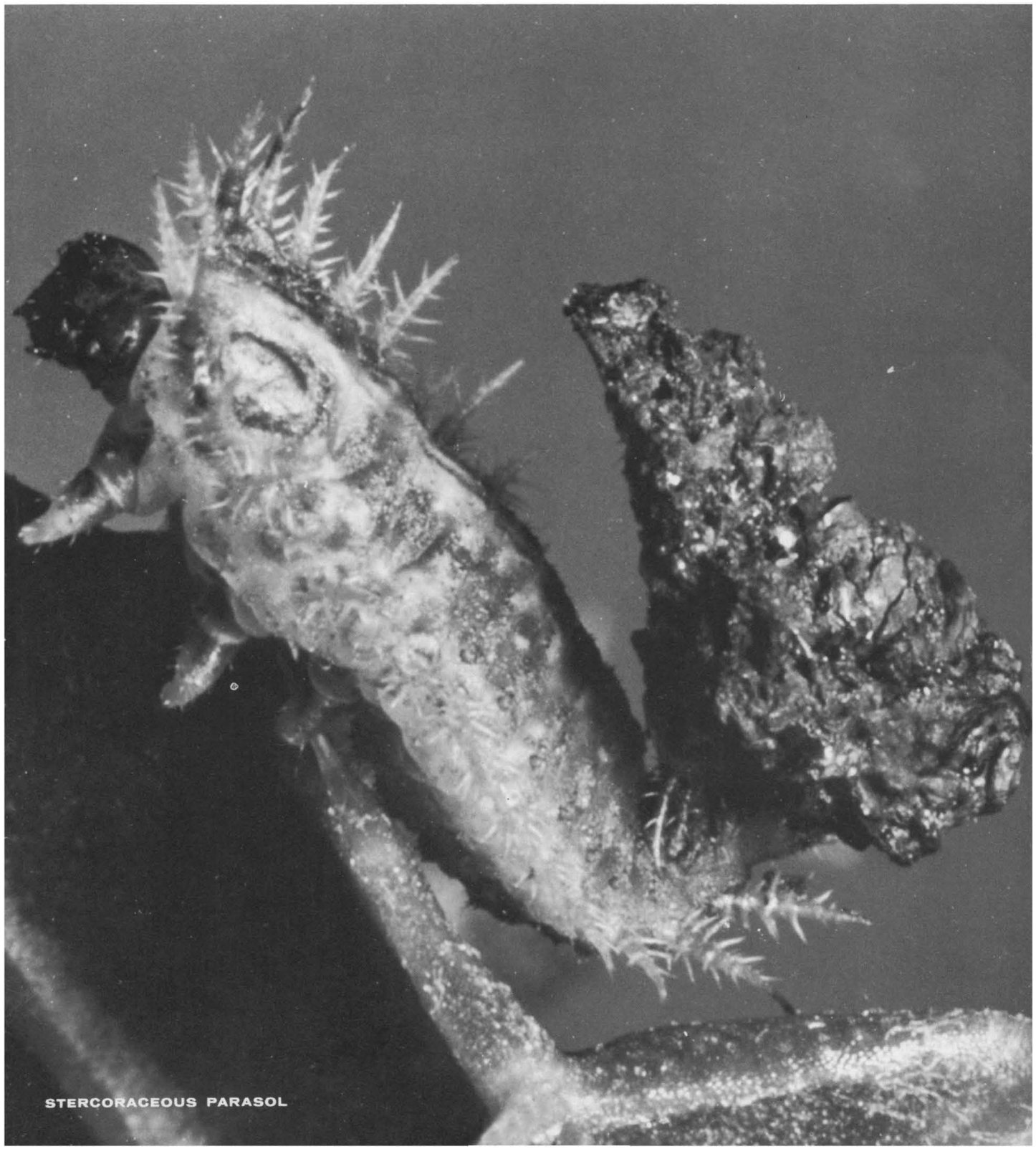
SCIENCE 15 December 1967
Vol. 158, No. 3807
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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COVER

Larva of the beetle *Cassida rubiginosa*. The packet over its back, which consists of dried feces and molted skins, is a maneuverable shield used effectively in defense against ants. (Actual length of larva, 7 millimeters.) See page 1471. [T. Eisner, E. van Tassel, and J. E. Carrel, Cornell University]

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People who have used our new Hitachi Perkin-Elmer MPF-2A tell us it has the kind of performance they never expected to see in a fluorescence spectrophotometer.

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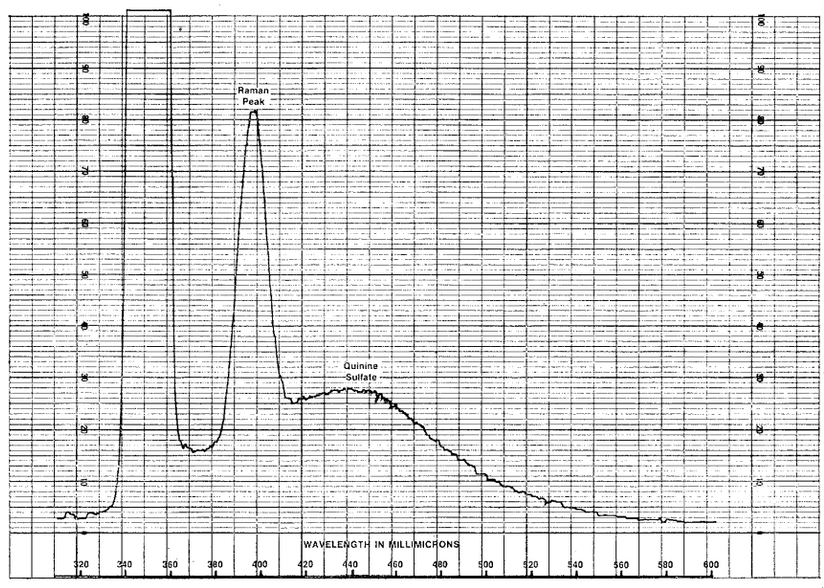

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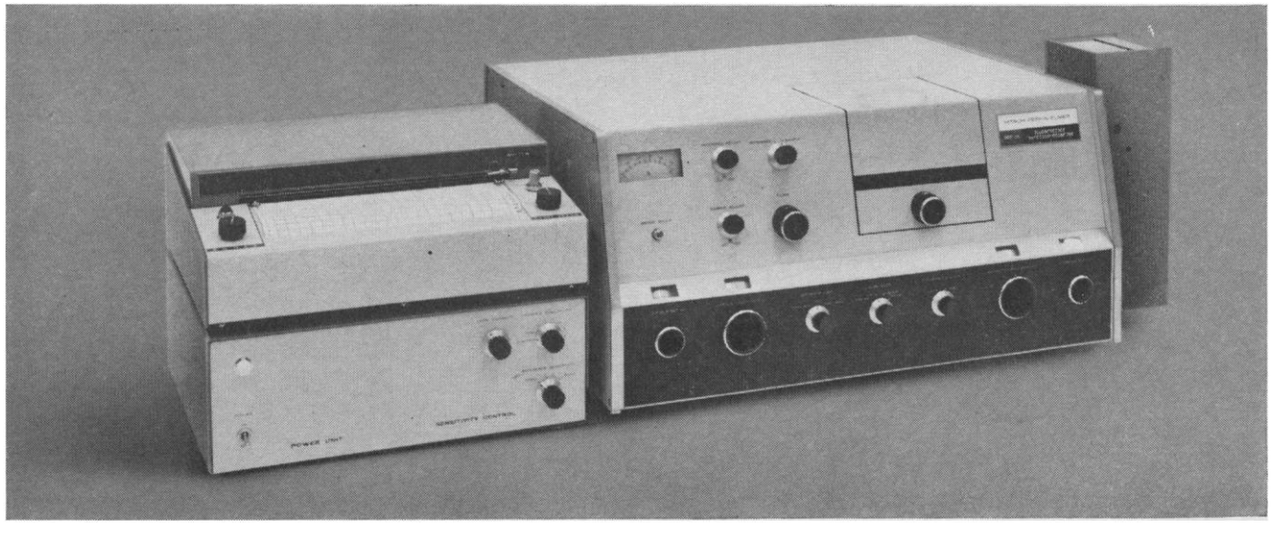

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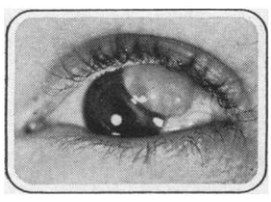
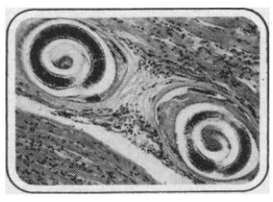
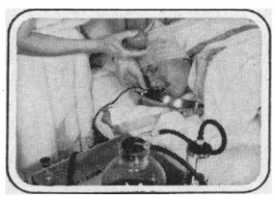
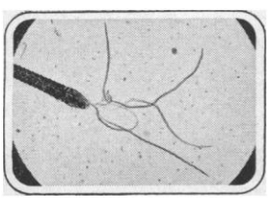


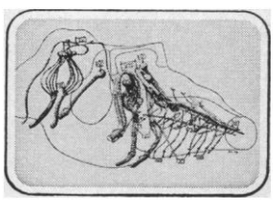

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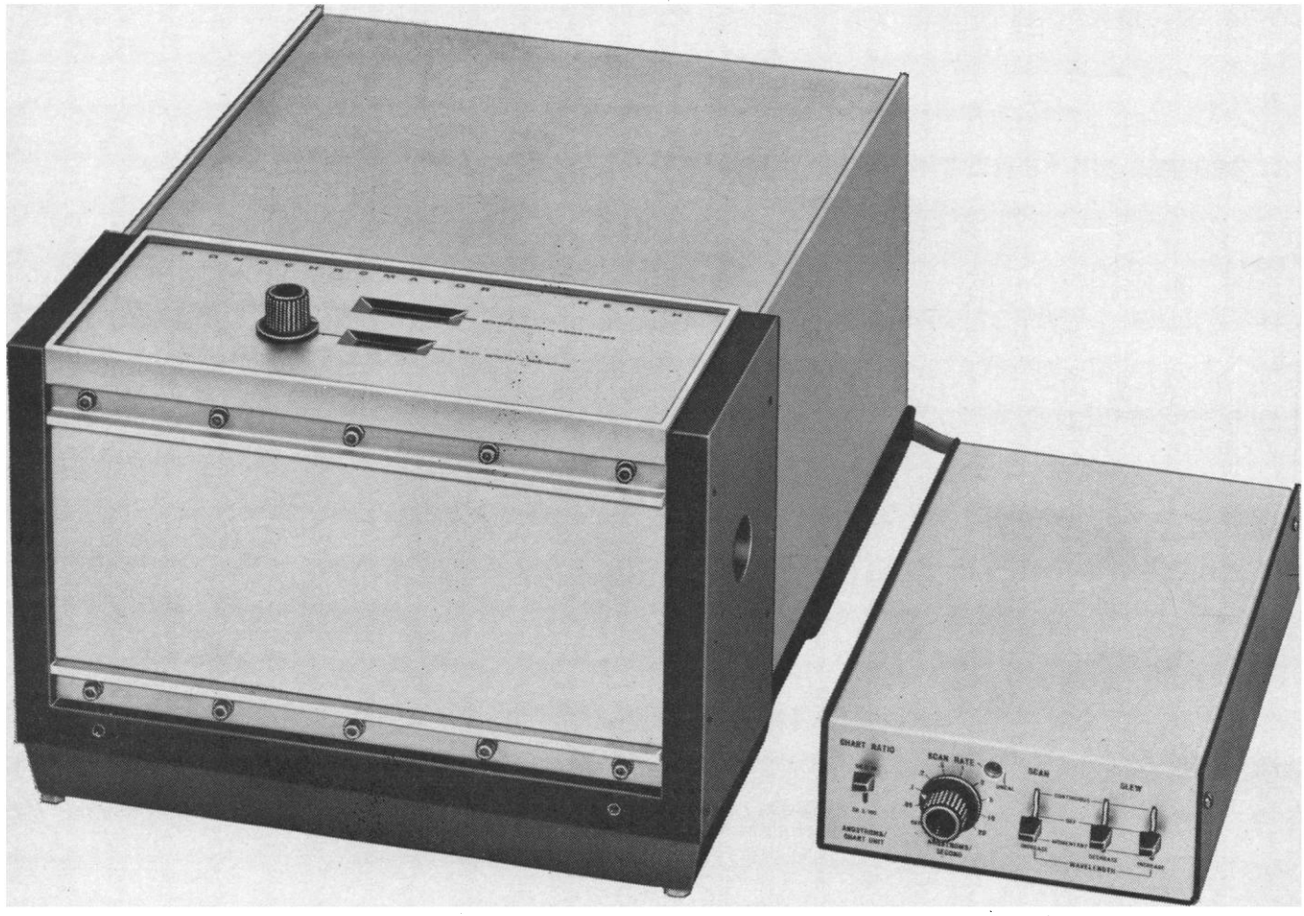

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First module* of a versatile high-quality spectroscopy system . . . designed to fulfill requirements of educational and research laboratories . . . ready for delivery in December. Its price . . . only $1195.

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Precision where it counts . . . high accuracy and stability . . . in optics, mechanical design and electronics. Example: The Heath "700" has better than one Angstrom resolution and ± one Angstrom tracking accuracy.

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The new Heath Spectroscopy instruments are in keeping with the company philosophy of optimum value . . . you get more performance per dollar invested.

Here are examples of Heath's Modular Design:

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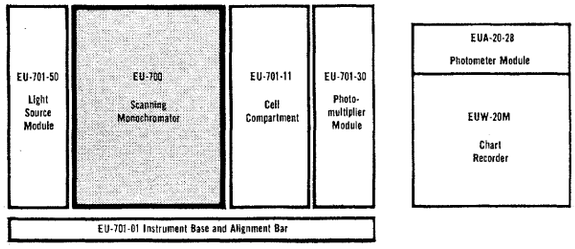
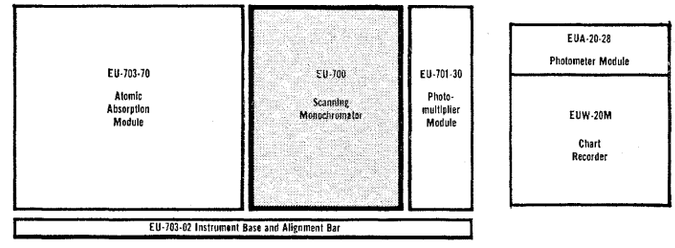


Atomic Absorption, Fluorescence, & Flame Emission Spectrophotometer



Shown above are illustrations of the modular concept common to all Heath scientific instrumentation. The "700" Monochromator is a basic module of these and a whole series of future instruments. And as new techniques are accepted, Heath will offer the required modules.

Accessory modules shown above will be available in 1968. This concept assures research-quality performance at low cost, keeps your equipment at state-of-the-art, and encourages modification to your exact needs.

Here are features of the first module . . . the new HEATH "700" Scanning Monochromator

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Czerny-Turner Type, f/7, 350 mm focal length. High quality grating, 30,000 lines per inch, broad blazed for ultraviolet-visible range, zero order to 10,000 Angstroms first order. Precision ground and overcoated mirrors. Resolution better than one angstrom.

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Rates: zero to 20 Angstroms per second. Nine fixed rates. Also easily programmed with external sources for continuously variable rates. Electronic pulses, developed internally through integrated-circuit digital techniques, control the wavelength drive in 0.1 Angstrom steps. Bi-directional slewing permits rapid change greater than 5,000 Angstroms per minute. All controls in separate unit for remote operation.

Recorder Readout

The "700" Monochromator provides synchronizing pulses for the Heath EUW-20M Chart Recorder to lock it electronically to the wavelength drive for direct readout in Angstroms per inch, regardless of scan rate. Twelve ratios available.

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Rigid aluminum-alloy base castings with precision machined surfaces. Tracking accuracy better than ± 1 Angstrom. System alignment is automatic, exact, with complete flexibility.

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Knife edges of bilateral slits move symmetrically with respect to optical axis; ganged entrance and exit slits; readout directly in microns on 4-digit counter; new slit design assures parallelism, repeatability, and smooth control.

Purgable

Enclosure is purgable with dry nitrogen to extend the range below 2,000 Angstroms in the ultra-violet region.

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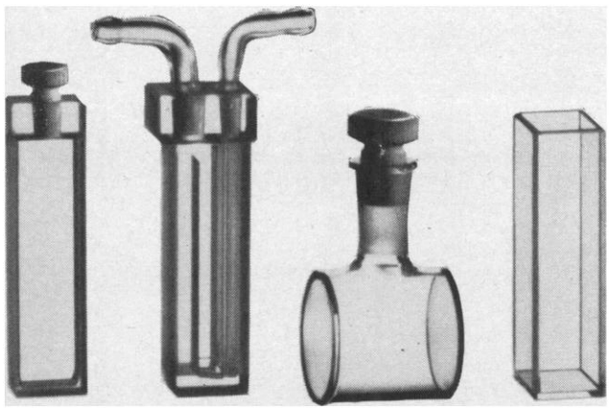

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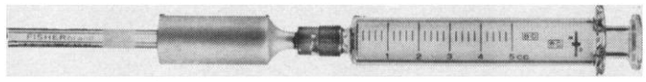

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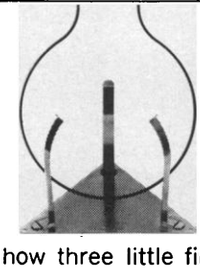

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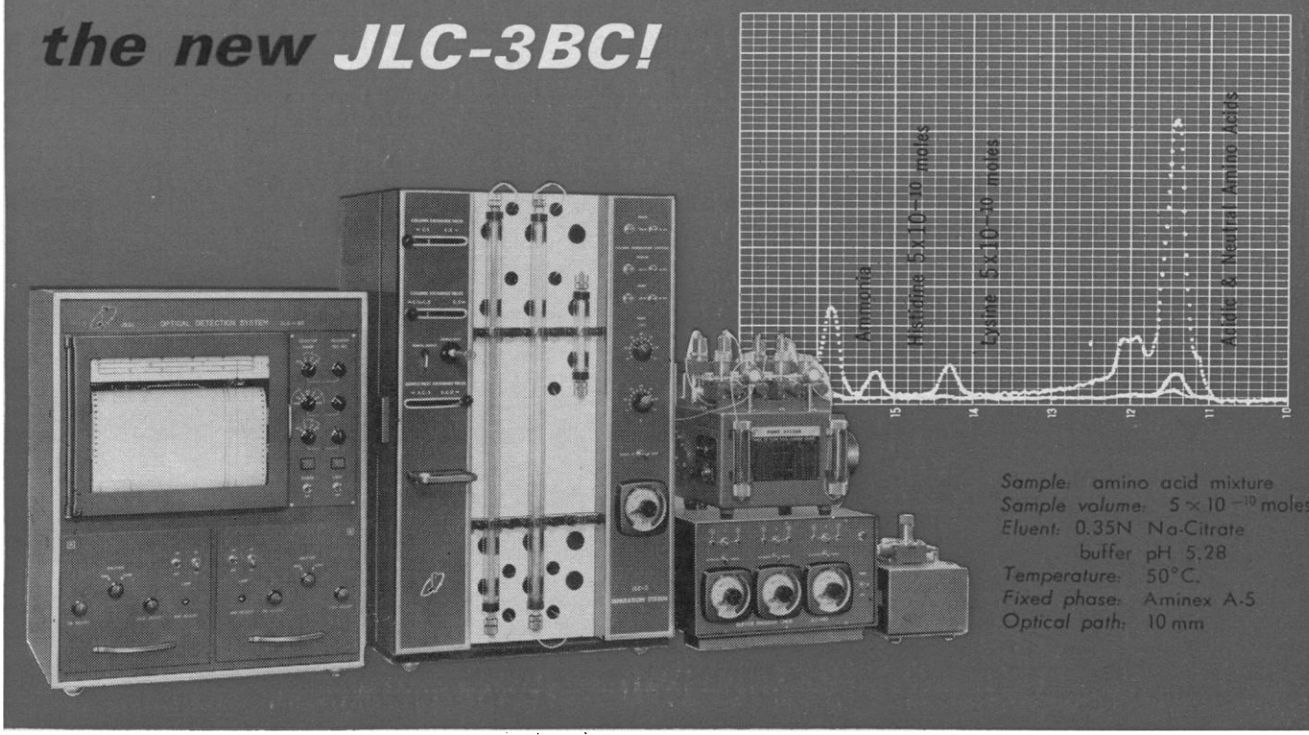

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*UV detector for proteins and nucleic acids–visible light detector for amino acids.

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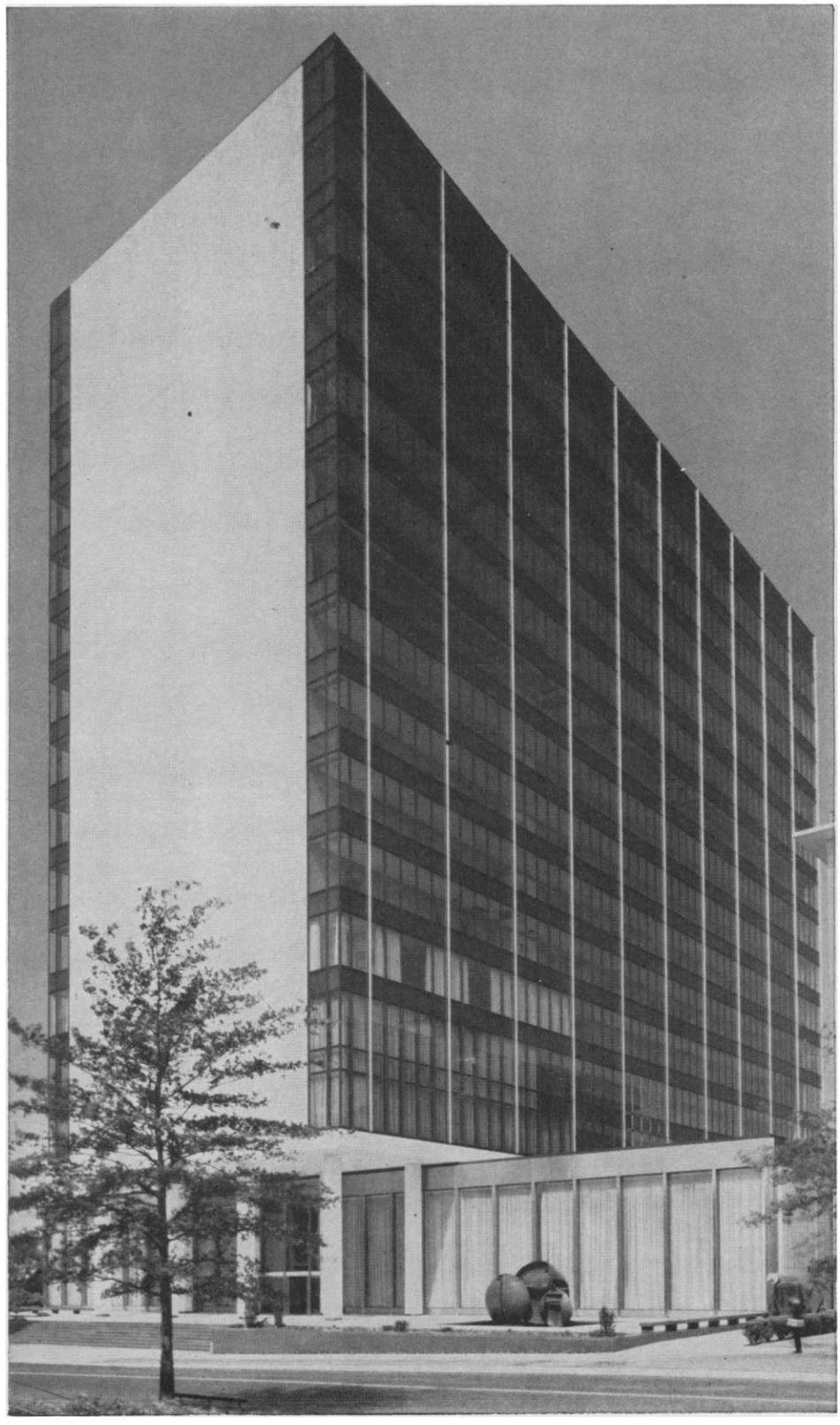

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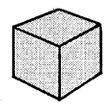

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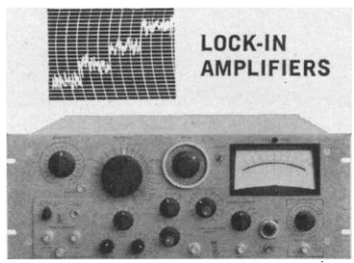
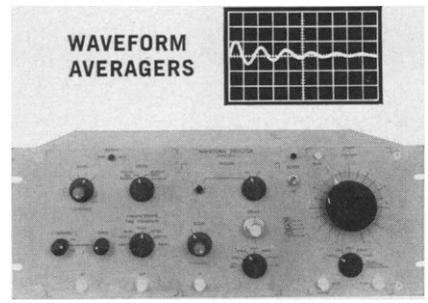
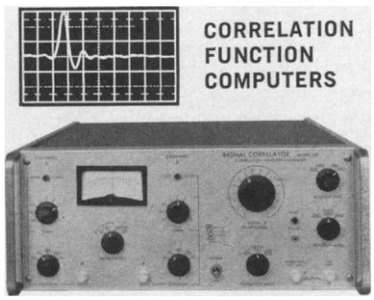


Lock-In Amplifiers have application where the signal of interest is or can be made to appear at a single frequency and where a reference voltage related in frequency and phase to the signal can be obtained. These instruments employ phase-sensitive detection and narrow-band filtering techniques to provide a DC output signal proportional to the amplitude of the fundamental component of the signal being measured. The Lock-In Amplifier can be described as a tuned voltmeter, the response of which is "locked" to that particular frequency and phase at which the signal information has been made to appear. They operate typically in the frequency range of 1.5 Hz to 150 kHz with full scale sensitivities down to 10^{-9} volts.

Waveform Averagers are useful when, after processing, the actual waveform of the signal of interest must be maintained and the signals are repetitive waveforms or transients whose onset can be related to a trigger pulse. The application of a synchronized, repetitive waveform will result in an output that corresponds to the average value at each of the segments of the waveform being studied, whereas any non-repetitive (or un-synchronized) signals such as noise will be suppressed since their average after many occurrences will approach zero. PAR makes two instruments that perform this function; the Boxcar Integrator and the Waveform Eductor.[T.M.] The Boxcar Integrator is a single point averager in which a single slice, as narrow as 1 microsecond, of the input waveform is averaged while the position of the slice is slowly scanned through the waveform. The Waveform Eductor simultaneously averages one hundred points of the waveform which can be distributed over periods varying from 100 microseconds to 10 seconds.





Correlation Function Computers are the most general form of signal processing equipment that can be constructed (Lock-In Amplifiers and Waveform Averagers are actually special cases of correlation equipment). Whereas a reference or synchronization signal is required in the other equipment discussed, autocorrelation analysis allows periodic and random signals to be defined without this restriction. An even more powerful technique is crosscorrelation which has the ability to describe the degree of conformity between two different signals as a function of their mutual delay. The PAR Signal Correlator simultaneously computes in real time 100 points of either the auto- or crosscorrelation function over total delay spans of 100 microseconds to 10 seconds.

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PRINCETON APPLIED RESEARCH CORP.

Any scientist desiring to work on biological aging will be warmly received by the NIH staff. But warm reception and shared philosophies do not necessarily imply flow of dollars; good research proposals are also a requirement.

Strehler's hope that "in 1977 a book review such as this would be an undiluted discussion of solid achievements" must rest largely on the attraction of bright, imaginative scientists into the field of aging. This will be accomplished by the demonstration of research competence in the laboratories where aging research is now in progress.

BERNARD M. WAGNER
College of Physicians and Surgeons, Columbia University, and *Rockefeller University, New York 10021*

. . . How can the present feeble research effort be improved? I would suggest . . . creation of a Research Commission on Aging which would be directly responsible to the President and Congress and the transfer to this commission of authority for all basic biological research on aging—in effect, formation of an AEC of biological aging.

There are very good reasons for taking so strong a stand. For one, Verzar's experimental work relating the amount of cross-linkage (chemical bonding between molecules not normally joined) in collagen to the age of the collagen is of the same order of importance to aging research as the discovery of nuclear fission was to nuclear research. (The developmental stages are quite comparable.) Another reason is that the impact upon the world will be even greater from the significant extension of the human lifespan than it has been from the application of nuclear power. . . .

Perhaps the greatest need is for the testing of the various hypotheses on the origin of aging. For example, at present there is a considerable question as to which is the more important in producing biological aging—the accumulation of nongenetic cross-linked material, or the accumulation of mutations. Further, there is the question of just how important cross-linkage is in producing mutations. Obviously these questions are not going to be answered by theoreticians alone; solid experimental data are essential. . . .

Why haven't steps been taken before now? There are a number of barriers, including psychological ones. The lingering influence of ancient moral and religious ideas predisposes people toward accepting the inevitability of aging. The story of Adam and Eve explains that mankind lost eternal youth through original sin, and stories of arrangements with the devil (Dr. Faustus) point the moral that the search for eternal youth is evil. . . . A military barrier may develop because of the possibility that men would be less willing to risk their lives in battle if the lifespan were longer and old age more attractive. . . . A political barrier might develop if certain heavily populated countries considered any effort at lowering the death rate to be a biological weapon intended for use against them. . . .

Yet considerable prestige would accrue to the country that first bestows extended youth upon the rest of the world, and an increased lifespan would permit an increased rate of scientific and economic progress. . . .

DONALD G. CARPENTER
Department of Physics, U. S. Air Force Academy, Colorado 80840

Unfortunately, Wagner's letter does not deal substantively with the historical issues discussed in my review. Of course, he has every right to interpret the past in the light of his own beliefs, but one might have hoped for something more than blanket denials of facts presented by the organization in question—facts that are generally substantiated by my own observations during the past 11 years as section chief in the Gerontology Branch, NICHHD, NIH.

Carpenter's observations are interesting and constructive; and although I, too, believe that a more intensive and systematic approach than that presently in effect is needed, if we are to understand this problem in the next quinquennium, I neither believe that anything as massive as a Manhattan Project is needed or desirable, nor that we should emphasize too heavily problematical political or military consequences of a breakthrough in this field. Rather, what is needed is primarily imaginative, dedicated, and constructive leadership within appropriate governmental or private organizations, and a corresponding resource commitment—a commitment smaller than that required for one Moon Shot.

BERNARD L. STREHLER
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Student Skeptics Study UFO's

The recent demonstrations in Washington and Wolfle's editorial, "Student unrest" (27 Oct., p. 443), as well as Tom Lehrer's records, show that young people "gotta have a cause," opposing U.S. government policy, or university faculty, or "the Establishment." It seems to me that this tendency to opposition can be effectively exploited in teaching science and other subjects. As an example, I am now teaching a course on "Flying Saucers," capitalizing on student interest in UFO reports that discredit the scientific establishment. The 50 students who signed up (for a class "limited to 20") will get the fundamentals of astronomy and physics that apply to UFO sightings. By the end of one semester, they should at least understand what is involved between the flying-saucer hypothesis and the laws of mechanics, radiation, and physics of the upper atmosphere (see Markowitz, "The physics and metaphysics of unidentified flying objects," 15 Sept., p. 1274). The only trouble is that I don't know enough social psychology to capitalize fully on this broad topic.

In the realm of physical science, it would help if E. U. Condon and his panel in Boulder, Colorado, would publish some statistics on the UFO reports, estimate the labor necessary to analyze one, and give interpretations of a few typical cases. Students will read such materials avidly (looking for loopholes) and will certainly learn some astronomy and physics in the process.

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Are Dental X-Rays Dangerous?

During Senate hearings on S. 2067, the bill which would set standards governing radiation hazards (15 Sept., p. 1292), Albert Richards, speaking for the American Dental Association, pointed out that dentists live an average of 1.4 years longer than the rest of the white male population and that dentists who die of diseases of the blood and blood-forming organs, including leukemia, live to an average age of 71.2 years while the parallel figure for the general population for death from these diseases is 68. His arguments are invalid for the following reasons:

1) The blood-forming organs, the bone marrow and the spleen, are deep within the body. A dentist is exposed only to scattered radiation which has a kilovolt-peak far lower than that of the primary beam. Therefore, only a very small percentage of this radiation would ever reach the blood-forming organs as most of it would be shielded out by the bones and overlying tissues.

2) There are less than 15,000 cases of leukemia in the United States per year. Therefore, the data may be statistically invalid, as there are less than 100,000 dentists practicing in a population of 200 million. If dentists were to get leukemia at the same rate as the general population, they would have roughly 7 to 7½ cases per year, and certainly in a group of 100,000, it is hard to see this as a statistically significant figure.

3) The universal use of x-ray in dentistry is an event of the last 20 years so that many of the older dentists have not had x-ray machines during their whole practice experience. Also, many have delegated this technique to assistants and hygienists.

Richards' figures comparing death rates from blood diseases of dentists with that of the general population are not realistic because virtually no dentists are under the age of 20, while many leukemia deaths occur among children. The incidence of skin cancer which could result from low kilovolt radiation would provide a more significant comparison. If the number of dentists having skin cancer were compared with another professional group not exposed to such radiation reliable data could be obtained. Most every dentist knows of a colleague who has contracted skin cancer from his x-ray machine.

FRED M. MEDWEDEFF
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Age-at-death figures referred to by Medwedeff are from the study entitled *Mortality of Dentists, 1955–1960,* by the American Dental Association's Bureau of Economic Research and Statistics. The study, based on death certificates of dentists received from a majority of the state health departments, covered a period of 6 years. In accord with the *International Classification of Diseases, Injuries, and Causes of Death* (World Health Organization, Geneva, ed. 7, 1957), leukemia and aleukemia were included under "neoplasms," not under "diseases of the

blood and blood-forming organs." The mean age at death of dentists dying from neoplasms was 67.5, compared to 66.3 for nondentists. These figures are for white males, and are age-adjusted to take into account age differences in the populations at risk (the number of living dentists 25 and older, and white male population 25 and older). No death occurring at age less than 25 was included for either dentists or nondentists, so Medwedeff's assertion that "virtually no dentists are under 20" is irrelevant and misleading.

Death from cancer was studied also in an earlier investigation conducted by the Bureau of Economic Research and Statistics, *Mortality of Dentists, 1951–1954*. The mean age at death caused by neoplasms was 67.7 for white male dentists 25 and older, and 65.2 for white male nondentists 25 and older. In this study, too, the difference in age distribution of the populations at risk was taken into account.

Therefore, over a period of 10 years, dentists dying from neoplasms were older than the comparable general population group dying from neoplasms.

In a national survey of dentists conducted by the Bureau in 1950, 92.4 percent reported having x-ray equipment in their offices. This would indicate that x-ray machines have been in wide use in dentistry for considerably longer than 20 years as indicated by Medwedeff. Certainly earlier equipment and procedures caused greater dentist exposure than current usage.

JOHN W. STANFORD
211 East Chicago Avenue, Chicago, Illinois 60611

Symbols and Symbolic Codes

The recent issue of *Science* (13 Oct.) was distressing for one interested in the development of symbols and symbolic codes for diagrams.

The new symbol for "biohazards" (*1*) was chosen on the basis of two criteria, one of which was "uniqueness," interpreted as lack of prior meaningful associations. A good deal of research has indicated that symbols capitalizing on appropriate prior associations and meaningful stimulus structure are often superior to arbitrary "signs" (*2*). When new symbols utilize arbitrary stimuli, it is not uncommon for lapses of meaning to occur, even with trained persons. Although the symbol chosen for biohazards may *become* meaningful for persons engaged in constant work on such projects, it would not seem to provide any strong avoidance associations for nonlaboratory personnel who might come across such materials accidentally. I cannot help wondering why previously learned avoidance meanings were not considered (apparently). Offhand, one might think a skull and crossed test tubes would convey the desired meaning to both laboratory and lay persons better than the symbol chosen.

Second, Walsh's article was marred by a map (p. 243) which violated rather well-established principles of "S-R compatibility" (*3*) and standard coding techniques. Looking at the map, one would think that Massachusetts, Maryland, New York, Pennsylvania, and Texas received the lion's share. The confusion obligations. Only in reading the fine print does one discover that California received the lions' share. The confusion is compounded by the fact that up until the final division, increased shading is more or less correlated with increased funding.

Whether one is dealing with a life-and-death matter (biohazards) or simply with graphic communication, it is unfortunate that both research findings and common sense are overlooked in the development of so many symbolic displays.

WILLIAM SCHIFF
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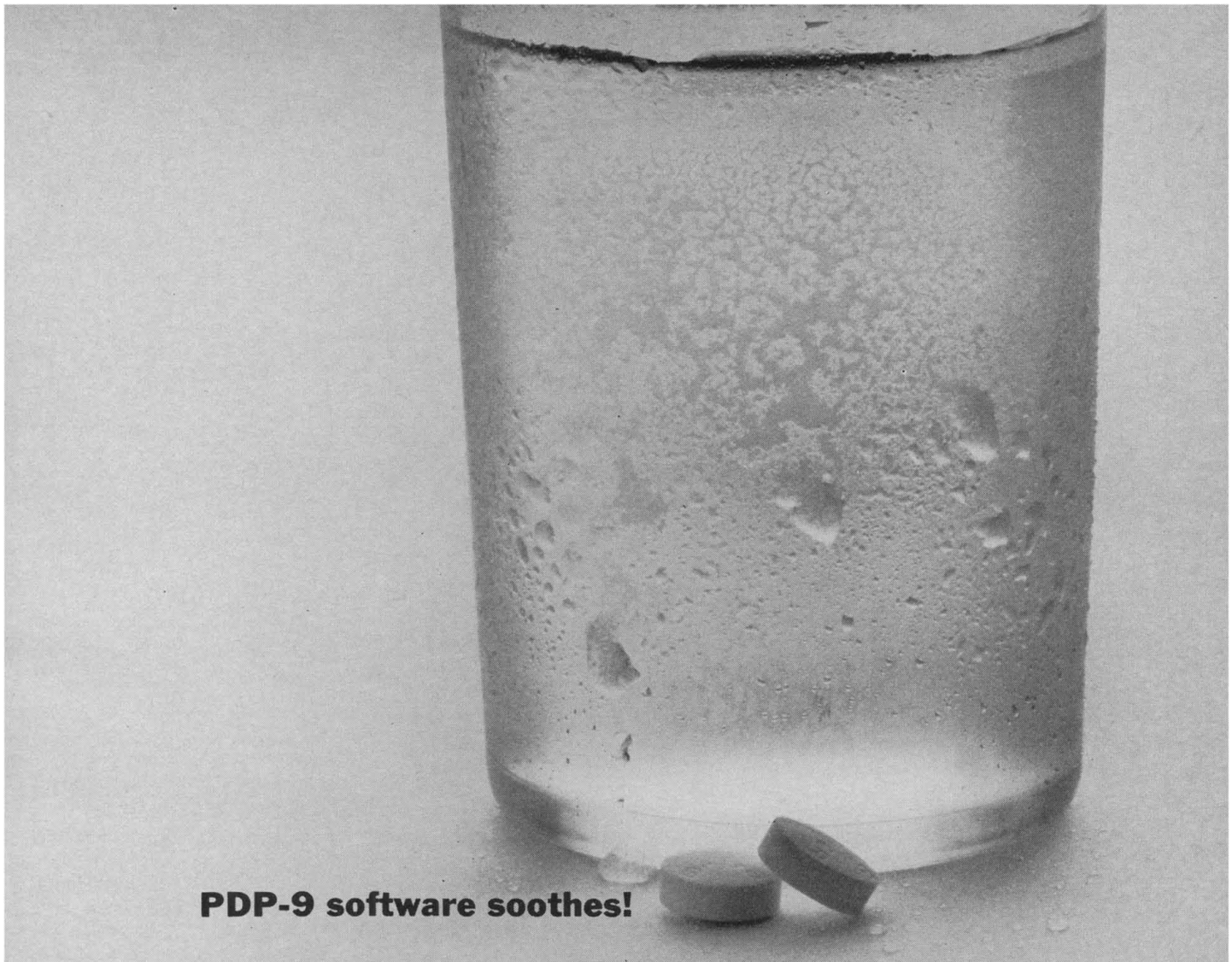
2. W. L. Carel, *General Electric Advanced Electronics Center Publ. No. R6ELC60* (1961); T. A. Ryan, *Amer. J. Psychol.* **51**, 629 (1938); W. Schiff and H. Isikow, *Intern. J. Educ. Blind* **15**, 1 (1966); W. Schiff, L. Kaufer, S. Mosak, *Perceptual Motor Skills* **23**, 1315 (1966); H. Werner and B. Kaplan, *Symbol Formation* (Wiley, New York, 1963).
3. P. M. Fitts and C. M. Seeger, *J. Exp. Psychol.* **46**, 199 (1953).

Reactions from Reed

Nelson's provocative and interesting article on Reed College (15 Sept., p. 1282) provided me with somewhat mixed emotions; one cannot help but cringe upon seeing one's beloved so exposed to public examination. In general, his facts seem to be both accurate and clearly presented, though somewhat more pessimistically interpreted than we feel is representative of our view. However, three points I believe should be clarified:

1) "Students here note a high sui-



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cide rate as well as the frequent seeking out of medical help to combat fatigue and despair." We have for many years taken pride in the high degree of confidence which exists between our students and the deans of students. The deans are thus in a position to know a great deal about student life and problems, and can give maximum counsel, recommending medical or psychological advice as required. Contrary to student myth, we have had *no* suicides on campus during the 11 years that I know personally at Reed, and only one by a registered student—at home during the summer.

2) "One of the things that worries some Reed educators is the fact that 40 percent of those who drop out never receive a B.A. from any institution." This figure is a complete mystery to us. Our self-study report of 1960 indicates that approximately 80 percent of Reed's dropouts continue their education at other institutions, and indeed that almost 50 percent of them are back in college within 1 year of leaving Reed.

3) "So far, three presidential prospects have turned down firm offers from Reed." In fact, *no* firm offers have been made! That is not the way we play the game. We have invited a number of prospects to campus for closer acquaintance, have become very interested in two of these, but both have decided for rather personal reasons to discontinue the courtship. One felt quite personally involved in administrative commitments involving a number of other people at his own institution whom he did not wish to ditch; the other was an active scholar who still had several books to get off his chest before going into administration.

BYRON L. YOUTZ
Office of the President,
Reed College, Portland, Oregon 97202

I wish to disclaim the statement "a large part of the college sneers at big-time research." If these words were used by me (which I doubt) they were certainly taken out of the context of their purported use. However, I do find shocking, particularly in an intellectual environment, *any* antipathy toward scholarly endeavors.

The unqualified "great preoccupation [of the biologists] with research" may have carried the implication that teaching is a secondary or ancillary concern of ours; this would be an unfortunate and mistaken construction. I made clear in our interview that the

biology department considers research a most important adjunct to teaching. In rapidly moving and shifting fields, such as biology, research activities provide insurance that the teacher will maintain an awareness of current developments in his field and bring this awareness to his classroom. Thus, our "preoccupation" with research has an extension beyond its intrinsic justification.

In his seeming preoccupation with the flamboyant, Nelson neglected the more substantive aspects of our interview. Omitted was an account of the integration of our students into the scholarly activities of the biology department, through direct participation in faculty research, independent projects, and thesis work. This learning by doing with its one-to-one student–faculty relationship is a basic aspect of our educational philosophy, and I suppose it takes some "preoccupation" with research to provide a real environment in which this philosophy can materialize. Also omitted was an account of the recent inception of a postdoctoral program, which has as a primary aim the development of teacher-scholars. This program provides new Ph.D.'s with an opportunity to examine and develop their proclivities toward teaching and to make progress as active scientists. A "preoccupation" with research makes a postdoctoral effort of this sort feasible. Thus, we are strongly committed to research, we are deeply involved in teaching, and we believe the two efforts are crucially complementary.

GABRIEL LESTER
Department of Biology,
Reed College, Portland, Oregon 97202

As one of the "smug" and "arrogant" traditionalists referred to in Nelson's article on Reed College (15 Sept., p. 1282) I am surprised to find that a liberal arts college needs a Mission. I have been naive and innocent enough to believe that it is the function of a liberal arts college to bring together a faculty and student body with a mutual concern for learning. The faculty ought to be the most able which can be lured with nothing more than promises of hard work and low salary, and the students should regard learning as their major reason for being in a college. Nelson's article tells me that, in addition to library and laboratory facilities appropriate to this joint enterprise of faculty and students, we now need a Mission.

If the faculty members are them-

selves committed to, and actively engaged in, learning (as scholars, writers or researchers) and if they are also committed to transmitting what they are continually learning to these students who actually desire to learn, I can see no reason for imposing on this relationship a Mission.

It is apparent that Nelson was infected by the myth makers. For example, those characteristics of a college community which lead the uninformed to conclude that an institution is "a bastion of Bohemian appearance and left-wing thought" have long since become such common characteristics of every major college or university in the country as to be hardly worth a comment. A number of points were missed. For example, the $400,000 to $500,000 yearly fund-raising effort is just a bit more than the direct financial aid given by the college to its students. In proportion to the size of the endowment and the yearly operating budget, I would guess that this is one of the highest student financial aid budgets in the country.

If the dropout problem is to be considered a serious one, the comparison with Swarthmore omitted vital information. Reed gambles on many more doubtful admissions than Swarthmore, as a comparison of applicants to admissions for the two schools indicates. Not all of these gambles disclose the jewel in the rough stone; however, enough do to make a good argument for the vice of gambling.

About my colleague's lugubrious predictions of an early demise for liberal arts colleges (Reed in particular) unless something is done, I can only say that they also represent an ancient and conservative point of view shared with such famous figures as Professor Burgess of Columbia (1884); President Harper of Chicago (1900), "Three out of four colleges must be reduced to academies or modified into junior colleges"; President Butler of Columbia, "If the American college is to be saved it must reduce its course of study to two or three years"; David Starr Jordan of Stanford (1903), "As time goes on the college will disappear, in fact, if not in name. The best will become universities, the others will return to their place as academies" [F. Rudolph, *The American College and University—A History* (Vintage Books, New York, 1965), p. 443].

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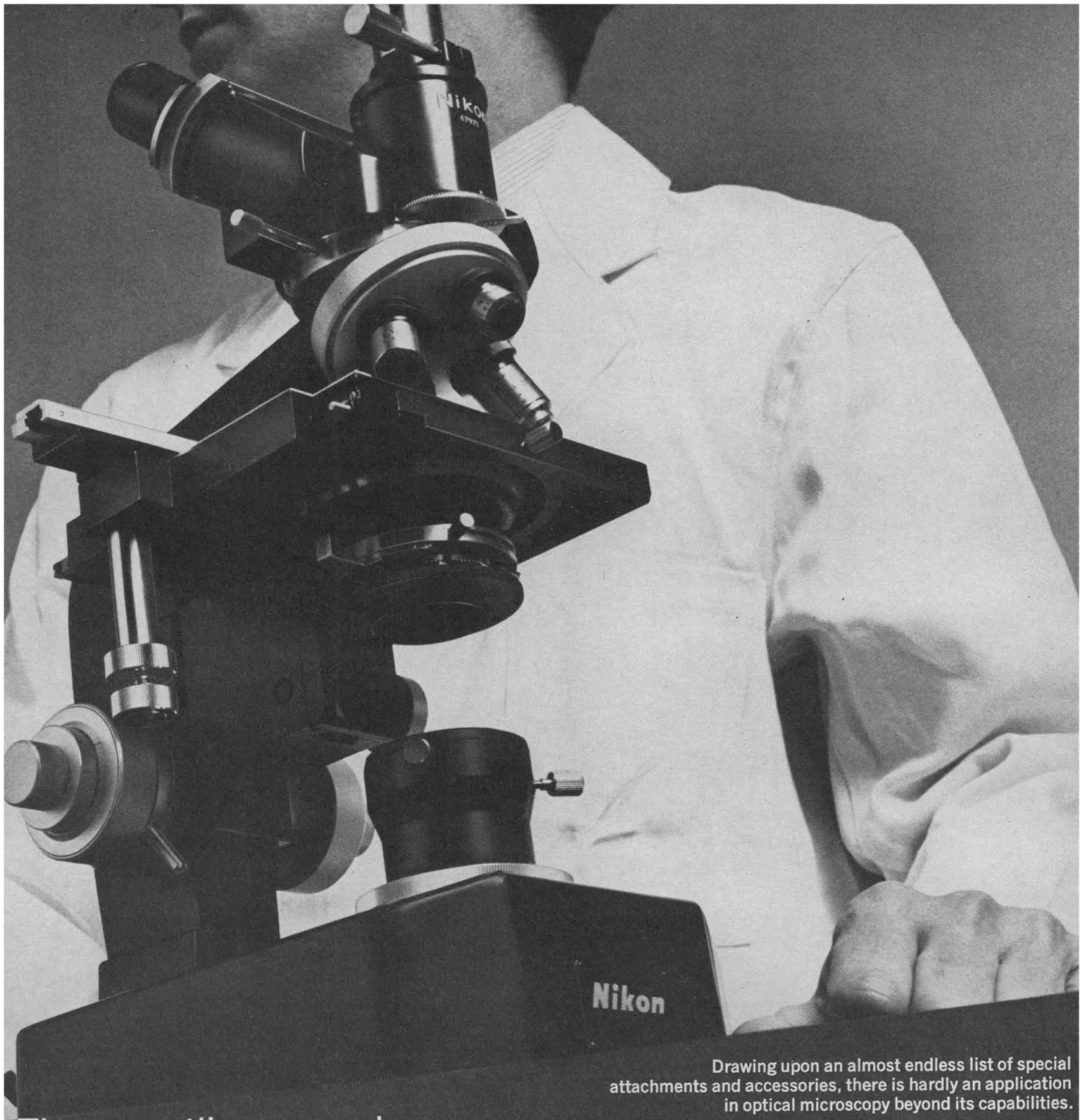

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15 December 1967, Volume 158, Number 3807

SCIENCE

Are We to Abandon the Planets To the Soviet Union?

During the past 5 years the United States has undertaken five interplanetary-planetary missions to Venus and Mars. Three of these—Mariners II, IV, and V—have been notably successful, both technically and scientifically. The observations have yielded marked advances in knowledge and understanding of the atmospheres, the ionospheres, and the thermal and magnetic properties of Venus and Mars. Not the least of the consequences of these new findings has been a deeper insight into the nature of the earth as an astronomical and physical object of great complexity and wonderment. Portions of the Martian surface have been studied by television photography with a resolution of a few kilometers, such resolution being quite unattainable by any terrestrial technique. During the journeys to the planets important contributions to our knowledge of the physical characteristics of the interplanetary medium and the propagation of energetic particles therein have been made, the impulsive emission of energetic electrons by the sun has been discovered, and the soft x-ray emission of the sun has been monitored continuously for extended periods.

The technical requirements of such missions have motivated many advances in telecommunications, in the science of navigation in the solar system, and in the development of long-lived electronic and mechanical systems. Intelligible telemetry signals from Mariner IV have been received from ranges as great as 320 million kilometers, and the spacecraft continues to operate properly after 36 months of interplanetary flight. The entire Mariner V mission, which culminated in a close flyby of Venus on 19 October 1967, was conducted with such precision and competence as to draw cheers from even the most hardened professionals.

All of this has been accomplished at a cost of less than 2 percent of the budget of the National Aeronautics and Space Administration.

Yet, current congressional action provides for no preparatory work during fiscal year 1968 for any specific planetary mission beyond the presently approved pair of Martian flyby missions in 1969. Even more devastating is the reluctance of NASA to forcefully request adequate funding for such work during fiscal year 1969, despite the existence of well-conceived programs of great scientific potential which are being urged by its several advisory bodies. Specific targets of high interest are Mars, Venus, Mercury, and Jupiter. The basic technology is available, and a rich diversity of feasible experiments has been proposed by university groups and government laboratories.

Although I am not privy to the plans of the Soviet Union for further planetary exploration, its past history [*Science* **151**, 945 (1966)] and its recent, successful dropping of a scientific capsule through the Venusian atmosphere suggest that such plans are both ambitious and increasingly competent. Despite such evidence, the United States is now allowing its own high competence in planetary exploration to decay and is thus abandoning *in situ* study of the planets to the Soviet Union. Surely this trend must be reversed if we are to regard intellectual leadership as one of the most central of our national objectives.

—JAMES A. VAN ALLEN, *University of Iowa*

reviewed aspects of the early history of concepts involved in betatron acceleration, as well as items in the early development and operation of the betatron.

The symposium, planned by the Subcommittee on Radiation Dosimetry of the American Association of Physicists in Medicine, was sponsored by the Association, the New York Academy of Sciences, and the Office of Naval Research. Additional financial support was provided by the American Roentgen Ray Society and several accelerator manufacturers.

The proceedings will be published by the New York Academy of Sciences.

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Calendar of Events—January

National Meetings

4–6. **Human Factors in Automotive Engineering** Design, Ann Arbor, Mich. (Society of Automotive Engineers, Continuing Education Program, 485 Lexington Ave., New York 10017)

7–12. American **Chemical** Soc., New Orleans, La. (Meetings Manager, 1155 16th St., NW, Washington, D.C. 20036)

8–9. National Specialists Symposium on **Orbital Resonance**, Redondo Beach, Calif. (G. S. Gedeon, Systems Group, TRW, Inc., One Space Park, Redondo Beach 90278)

8–12. Automotive **Engineering** Congr. and Exposition, Detroit, Mich. (W. I. Marble, Soc. of Automotive Engineers, Meetings Div., 485 Lexington Ave., New York 10017)

9–11. **Chemical Marketing**, Hopatcong, N.J. (Saul Gordon Associates Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

10–13. National Soc. of **Professional Engineers**, winter mtg., Washington, D.C. (P. H. Robbins, NSPE, 2029 K Street NW, Washington, D.C. 20006)

11–12. Wires for **Electrical Conductors**, Philadelphia, Pa. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia 19103)

14–18. Society for **Cryo-Ophthalmologists**, Miami Beach, Fla. (J. G. Bellows, Executive Sceretary, 30 N. Michigan Ave., Chicago, Ill. 60602)

15–16. **Medical Library** Board, Washington, D.C. (Medical Library Assoc., Inc., 919 N. Michigan Avenue, Chicago, Ill.)

15–17. **Noise Measurement and Control**, Hopatcong, N.J. (Saul Gordon Associates Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

15–17. **Paint, Varnish, Lacquer**, and Related Products, Cincinnati, Ohio.

(American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

15–17. Use of **Data Mechanization and Computers in Clinical Medicine**, New York, N.Y. (E. R. Gabrieli, Director, Clinical Information Center, SUNY, Buffalo, N.Y. 14215)

15–18. **Environmental Sciences** Research Symp. (Solid Waste Disposal, Air Pollution, Agricultural Pollutants, Water Quality, Corrosion), New Orleans, La. (E. Klein, Director, Physical Chemistry, P.O. Box 26500, New Orleans 70126)

16–18. **Reliability** Symp., Boston, Mass. (V. R. Monshaw, Astro-Electronics Div., RCA, Box 800, Princeton, N.J. 09540)

17–19. **Nuclear Medicine**, postgraduate symp., St. Louis, Mo. (E. J. Potchen, Washington Univ. School of Medicine, St. Louis, Mo. 63110)

17–19. **Process Industries**, instrumentation symp., College Station, Tex. (R. G. Anthony, Texas A&M Univ., College Station)

18–20. **Pediatrics**: Diagnosis and Treatment of Disorders of Perception, Speech and Learning, Gainesville, Fla. (Division of Postgraduate Education, P.O. Box 746, J. Hillis Miller Health Center, Gainesville 32601)

19–20. American **Rheumatism** Assoc., mtg., Baltimore, Md. (M. M. Walsh, ARA Headquarters, 1212 Ave. of the Americas, New York 10036)

19–20. American Soc. for **Surgery of the Hand**, annual mtg., Chicago, Ill. (R. M. Curtis, The Society, 2947 St. Paul St., Baltimore, Md. 21218)

19–20. **Blood**, 16th annual symp., Detroit, Mich. (W. H. Seegers, Chairman, Dept. of Physiology and Pharmacology, Wayne State Univ. College of Medicine, Detroit 48207)

20–25. American Academy of **Orthopaedic Surgeons**, annual mtg., Chicago, Ill. (J. K. Hart, AAOS, 29 E. Madison, Chicago 60602)

22–23. **Industrial Research**, 3rd annual, Chicago, Ill. (V. H. Disney, IIT Research Inst., 10 W. 35 St., Chicago 60616)

22–24. **Aerospace** Sciences mtg., New York, N.Y. (Meetings Manager, American Inst. of Aeronautics and Astronautics, 1290 Ave. of the Americas, New York 10019)

22–24. **Coal and Coke**, Philadelphia, Pa. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia 19103)

22–24. **Radioisotopes and Radiation Effects**, New Orleans, La. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

22–26. **Basic Electronics**, Hopatcong, N.J. (Saul Gordon Associates Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

22–26. **Marine Sciences Instrumentation**, 4th natl. symp., Cocoa Beach, Fla. (M. Reed, Instrument Soc. of America, 530 William Penn Pl., Pittsburgh, Pa. 15219)

22–26. **Powder X-Ray Diffractometry**, Austin, Tex. (D. E. Griffith, Program Director, Taylor Hall 153, College of Engineering, University of Texas, Austin 78712)

22–27. **Air Conditioning** Principles and Practices, Austin, Tex. (D. E. Griffith,

Program Director, Taylor Hall 153, College of Engineering, University of Texas, Austin 78712)

23. **Industrial Associates** Research Review, Houston, Tex. (D. E. Griffith, Program Director, Taylor Hall 153, College of Engineering, University of Texas, Austin 78712)

23. Preventive and Therapeutic Aspects of **Coronary Heart Disease**, conf., New York, N.Y. (Conference Planning Committee, New York Heart Association, 10 Columbus Circle, New York 10019)

23–26. Council on **Social Work Education**, Minneapolis, Minn. (P. Stickney, Council on Social Work Education, 345 E. 46 St., New York 10017)

23–26. **Water**, Technical Committee mtg., West Palm Beach, Fla. (American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

23–27. American Mathematical Soc., 74th annual, San Francisco, Calif. (G. L. Walker, American Mathematical Soc., Box 6248, Providence, R.I. 02904)

24–25. **Health Physics**, 2nd mid-year symp., Augusta, Ga. (C. M. Patterson, E. I. duPont, Savannah River Lab., Aiken, S.C. 29801)

25–27. **Mathematical** Assoc. of America, 51st annual, San Francisco, Calif. (H. M. Gehman, MAA, Executive Director, c/o SUNY at Buffalo, N.Y. 14214)

25–27. **Symmetry Principles** at High Energy, 4th conf., Coral Gables, Fla. (Conf. on Symmetry Principles at High Energy, Center for Theoretical Studies, University of Miami, Coral Gables)

27–1. American Group **Psychotherapy** Assoc., conf., Chicago, Ill. (M. Schiff, AGPA, Room 702, 1790 Broadway, New York 10019)

28. Fourth **Mössbauer** Symp., Chicago, Ill. (P. A. McNulty, New England Nuclear Corp., 575 Albany St., Boston, Mass. 02118)

28–2. Institute of **Electrical and Electronics Engineers**, winter power mtg., New York, N.Y. (J. W. Bean, American Electric Power, 2 Broadway, New York 10008)

28–2. **Testing and Materials**, winter mtg., Atlantic City, N.J. (T. A. Marshall, Jr., American Soc. for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103)

29–31. National Assoc. of **Private Psychiatric Hospitals**, 35th annual mtg., Miami Beach, Fla. (The Association, 353 Broad Ave., Leonia, N.J.)

29–31. Society of **Thoracic Surgeons**, annual mtg., New Orleans, La. (F. X. Byron, Executive Secretary, Society for Thoracic Surgeons, City of Hope Medical Center, 1500 E. Duarte Rd., Duarte, Calif. 91010)

29–1. American Assoc. of **Physics Teachers**, annual mtg., Chicago, Ill. (S. S. Ballard, Univ. of Florida, Gainesville 32603)

29–1. American **Meteorological** Soc., 48th annual, San Francisco, Calif. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass. 02108)

29–1. American **Physical** Soc., annual mtg., Chicago, Ill. (R. G. Sachs, Box 344, Argonne, Ill. 60440)

29–3. **Bio-Physical Techniques**, Hopat-

cong, N.J. (Center for Professional Advancement, P.O. Box 66, Hopatcong 07843)

International and Foreign Meetings

1–5. **Health Education**, intern. seminar, London, England. (Ciba Foundation, 41 Portland Pl., London, W.1, England)

3–6. **Solid State Physics**, 5th annual conf., Manchester, England. (Meetings Officer, The Institute of Physics and The Physical Society, 47 Belgrave Sq., London, S.W.1, England)

3–10. **Tamil Research**, intern. conf. and seminar, Madras, India. (X. S. Thani Nayagam, c/o Dept. of Indian Studies, Univ. of Malaya, Kuala Lumpur, Malaysia)

5–6. **Medical Days of Renon**, intern. mtg., Collalbo, Italy. (M. DeMichelis, Via Modica 6, Milan, Italy)

8–10. **Nordic Geological**, winter mtg., Lund, Sweden. (G. Regnell, Chairman, Organizing Committee, c/o Paleontologisk-Geologiska Institutionen, Lunds Universitet, Solvegatan 13, Lund)

9–11. **Valence and Reactivity**, intern. symp., Oxford, England. (Scientific Affairs Officer, Chemical Soc., Burlington House, London, W.1, England)

10–1. British Commonwealth **Forestry**, 9th conf., Delhi, India. (M. J. Eden, c/o Office of the Forestry Commission, 25 Savile Row, London, W.1, England)

12–16. **Mollusca**, symp., Cochin/Ernakulam, India. (The Convenor, Marine Biological Assoc. of India, Marine Fisheries Post Office, Mandapam Camp, India)

14–19. Strategies for **Behavioral Change in Agricultural Development**, intern. conf., Ithaca, N.Y. (J. P. Leagans, Education Dept., Stone Hall 109, Cornell Univ., Ithaca 14850)

14–21. **Orthopedic** Soc., 7th Latin-American Congr., Caracas, Venezuela. (L. Petracchi, Secretary, Potosi 42-15, Buenos Aires, Argentina)

16–20. **Psychiatry**, 2nd African colloquium, Dakar, Senegal. (Societé de Psychopathologie et d'Hygiene Mentale de Dakar, Service de Neuropsychiatrie, BP 5097, Centre Hospitalier de Fann-Daker, Dakar)

19–21. **Diseases of Colon, Rectum and Anus**, intern. seminar, Bombay, India. (R. K. Menda, Chairman, P.O Box 677, Bombay)

23–26. Canadian **Pulp and Paper** Assoc., 54th annual mtg., Montreal, P.Q., Canada. (The Association, 2280 Sun Life Building, Montreal 2, Quebec)

24–31. Australian and New Zealand Assoc. for the **Advancement of Science**, 40th Congr., Christchurch, New Zealand. (B. R. Penfold, Univ. of Canterbury, Private Bag, Christchurch 1)

29–30. Canadian Soc. of **Chemotherapy**, 4th annual mtg., Montreal, Quebec. (L. Tétreault, Service de Recherche, Hôpital Saint-Jean-de-Dieu, Montréal-Gamelin, Québec, Canada)

29–31. **Photosensitization in Solids**, 2nd intern. conf., Tucson, Ariz. (G. Tollin, Dept. of Chemistry, Univ. of Arizona, Tucson 85721)