II St., London, S.W.1, England)

6–16. U.S.–Australia **Weather Modification** Conf., Canberra, Australia. (E. G. Droessler, Office of the Vice President for Research, State Univ. of New York, 1400 Washington Ave., Albany 12203)

7–9. **Computers for Analysis and Control in Medical and Biological Research**, Sheffield, England. (Secretary, Conference Dept., Inst. of Electrical and Electronics Engineers, Inc., Savoy Pl., London, WC2R OBL, England)

7–10. **Electron Spectroscopy**, intern. conf., Pacific Grove, Calif. (D. A. Shirley, Dept. of Chemistry, Univ. of California, Berkeley 94720)

7–10. **Human Locomotor Engineering**, Sussex, England. (Secretary, Inst. of Mechanical Engineers, 1 Birdcage Walk, Westminster, London, W.W.1, England)

7–10. **Organic Geochemistry**, 5th intern., Hanover, Germany. (H. Wehner, Bundesanstalt fur Bodenfoshchung, Postfach 54, 3 Hannover-Buchholz)

7–11. **Computational Photogrammetry**, San Francisco, Calif. (J. E. Anderson, Civil Engineering Dept., Univ. of California, Berkeley 94720)

7–12. **High Energy in Nuclear Structure**, Dubra, U.S.S.R. (Secretary, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London S.W.1, England)

7–12. **Optimizing Drug Activity**, 31st intern. congr., Washington, D.C. (G. B. Griffenhagen, American Pharmaceutical Assoc., 2215 Constitution Ave., NW, Washington, D.C. 20037)

7–16. International **Mycological** Congr., Exeter, England. (J. Webster, Dept. of Biological Sciences, The University, Prince of Wales Rd., Exeter, Devon)

8–9. **High Voltage Insulation in Vacuum**, 2nd annual conf., London, England. (Meetings Officer, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1)

8–10. **Design Automation**, intern. conf., Toronto, Canada. (A. Seireg, Dept. of Mechanical Engineering, Univ. of Wisconsin, Madison 53706)

8–10. **Pharmacology of Antiepileptic Drugs**, Scottsdale, Ariz. (J. K. Penry, Bldg. 36, Room 5D-10, Natl. Inst. of Neurological Diseases and Stroke, Bethesda, Md. 20014)

8–10. Society of **Therapeutic Chemistry**, 8th intern., Lyon, France. (H. Pacherco, Service de Chimie Biologique, INSA 20 Ave. Albert Einstein, 69 Villeurbanne, Lyon)

8–10. **Urban Transportation**, 5th intern., Pittsburgh, Pa. (A. V. Harris, Pittsburgh Urban Transit Council, U.S. Dept. of Transportation, Transportation Research Inst. of Carnegie-Mellon Univ., P.O. Box 2149, Pittsburgh 15230)

8–11. **Drugs Affecting Lipid Metabolism**, 4th intern. symp., Philadelphia, Pa. (W. L. Holmes, Lankenau Hospital, Lancaster and City Line Aves., Philadelphia 19151)

8–11. International Assoc. of **Gerontology**, Bern, Switzerland. (B. Steinmann, Medizinische Abteilung C. L. Laury-Haus, Inselspital Bern, 3008, Bern)

8–12. National Conf. on **Mechanical Vibrations**, 3rd annual, Toronto, Ont., Canada. (P. W. Curwen, Mechanical Tech. Inc., 968 Albany-Shaker Rd., Lathan, N.Y. 12110)

8–15. **Illumination.** 17th intern. conf., Barcelona, Spain. (Secretary, Intern. Commission on Illumination, 25 rue de la Pepiniere, Paris 8°, France)

9–10. **Aerospace Mechanisms**, 6th an-

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nual symp., Moffett Field, Calif. (G. G. Herzl, ORGN. 52-60, Bldg. 201, Lockheed Missiles and Space Co., 3251 Hanover St., Palo Alto, Calif. 94304)

9–11. **Cardiovascular** Soc., 10th intern., Moscow, U.S.S.R. (A. D. Callow, 171 Harrison Ave., Boston, Mass. 02111)

9–11. American Assoc. of **Obstetricians and Gynecologists**, Hot Springs, Va. (C. A. Hunter, Jr., Indiana Univ. Medical Center, 1100 W. Michigan St., Indianapolis, Ind. 46202)

9–11. **Parapsychological** Assoc., Montreal, P.Q., Canada. (C. Honorton, Dept. of Psychiatry, Maimonides Medical Center, 4802 Tenth Ave., Brooklyn, N.Y.)

9–11. **Photosensitization in Solids**, 3rd intern. conf., Sarlat, Dordogne, France. (J. Bourdon, Centre de Recherches Kodak-Pathe, 30 rue des Vignerons, 94 Vincennes, France)

9–15. Union of **Prehistoric and Protohistoric Sciences**, 8th intern., Belgrade, Yugoslavia. (A. Benac, Archeoloski Inst., Knez Mihajlova 35-11, Belgrade)

10–12. International Soc. of **Hematology**, Milan, Italy. (A. T. Maiolo, Istituto di Pathologia Medica, Via Pace 15, 20122 Milan)

12–15. Canadian **Agricultural Chemicals** Assoc., 12th annual, Montreal, P.Q., Canada. (J. Chevalier, Suite 1004, 1010 Ste. Catherine St., W., Montreal)

12–15. **Ceramic-Metal Systems** Div., American Ceramic Soc., St. Louis, Mo. (Secretary, ACS, 4055 N. High St., Columbus, Ohio 43214)

12–16. American Assoc. of **Blood Banks**, Chicago, Ill. (L. J. James, 30 N. Michigan Ave., Chicago 60602)

12–17. **American Chemical** Soc., 162nd natl. fall mtg., Washington, D.C. (F. T. Wall, ACS, 1155 16th St., NW, Washington, D.C. 20036)

12–17. **Gas Dynamics of Explosions and Reactive Systems**, 3rd intern. congr., Marseille, France. (H. van Gelder, Intern. Acad. of Astronautics, 250 rue St. Jacques, Paris, France 19159)

12–18. International Symp. on **Sexology**, Stockholm, Sweden. (Secretary, Swedish Assoc. for Sex Education, Box 17006, 104 62 Stockholm 17)

12–18. **Solid State Physics**, European Physical Soc., Florence, Italy. (A. B. Lidiard, Atomic Energy Research Establishment, Bldg. 89, Harwell, Didcot, Berkshire, England)

13–15. **Petroleum and Chemical Industry** Technical Conf., Atlanta, Ga. (Secretary, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

13–15. **Plant Engineering**, intern. conf., Anaheim, Calif. (G. Paula, 796 S. Earlham St., Orange, Calif. 92669)

13–15. **Surface Chemistry of Oxides**, London, England. (Secretary, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1)

13–16. Institute on **Hospital and Community Psychiatry**, Seattle, Wash. (R. L. Robinson, Public Information Officer, 1700 18th St., NW, Washington, D.C. 20009)

13–17. **Coal Workers Pneumoconiosis**, intern. conf., New York, N.Y. (L. R. Neville, New York Acad. of Sciences, 2 E. 63 St., New York 10021)

13–17. **Comparative Leukemia Research**, 5th intern. symp., Padova-Venice, Italy. (R. M. Dutcher, Leukemia Soc. of America, Inc., 211 E. 43 St., New York 10017)

13–17. World **Medical** Assoc., 25th assembly, Ottawa, Ont., Canada. (A. Z. Romualdez, 10 Columbus Circle, New York 10019)

13–17. **Photoelectric Image Devices**, 5th annual, London, England. (B. L. Morgan, Physics Dept., Imperial College, Prince Consort Rd., London, S.W.7)

13–17. Institute of **Water Pollution Control**, Brighton, Sussex, England. (Secretary, Inst. of Water Pollution Control, 49-55 Victoria St., London S.W.1, England)

13–18. **Biodeterioration**, 2nd intern. symp., Luntern, Netherlands. (Congress Secretariat, Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands)

13–18. **Dynamics of Ionized Gases**, Tokyo, Japan. (Prof. Sato, Inst. of Space and Aeronautical Sciences, Univ. of Tokyo, Komaba, Meguroku, Tokyo)

14–16. International Conf. on **Engineering in the Ocean Environment**, San Diego, Calif. (M. Nelles, Bissett-Berman Corp., 3939 Ruffin Rd., San Diego 92123)

14–16. **Solid State Devices**, 5th annual conf., Lancaster, England. (Secretary, Inst. of Physics and Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

14–17. International Union for **Pure and Applied Biophysics**, Baden near Vienna, Austria. (Mrs. E. Weidenhaus, Wiener Medizinische Akademia, Stadiongasse 6-8, A 1010 Vienna)

14–17. **Radioecology as Applied to the Protection of Man and His Environment**, Rome, Italy. (J. Smeets, Commission of the European Communities, 29, rue Aldringen, Luxemborg, Grand Duchy)

14–20. American **Electroencephalographic** Soc., Minneapolis, Minn. (P. T. White, Marquette School of Medicine, 8700 W. Wisconsin Ave., Milwaukee, Wis.)

15–17. **Engineering** Inst. of Canada, 85th annual, Quebec City, P.Q. (General Manager, EIC, 2050 Mansfield St., Montreal 110, P.Q., Canada)

15–17. American **Fisheries** Soc., Salt Lake City, Utah. (R. F. Hutton, AFS, Washington Bldg., Suite 1040, 15th and New York Ave., Washington, D.C. 20005)

15–17. Canadian **Informational Processing** Soc., Computer Show, Toronto, Ont. (J. Gillies, CIPS, P.O. Box 484, Waterloo, Ont., Canada)

15–18. American Assoc. of **Medical Clinics**, Cleveland, Ohio. (E. M. Wurzel, AAMC, 719 Prince St., Alexandria, Va. 22313)

15–19. **Drug, Chemical and Allied Trades** Assoc., Scottsdale, Ariz. (J. D. Madden, Suite 3014, 350 Fifth Ave., New York 10001)

15–19. American **Medical Writers** Assoc., Chicago, Ill. (W. W. Curtis, AMWA, Suite 417, 420 Lexington Ave., New York 10017)

17–18. **Eye Bank** Assoc. of America, Las Vegas, Nev. (W. B. Clark, EBAA, 1111 Tulane Ave., New Orleans, La. 70112)

17–18. Scandinavian **Neurosurgical** Soc., 23rd intern. congr., Lund, Sweden. (N. Lundberg, Neurosurgical Dept., University Hospital, 22005 Lund 5)

17–19. Mid-Continent **Psychiatric** Assoc., Columbia, Mo. (D. T. Collins, Menninger Foundation, Box 829, Topeka, Kan. 66601)