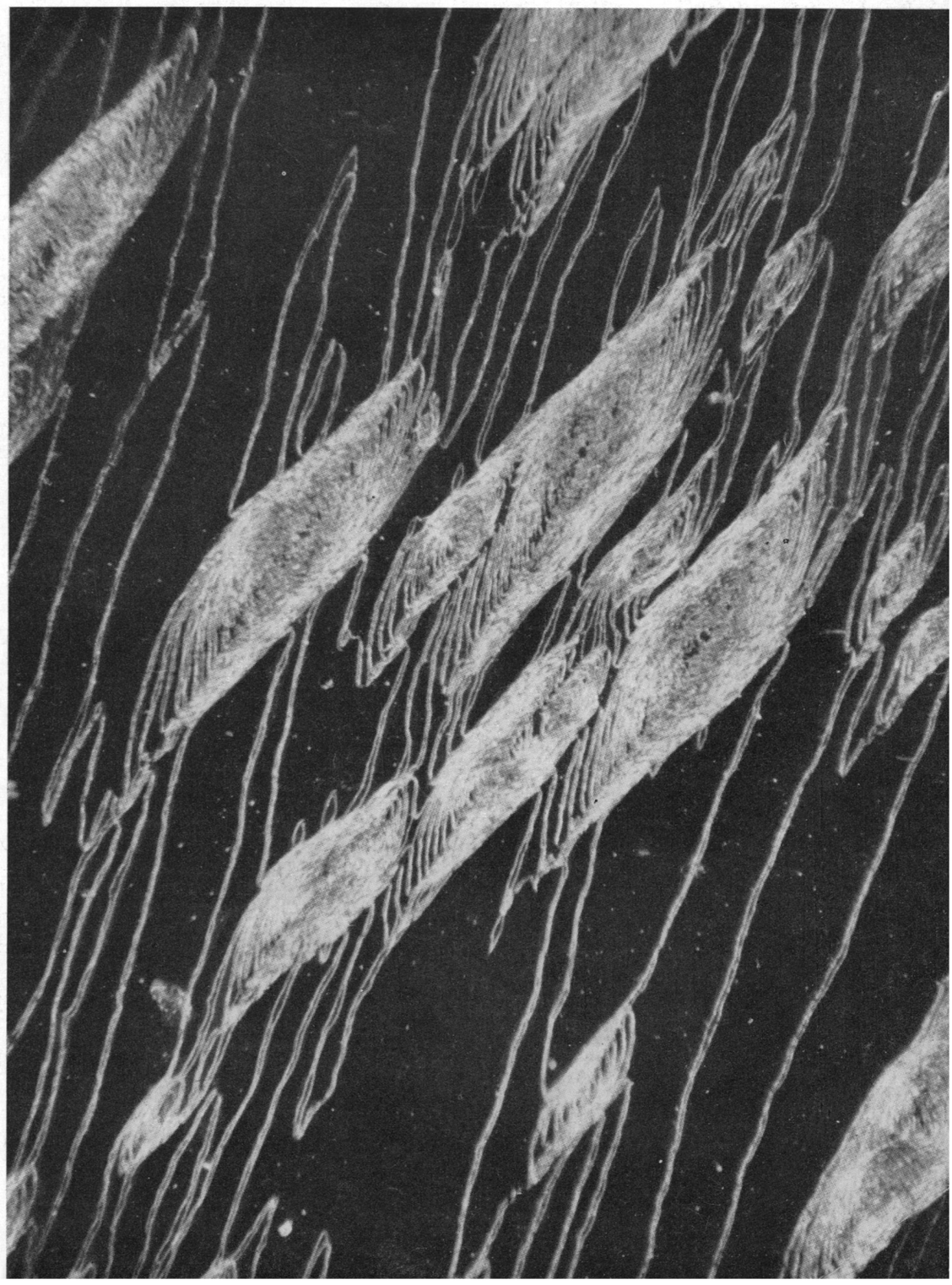
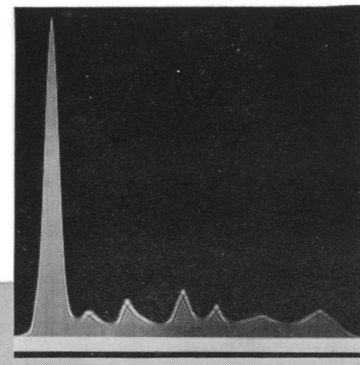
SCIENCE

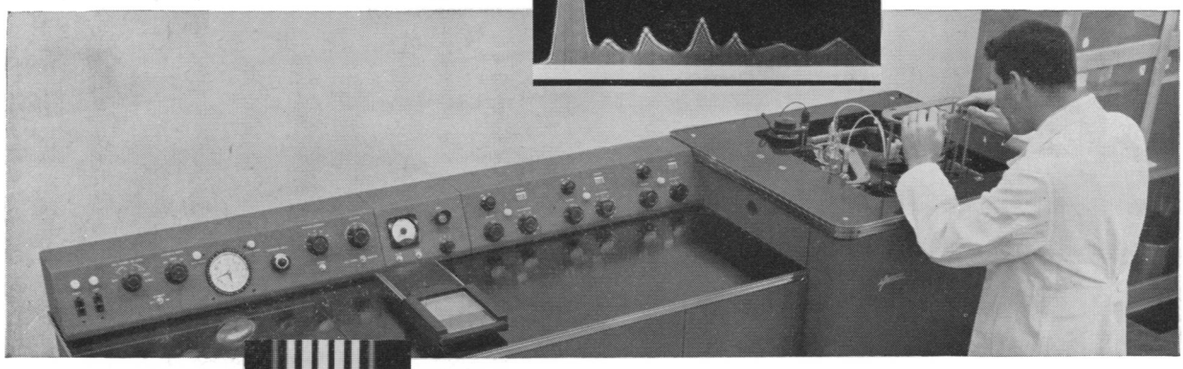
8 January 1960
Vol. 131, No. 3393

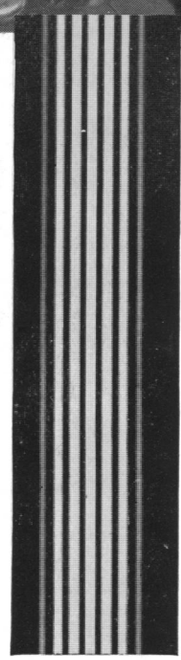
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





Electrophoresis of human serum diluted 1:6; ascending boundaries. Inclined knife-edge schlieren and Rayleigh fringes.





Typical reference fringe pattern obtained from standard production model.

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As protein research progresses, biochemists rely more and more upon instruments of high precision for diffusion and electrophoresis studies. Especially critical are the optical measurements needed to obtain accurate diffusion coefficients, absolute electrophoretic mobilities, and information on purity.

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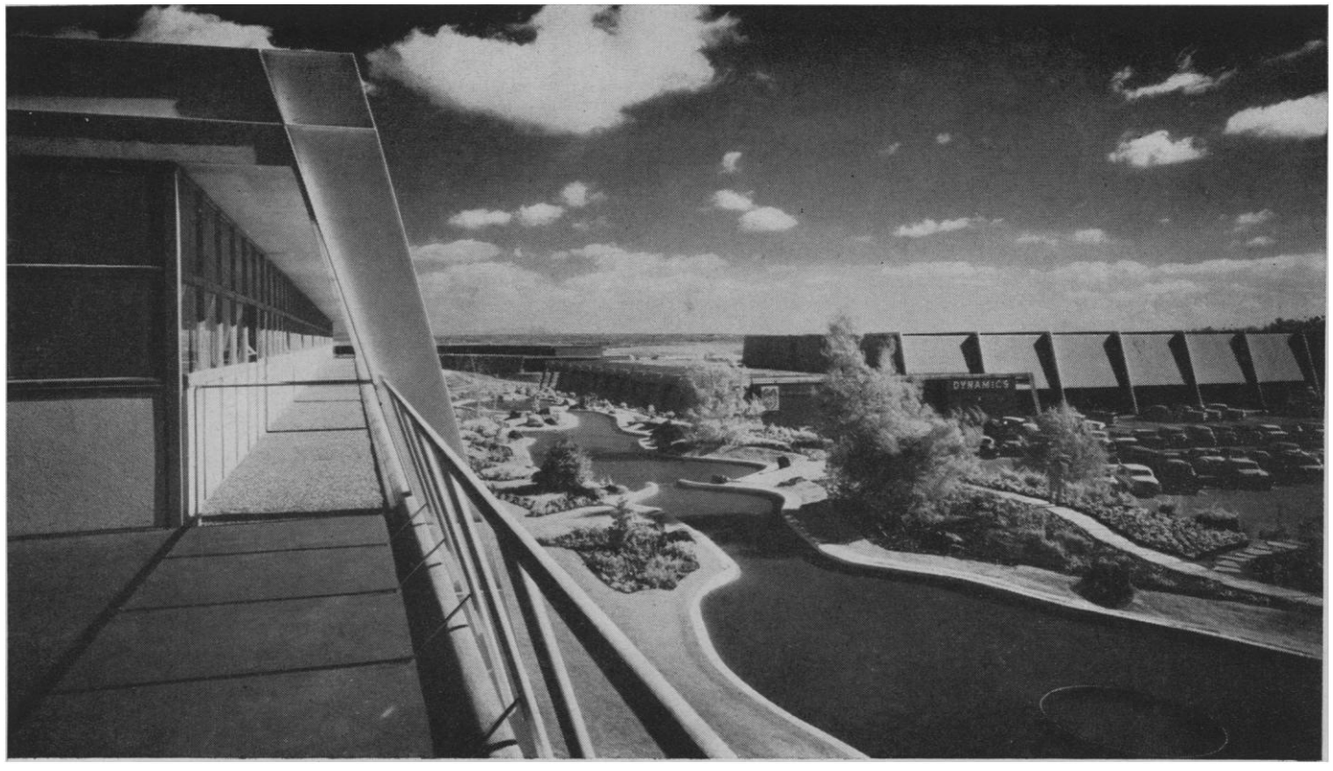


Focal Point for Nuclear Engineering

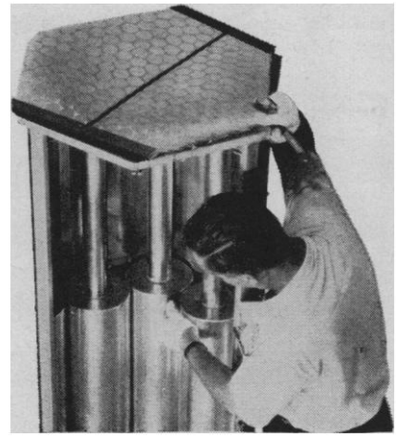
The John Jay Hopkins Laboratory for Pure and Applied Science at General Dynamics' General Atomic Division in San Diego, California, is a modern center of research and development, where new ideas and techniques are vigorously pursued. Here, strong engineering and development activities are matched with broad basic theoretical and experimental research to create an ideal environment for productive efforts in the nuclear field.

Here, advanced work is underway on the High Temperature Gas-cooled Reactor (HTGR), which promises to be a major short cut to the nation's goal of economic nuclear power. The prototype HTGR plant will be constructed by 1963 for Philadelphia Electric Company and High Temperature Reactor Development Associates, Inc.

Here, engineers and scientists work in a creative atmosphere on other advanced programs, including the MGCR gas-cooled reactor and closed-cycle gas turbine system for merchant ship propulsion . . . TRIGA reactors for training, research, and isotope production, which are now being installed on five continents . . . small nuclear power systems . . . test reactors . . . nuclear power for space vehicles . . . thermoelectricity . . . controlled thermonuclear reactions.

Rapid expansion of these programs has led to increased engineering activity and created openings, including senior positions, for men who seek a high degree of individual responsibility coupled with unusual opportunities to demonstrate their initiative and ability.

In addition to **Nuclear Engineers, Metallurgists** experienced in materials development, **Mathematicians - Programmers,** and Experimental and Theoretical **Physicists** are invited to consider opportunities now existing in varied program areas. Please address your letter of inquiry to Manager of Personnel, P.O. Box 608-R6, San Diego 12, California.



GENERAL ATOMIC
DIVISION OF **GENERAL DYNAMICS**

8 January 1960, Volume 131, Number 3393

SCIENCE

Cover Domain boundaries in a magnetic substance: a thin film of nickel-iron alloy was formed by evaporating the alloy in a vacuum and condensing it, in the presence of a strong magnetic field, on a glass slide. After condensation, the film was slowly demagnetized by applying a cyclic field at right angles to the original field (about × 300). [From *Scientists' Choice*, with permission of the publishers, Basic Books]

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If you are interested in studying free radicals, radiation damage, color centers, paramagnetic ions, or other unpaired electrons, Varian's exhibit is reason enough for you to visit the 1960 Pittsburgh Conference.

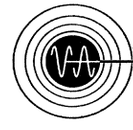
The Instrument Division will set up a complete applications laboratory at the Conference, and will staff the laboratory with leading EPR research scientists. Throughout the Conference the spectrometer and staff will be engaged in the investigation of scientific applications submitted by interested persons.

Equipment will be available for u.v. irradiation of samples *in situ,* and for temperature variation from −196°C to +300°C. Flow system for study of very rapid reactions will also be available.

If you wish to submit samples to be run in your presence on a no-obligation basis during the Conference, advance arrangements must be made by writing Gordon Harper in the Instrument Division. He will need an explanation of the background of your desired application study, and a statement of your preference as to date and time for performing the experiment. Your inquiry will receive careful attention and a prompt reply with full instructions. But whether you wish to run samples or not, you are cordially invited to attend and inspect the equipment.

* FEB. 29 - MARCH 4, 1960
Penn-Sheraton Hotel, Pittsburgh, Pennsylvania. The Varian EPR Applications Laboratory will be open at the following time:

Tuesday	March 1	9:00 a.m. to 10:00 p.m.
Wednesday	March 2	9:00 a.m. to 6:00 p.m.
Thursday	March 3	12:00 noon to 10:00 p.m.
Friday	March 4	9:00 a.m. to 12:00 noon



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General Electric's Missile & Space Vehicle Dept. Building New $14,000,000 Space Research Center

17 miles from Philadelphia, Near Valley Forge Park

Back in 1956 this General Electric organization outgrew its quarters in Schenectady, N. Y. and moved to Philadelphia. Since then its research and development staff has increased 5-fold. A new move is fast becoming imperative and will be met by the $14,000,000 Space Research Center now under construction on a 132 acres site near Valley Forge Park. This construction will feature unique facilities, to be utilized in a long-term program, to expand the activities in the realm of space research and the development of space vehicles and systems—areas in which MSVD has already contributed so many notable advances:

- the FIRST re-entry at ICBM range with both heatsink and ablation methods
- the FIRST recovery of payload from space
- the FIRST movies of earth from space
- the FIRST flight demonstration of effective space vehicle stabilization control and navigation (control systems of interplanetary capacity)
- the FIRST measurements in space of earth's magnetic field and infrared radiation
- the FIRST meteorological information from space
- the FIRST organic plastic ablation material for nose cone re-entry protection capable of withstanding temperatures from 5,000 to 13,000°F

Currently a broad diversity of programs are under way at MSVD, offering assignments of exceptional interest to engineers and scientists qualified to work with a research-oriented organization. Your inquiries are invited regarding the following areas: SYSTEMS ENGINEERING • AERODYNAMICS • THERMODYNAMICS • GUIDANCE & CONTROL • INSTRUMENTATION & COMMUNICATION • PLASMA PHYSICS • GAS DYNAMICS • AEROMEDICAL DESIGN ENGINEERING • ANTENNA & MICROWAVE DESIGN • SPACE MECHANICS • STRUCTURAL DESIGN • ENERGY CONVERSION • HUMAN FACTORS • ADVANCED POWER SYSTEMS • RELIABILITY ENGINEERING • PRODUCIBILITY ENGINEERING • ARMING AND FUZING SYSTEMS • APPLIED MATHEMATICS & COMPUTER PROGRAMMING

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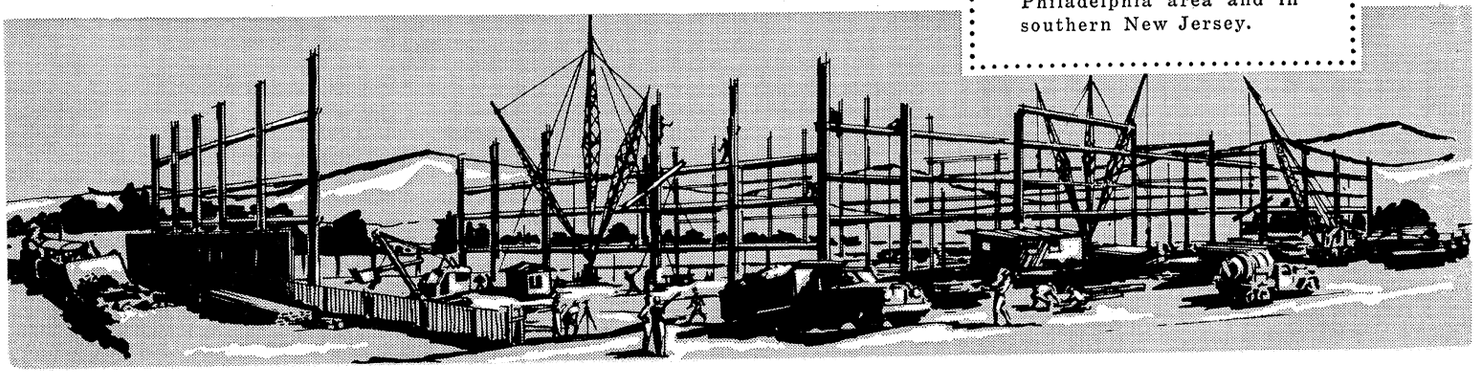
DIVERSITY OF ADVANCED PROGRAMS NOW UNDER WAY AT MSVD INCLUDE:

- Follow-on contracts for 2nd generation nose cones
- NERV (Nuclear Emulsion Recovery Vehicles) for NASA to study the lower Van Allen radiation belts at altitudes from 200 to 1800 miles
- STEER—a communications satellite to provide global military radio communications.
- Study programs in the area of accessory space power for a variety of missions, including chemical, nuclear and solar energy sources, electrolytic fuel cells and thermoelectric and thermionic converters
- Studies for three of the nation's space agencies to develop more accurate "space maps" than have hitherto existed to guide rockets and manned flights to the moon and planets

A well qualified scientist or engineer is likely to find advanced work going on at MSVD on almost any field of space research of special interest to him.

A campus-like setting is planned for the new Space Research Center which General Electric's Missile and Space Vehicle Department is building close to historic Valley Forge Park. Situated at the junction of the Schuykill Expressway and Pennsylvania Turnpike, the Center will be easily reached by engineers and scientists living in the Philadelphia area and in southern New Jersey.



SHIP WITHOUT AN OCEAN

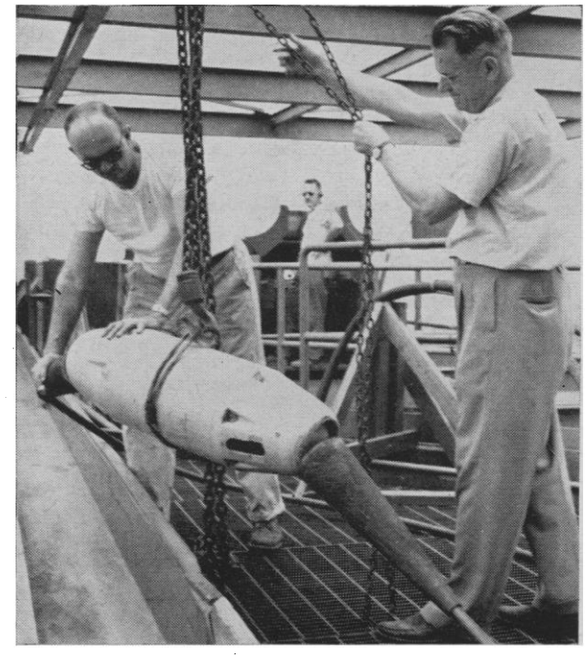
How do you lay a cable on the ocean floor—a cable that is connected to scores of large, heavy amplifiers? How do you "overboard" such a system in a continuous operation, without once halting the cable ship?

Bell Telephone Laboratories engineers must answer these questions in order to lay a new deep-sea telephone system designed to carry many more simultaneous conversations. They're experimenting on dry land because it is easier and more economical than on a ship. Ideas that couldn't even be attempted at sea are safely tested and evaluated.

In one experiment, they use a mock-up of the storage tank area of a cable ship (above). Here, they learn how amplifiers (see photo right), too rigid and heavy to be stored with the cable coils *below* decks, must be positioned *on* deck for trouble-free handling and overboarding.

Elsewhere in the Laboratories, engineers learn how best to grip the cable and control its speed, what happens as the cable with its amplifiers falls through the sea, and how fast it must be payed out to snugly fit the ocean floor. Oceanographic studies reveal the hills and valleys which will be encountered. Studies with naval architects show how the findings can be best put to work in actual cable ships.

This work is typical of the research and development effort that goes on at Bell Laboratories to bring you more and better communications services.



Experimental amplifier about to be "launched" from "cable ship." Like a giant string of beads, amplifiers and connecting cable must be overboarded without stopping the ship.

BELL TELEPHONE LABORATORIES

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We need group leaders and other professional and technical personnel for our expanded program of fundamental and exploratory research. Those who join us will be free to develop new ideas and concepts with respect to materials, processes and products. We encourage our people to publish results and to maintain activity and status in the scientific community.

We are seeking:

GROUP LEADERS with stature in their fields, broad interests, initiative, and competence to choose and organize their work, and to select facilities and assistants, in these areas:

1. SOLID STATE PHYSICS
2. INORGANIC POLYMERS
3. ORGANIC POLYMER PROPERTIES AND SYNTHESIS
4. CHEMISTRY AND PHYSICS OF SURFACES
5. ENGINEERING THEORY AND ENGINEERING PHYSICS
6. FOREST PRODUCT AND CELLULOSE MATERIALS

We also need:

OTHER PERSONNEL, ranging from senior research personnel with Ph.D's to research assistants with BS degrees. We are seeking people who are competent, creative, dedicated, and who desire freedom to pursue ideas. Situations open include:

PHYSICISTS AND PHYSICAL CHEMISTS

1. High temperature research up to 20,000 K. Gas stabilized arcs, thermodynamics, spectroscopy, calorimetry and related areas. Theoretical and experimental.

2. Solid state. Electronic properties of amorphous material. Thermo-electricity, conduction in ionic and non-polar materials, luminescence, dielectrics, band theory, quantum mechanical theory. Theoretical and experimental.

3. Solid state. Structure and behavior of crystalline and amorphous materials. Magnetics, radiation damage, structure determination. Experimental.

4. Solid state. Experimentalist to set up and supervise laboratory for measurement of properties and preparation of materials, (principally non-metals.)

5. General. Firm foundation in engineering physics: heat, mechanics, sound and optics. Good experimentalists with strong analytical background.

6. Theoretician in engineering physics or applied mathematician to work in hydrodynamics and other areas.

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1. Familiarity with high temperature techniques and strong in thermodynamics. Problems in reaction rates and mechanisms, absorption and diffusion.

2. Properties and synthesis of organic and inorganic polymers; structural chemistry of inorganic polymer materials.

3. Preparation and synthesis of materials, ceramics, salts, polymers, etc. Clever laboratory man.

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2. Crystallography, optical and x-ray.

3. Spectroscopy, U.V. and I.R.

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5. Electrical property measurements (micro-wave).

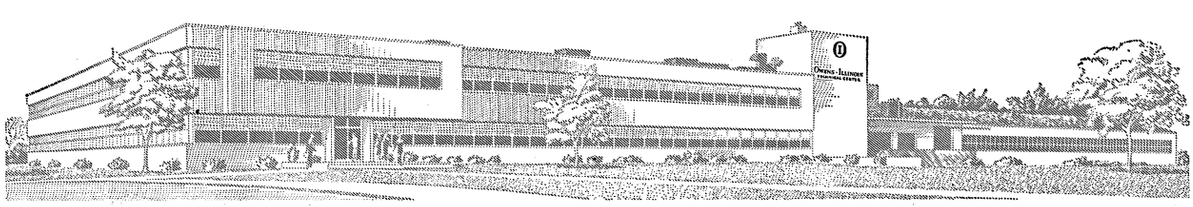
MINERALOGISTS, CERAMISTS, METALLURGISTS

Materials studies. Phase equilibria, structure, properties, syntheses, nonmetallic inorganics, including glass and ceramics. Emphasis on high temperature and composite materials.

ENGINEERS

Engineers for exploratory and pioneering work in construction of devices, prototype reduction to practice of ideas, processes and devices; and to assist patent counsel. We have openings for mechanical, electrical, chemical and ceramic engineers.

OPENINGS IN APPLIED RESEARCH. We also have a number of openings in applied research in the areas of physical chemistry, engineering physics and organic chemistry.



THOSE WHO JOIN US will work at the Owens-Illinois Technical Center in Toledo. Toledo is a community of 350,000 with many delightful residential sections, fine schools and a well-rated university. Cultural facilities include a renowned art museum and zoo. The community has excellent recreational facilities. You can drive via turnpike to Chicago or Pittsburgh in 4-½ hours, and to Ann Arbor (University of Michigan) or Detroit by expressway in one hour.

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For interview, contact: Harold F. Zink,
Owens-Illinois Technical Center, Toledo 1, Ohio

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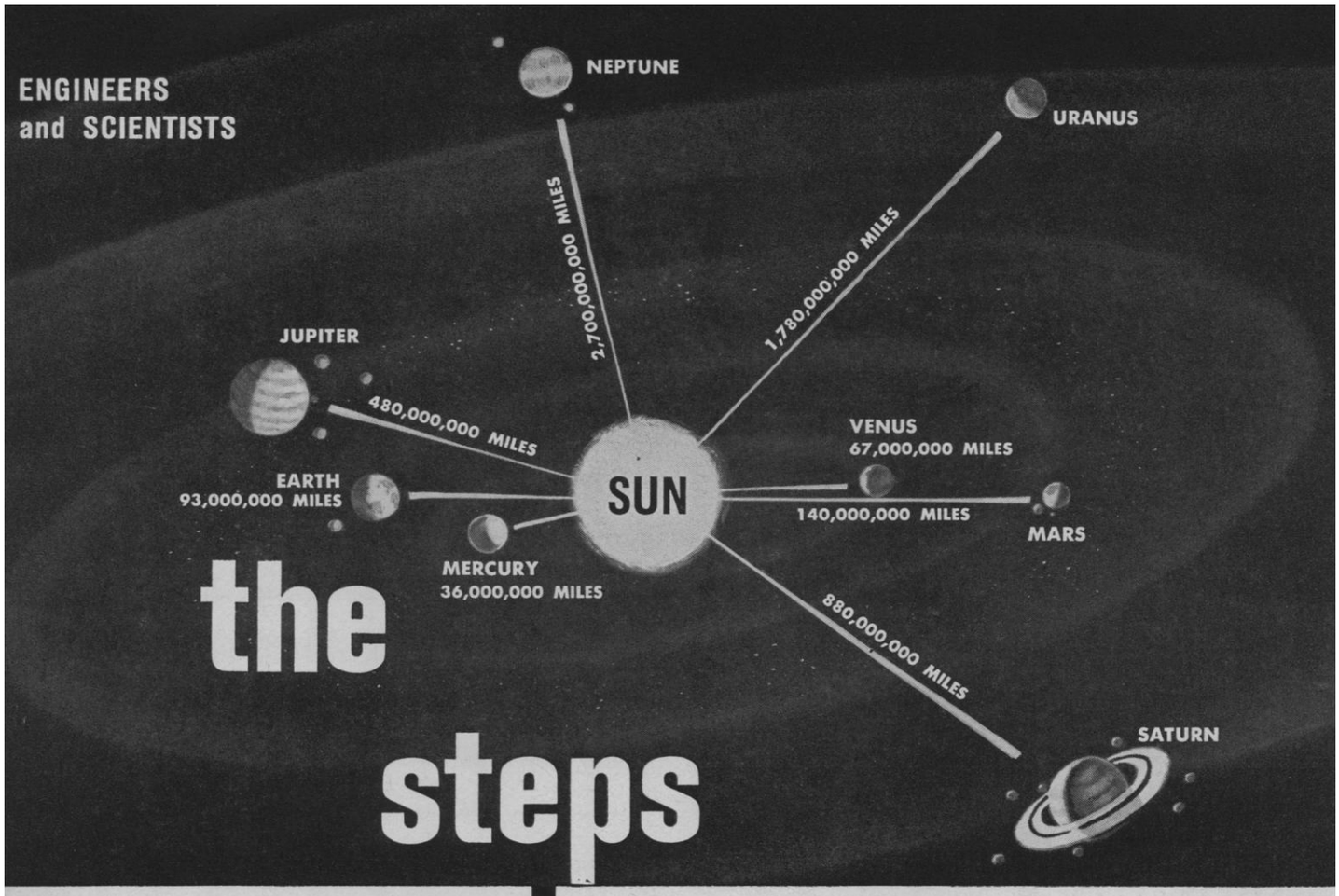

One day in the not too distant future man will be projected into orbit and will return to earth safely. Monumental as this exploit will be, the inevitable question will then arise: "What next?"

It is the "what next" that is being answered *today* at Republic Aviation where research and development is focused on the future. A short orbital flight or a brief landing on the moon will never satisfy man's curiosity or his needs. Space must be further explored and its secrets more fully understood so that some day man can freely traverse its vast distances.

Republic Aviation is proud of the part it is playing to make man's greatest adventure successful. Here every aspect of the space technology is under active investigation. A few of the challenging programs now underway include:

- Unique guidance systems for manned space vehicles
- Plasma and nuclear propulsion systems
- Space vehicle materials and processing techniques
- Control systems that remain efficient at temperatures in excess of 1500°F
- Studies in low-pressure plant growth for lunar base application
- Hyper-accurate space vehicle trajectory studies

All of these programs – and many others – are being substantially augmented with a view toward the early occupancy of Republic's new $14 million Research and Development Center.

Senior engineers or scientists with superior skills and a desire to pioneer in research so that man may pioneer in space are invited to inquire about positions in these important areas:

ELECTRONICS

Inertial Guidance & Navigation / Digital Computer Development / Systems Engineering / Information Theory / Telemetry-SSB Technique / Doppler Radar / Countermeasures / Radome & Antenna Design / Microwave Circuitry & Components / Receiver & Transmitter Design / Airborne Navigational Systems / Jamming & Anti-Jamming / Miniaturization-Transistorization / Ranging Systems / Propagation Studies / Ground Support Equipment / Infrared & Ultra-violet Techniques

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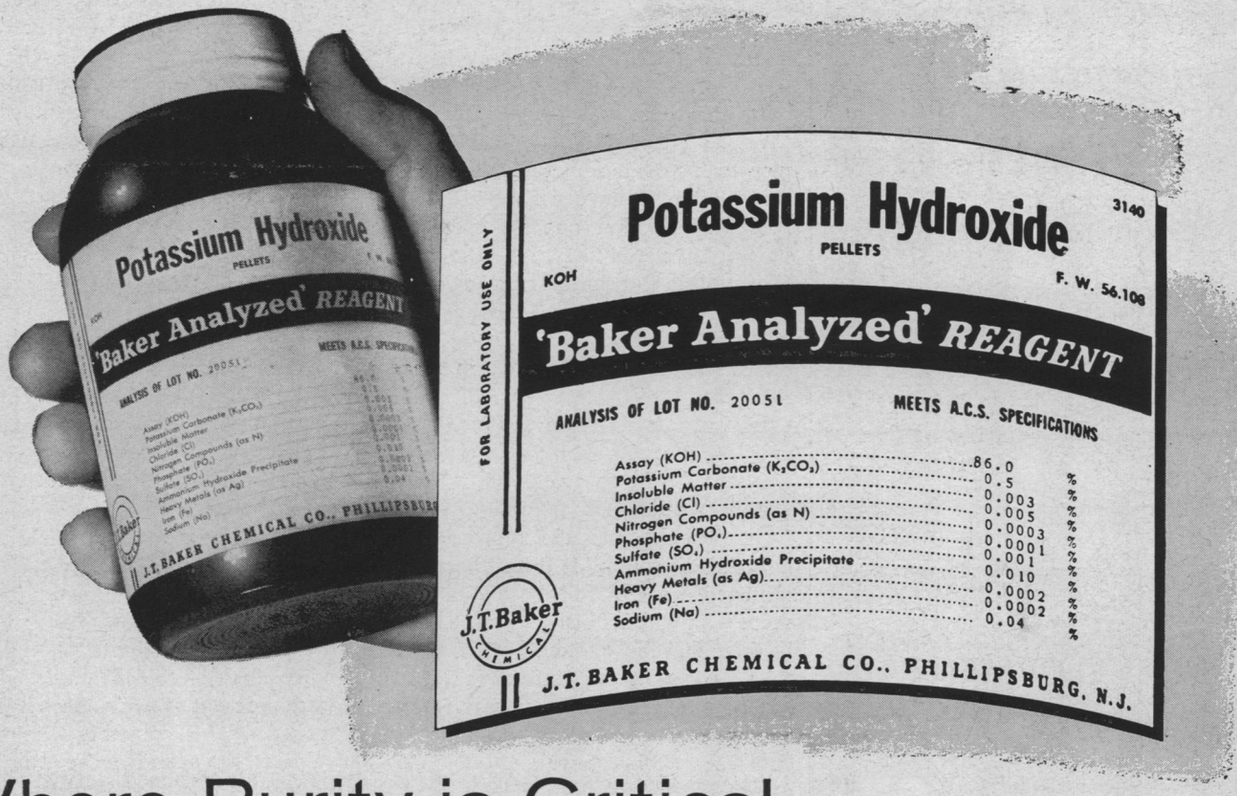

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Letters

"Thinking Claws"

In an article which appeared in *Science* [**127**, 521 (1958)], "Blocking by picrotoxin of peripheral inhibition in crayfish," by Van der Kloot, Robbins, and Cooke, the opening paragraph states: "In vertebrates, inhibition takes place within the central nervous system. But a crayfish 'thinks in its claws' "; this is followed by reference (*1*), which reads: "C. A. G. Wiersma, in *Recent Advances in Invertebrate Physiology* (Univ. of Oregon Press, 1957); P. Hoffman, *Z. Biol.* **63**, 411 (1914); **64**, 247 (1914)."

Any reader not familiar with the facts must be under the impression that either Hoffman or I is the author of this sentence. Since there is hardly any statement with which I disagree more strongly than the one quoted, I want to take this opportunity to point out that it does not occur in any of the papers referred to. It seems to have originated in Prosser's *Comparative Animal Physiology* (Saunders, Philadelphia, 1950), where, on page 597, the statement "A crab 'thinks in its claws' " appears as far as I know for the first time in literature, notwithstanding the quotes. As this is a type of slogan which apparently leaves a lasting impression in many minds, but is completely false in content, I hope this note will contribute to its everlasting suppression.

C. A. G. WIERSMA
Division of Biology, California Institute of Technology, Pasadena

We are sorry that Wiersma dislikes the phrase, because his studies on crustacean muscle are so important. Our reference was misleading; the disputed phrase in fact was quoted from C. A. G. Wiersma, *Symposia on Quantitative Biology* **17**, 157 (1952). As it does not appear in quotation marks, we mistakenly assumed that Wiersma was its author. I agree that—if taken literally—the "slogan" is untrue and is the stuff of poetry rather than of science. On the other hand, the phrase is more than fiction; it is a creative account of the integration of nerve impulses which goes on at a crustacean muscle. And the literature of science would be poorer if robbed of the factitious. Who would want to bury the obvious untruth, "Life has an itch to live" [C. S. Sherrington, *Man on his Nature* (Cambridge, 1951), p. 170], or never speak again of "the wisdom of the body" (W. B. Cannon), when these phrases, like the one in question, express fundamental biological ideas in an exhilarating fashion?

W. G. VAN DER KLOOT
Department of Pharmacology, New York University, New York

Cholinesterase Inhibitors

The 7 Nov. 1958 issue of *Science* [**128**, 1136 (1958)] carried a challenging article by W. H. Orgell *et al.*, entitled "Inhibition of human plasma cholinesterase in vitro by extracts of solanaceous plants."

The authors of this article have unquestionably demonstrated the existence of a cholinesterase inhibitor in extracts of solanaceous plants. Nevertheless, in my opinion, the quite plausible possibility that steroidal amine glucosides were present was rather lightly dismissed. The possibly unintentional neglect to acknowledge this distinct possibility might lead to a rather fallacious impression on the part of the casual reader, and therefore I wish to contribute a few thoughts of general interest.

The rather simple and crude preparation of plant extracts described in the article does by no means remove solanine (or solanidine in its numerous forms) from the substrate, nor from suspicion. Furthermore, the inhibition pattern for various parts of the potato plant or tuber coincides remarkably with that of solanine distribution. I do not propose to claim that solanine, in spite of its pronounced physiological and hemolytic action, is associated or directly responsible for cholinesterase inhibition. This is more probably due to the presence of free alkaloid solanidine, the product of enzymatic or acid solanine hydrolysis. Solanine alone has been resolved into alpha, beta, and gamma fractions, the latter presumably an artifact of the extraction procedure (*1*). Apparently the alkaloid solanidine has a wider occurrence than was assumed heretofore, since it is also the building block of three forms of chaconine in potato leaves. The possible presence of these steroidal amines in potato-plant extracts must not be overlooked, particularly in view of our

(Continued on page 68)

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Letters

(Continued from page 66)

limited knowledge of their physical and chemical nature. In this respect it is noteworthy that potato tubers with high levels of solanine are considered toxic and dangerous for human consumption.

I attribute the toxic effects of such tubers to the presence of free solanidine in tuber tissues (*2*). In other words, the remarkable structural similarity to cholesterol is indicative of a relatively easy diffusion of solanidine into the blood stream, while the absorption of solanine appears to be blocked in the digestive tract (*3*). Thus, one is not far from the thought that the toxic effects may be linked, at least in part, with a direct action of solanidine upon the cholinesterase system.

A. ZITNAK
Department of Horticulture, Ontario Agricultural College, Guelph, Canada

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1. R. Kuhn and I. Löw, *Ber. wiss. Biol. (Abt. A Ber. ges. Biol.)* **88**, 1492 (1955); *Chem. Abstr.* **51**, 1990g (1957).
2. A. Zitnak, paper presented before the Agricultural Institute of Canada, Wolfville, Nova Scotia (26 June 1958).
3. R. Rühl, *Arch. Pharm*, **284**, 67 (1951); *Chem. Abstr.* **45**, 7256 (1951).

We are in general agreement with Zitnak's suggestions regarding cholinesterase inhibition by the steroidal alkaloid glycosides and feel that his hypothesis for the physiological action of these substances merits investigation. To support the possibility that solanine, chaconine, and related glycoalkaloids are chiefly responsible for the inhibition of plasma cholinesterase by potato extracts, we would like to call attention to the report of Pokrovsky (*1*), who determined that solanine and solanidine were powerful inhibitors of horse serum cholinesterase, the aglycone solanidine being approximately twice as inhibitory as solanine in his tests. Pokrovsky also found that solanine was approximately 25 times more inhibitory (on the basis of I_{50} values estimated from graphical data) to nonspecific (horse serum) cholinesterase than to specific (rabbit brain) cholinesterase. This corresponds to our own results on comparing the action of potato-leaf extract against nonspecific (human plasma) and specific (human red cell) cholinesterase and perhaps has some bearing on the genetic differences between human beings in the response of their serum cholinesterase to Nupercaine and the inhibitor from potato extracts, as reported by Harris (*2*). We have confirmed Pokrovsky's observations with our own preparations of crystalline alkaloid from Irish Cobbler tuber sprouts, and also have noted the correspondence between the distribution of solanine (*3*) and inhibitor in the potato plant. We might point out that Pokrovsky has also suggested that the symptoms of solanine poisoning might reflect the cholinesterase inhibitory properties of solanine.

However, we would like to emphasize that there may be cholinesterase-inhibitory substances present in extracts of solanaceous plants other than the steroidal amine glycosides and their derivatives. As a specific example, we have found that aqueous extracts of the common garden petunia are a very potent source of cholinesterase inhibitor (I_{50} = 6 mg of fresh leaf tissue against 5 ml of human plasma), yet no precipitate forms on alkalinization to *p*H 10, as would be expected if solanine or related substances were present (*4*), and the extracts do not give the usual color reactions for the steroidal amine glycosides. Our method of extraction was developed specifically for rapid routine assay of the total cholinesterase inhibitory potency of large numbers of plant-tissue samples, and our extracts certainly contain the steroidal amine glycosides as well as other inhibitory substances.

An interesting question arises in regard to the "function" of these potent natural enzyme inhibitors in higher plants. Fraenkel (*5*) suggests that alkaloids and other secondary plant substances may have arisen in evolutionary response to selection pressure exerted by insects and other parasites and predators. We are currently studying the possibility that natural enzyme inhibitors represent a protective mechanism against the extracellular digestive enzymes secreted by many insects and plant pathogens.

W. H. ORGELL
KUNDA A. VAIDYA
P. A. DAHM
Department of Zoology and Entomology, Iowa State University, Ames

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2. H. Harris and Mary Wittaker, *Nature* **183**, 1808 (1959).
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5. G. S. Fraenkel, *Science* **129**, 1466 (1959).

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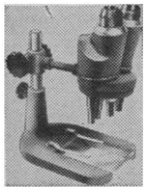

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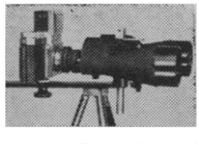

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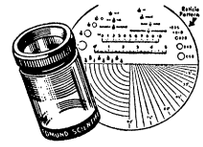

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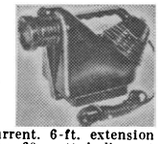

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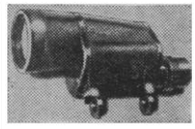

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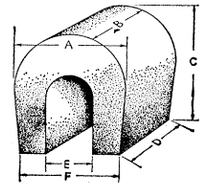

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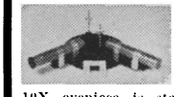

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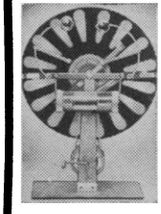

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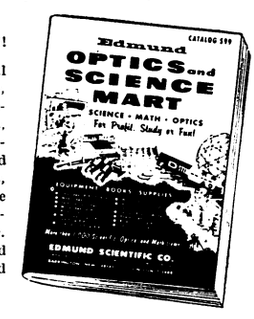

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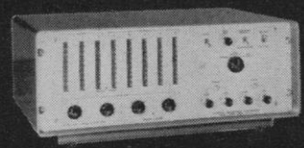

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Small Colleges and Small Minds

Although the place of scientific research in the independent liberal arts college is not so clearly defined as its place in a university, the contribution that research can make to education seems so clear that we wonder why, if research is welcomed in some liberal arts colleges, it is opposed in others. The core of the argument for scientific research, as pointed out by Laurence M. Gould, president of Carleton College, in an article in the AAAS volume *Symposium on Basic Research,* is that while there may be good research scientists who are not good teachers, the evidence is that there are no good teachers whose competence is not increased by good scholarship. Yet the instructor in an independent liberal arts college who opposes research tells us that *his* institution is a teaching college, that research is good and teaching is good but the two are incompatible.

The theory that the conscientious teacher, as distinct from the overworked teacher, simply has no time for research may be endorsed explicitly by the administration of a college or by influential members of particular departments in a college, but it may also receive a kind of indirect support. A prominent figure on many campuses is the instructor who is forever marking exams, grading papers, and drawing curves representing his students' performance. He is full of schemes, such as giving comprehensive examinations to the entire student body, that if instituted would require the assistance of all his colleagues. With such a person on hand, it soon appears that any instructor who so much as opens a book is goofing off just as surely as the student who cuts classes to improve his bridge.

To be sure, the administration of scientific research on a college campus poses many problems. Should the teaching load of an instructor who gets a grant for research be reduced? Should his salary be reduced? If the grant does not include salary, how much time should the college allow the instructor for his research? What percentage of the grant should the college charge for the use of its facilities and equipment? But these problems, if troublesome, can be solved. They are not arguments against the contribution that scholarship can make to effective teaching.

Instructors may all agree that in a liberal arts college the quality of teaching is the most important consideration. They may also agree that one can be a first-rate teacher without doing a stick of research, and that research, like teaching, can become a device for keeping oneself busy without actually working. But why in small colleges should some instructors oppose the recognition of good research as a consideration second to good teaching? The real reason is not one of those mysteries that science cannot explain. Consider the effect of such an additional consideration on faculty promotions and prestige—and even on the ability of a college to acquire teachers of merit. We suspect that some instructors oppose research, and other forms of scholarship as well, because, when a college encourages scholarship, competition for positions on its staff grows sharper.—J.T.

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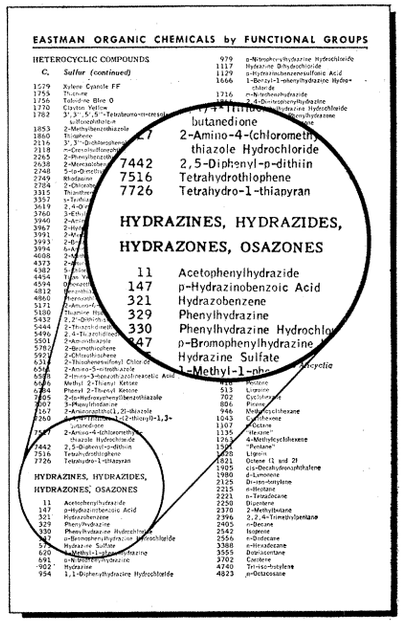
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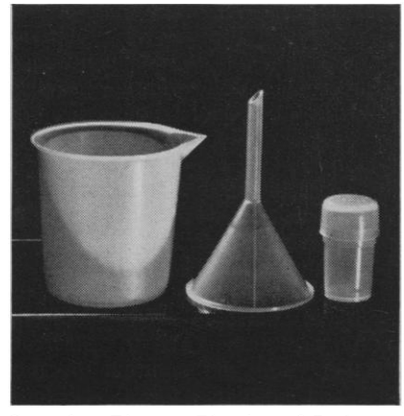

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The first day was devoted to naturally-occurring plant growth substances; the second, to the gibberellins; and the third and fourth to the synthetic auxins and other plant growth substances. In addition to the scheduled papers, there was ample time for discussion at each session. The papers presented and the remarks made during the discussion periods will be published in book form by the Iowa State College Press. Copies will be sent to each participant and will be available to others at a nominal cost.

Among the outstanding new discoveries revealed at the conference was the isolation of a new class of auxins from Maryland Mammoth tobacco by D. G. Crosby and A. J. Vlitos. A ton of tobacco leaves and growing tips yielded about 10 mg of active chemicals. One was identified as 1-docosanol, the other is a long-chain fatty acid not fully characterized as yet. Bruce Stowe also presented data showing the growth-promoting action of long-chain aliphatic compounds.

This was the first international growth conference at which the gibberellins were discussed. The Japanese scientists who did much of the early work on the gibberellins, T. Hayashi, J. Kato, and Y. Sumiki, took part in the conference. P. W. Brian, of the Akers Research Laboratories in England, who was instrumental in drawing the attention of the Western world to the Japanese work on gibberellins, reported on new developments from his laboratory. Evidence indicating the probable widespread occurrence of gibberellin-like substances in plants was presented by C. A. West.

New concepts on the relation be-

tween structure and auxin activity, with special reference to requirements for reaction with the necessary binding sites, were discussed in separate papers by K. V. Thimann and J. van Overbeek.

A feature of the conference was a memorial dinner in honor of the late P. W. Zimmerman. It was in his laboratory at the Boyce Thompson Institute, in cooperation with his associate, A. E. Hitchcock, that 2,4-D was first found to have marked effects on plant growth and development. Indolebutyric acid and 1-naphthaleneacetic acid were also first investigated as growth regulants by Zimmerman and Hitchcock. Extensive investigations by these authors were also carried out with derivatives of benzoic acid and a variety of substituted aryloxyacetic acids, in addition to 2,4-D.

Major addresses at the conference were given by William J. Robbins, director emeritus of the New York Botanical Garden, who spoke at the memorial dinner for P. W. Zimmerman on expanding concepts of plant growth regulation, and by James Bonner of California Institute of Technology, who delivered an address on the probable future of auxinology.

The day after the scientific sessions of the conference ended, the participants were taken on a chartered boat around Manhattan Island, where they had an opportunity to meet members of the botany departments of Columbia and Rutgers universities and staff members of the three sponsoring institutions who were not directly interested in plant growth substances and, therefore, were not participants in the scientific sessions.

George L. McNew, managing director of the Boyce Thompson Institute, was chairman of the organizing committee for the conference, and A. J. Vlitos, who originally suggested that such a conference be held, served as secretary. Vlitos, formerly at the Institute, is now with Caroni Ltd., in Trinidad.

LAWRENCE P. MILLER
Boyce Thompson Institute for Plant Research, Inc., Yonkers, New York

Forthcoming Events

February

1–4. American Soc. of Heating, Refrigerating and Air Conditioning Engineers, semi-annual, Dallas, Tex. (Miss J. I. Szabo, ASHRACE, 234 Fifth Ave., New York 1.)

1–4. Instrument-Automation Conf., Houston, Tex. (Director, Technical and Educational Services, Instrument Soc. of America, 313 Sixth Ave., Pittsburgh 22, Pa.)

1–5. American Inst. of Electrical Engi-

neers, winter general, New York, N.Y. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

1–5. Clinical Cong. of Abdominal Surgeons, Miami Beach, Fla. (CCAS, 633 Main St., Melrose 76, Mass.)

2–4. Haemopoiesis—Cell Production and Its Regulation, Ciba Foundation symp. (by invitation only), London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1, England.)

2–4. Society of the Plastics Industry (Reinforced Plastics Div.), Chicago, Ill. (W. C. Bird, SPI, 250 Park Ave., New York 17.)

3–5. Military Electronics, IRE winter conv., Los Angeles, Calif. (G. B. Knoob, Motorola, Inc., Military Electronics Div., 1741 Ivar Ave., Hollywood 28, Calif.)

3–6. American College of Radiology, New Orleans, La. (W. C. Stronach, 20 N. Wacker Dr., Chicago 6.)

3–6. Parathyroid Research, symp., Houston, Tex. (R. V. Talmage, Dept. of Biology, Rice Inst., Houston.)

4–6. American Soc. for Metals, San Francisco, Calif. (R. Huggins, ASM, Stanford Univ., Stanford, Calif.)

4–6. Congress on Administration, 3rd annual, Chicago, Ill. (R. E. Brown, American College of Hospital Administrators, 840 N. Lake Shore Drive, Chicago 11.)

5. Parenteral Drug Assoc., New York, N.Y. (H. E. Boyden, PDA, 4865 Stenton Ave., Philadelphia 44, Pa.)

7–9. Congress on Medical Education and Licensure, Chicago, Ill. (CMEH, AMA, 535 N. Dearborn St., Chicago 10.)

7–10. Radioactive Isotopes in Clinical Medicine and Research, 4th intern. symp., Bad Gastein, Austria. (R. Höfer, 2nd Medical Univ. Clinic, 13 Garnisongasse, Vienna 1X, Austria.)

10–11. Gas Cooled Reactor, symp., Philadelphia, Pa. (F. L. Jackson, Franklin Inst., Philadelphia, Pa.)

10–12. American Acad. of Occupational Medicine, Williamsburg, Va. (L. B. Shone, Bureau of Medicine and Surgery, Navy Dept., Washington 25.)

10–12. Solid States Circuit Conf., Philadelphia, Pa. (T. R. Finch, Bell Telephone Laboratories, Murray Hill, N.J.)

10–13. National Assoc. for Research in Science Teaching, 33rd annual, Chicago, Ill. (C. M. Pruitt, Univ. of Tampa, Tampa, Fla.)

10–13. National Soc. of College Teachers of Education, Chicago, Ill. (E. J. Clark, Indiana State Teachers College, Terre Haute.)

11. Protein and Amino Acid Requirements of Swine, Chicago, Ill. (J. T. Sime, Assoc. of Vitamin Chemists, Evaporated Milk Assoc., 228 N. La Salle St., Chicago 1.)

11–13. Society of Univ. Surgeons, Minneapolis, Minn. (B. Eiseman, 4200 E. Ninth Ave., Denver 20, Colo.)

14–18. American Inst. of Mining, Metallurgical and Petroleum Engineers, annual, New York, N.Y. (E. O. Kirkendall, AIME, 29 W. 39th St., New York 18.)

16. Astronomical Soc. of the Pacific annual, San Francisco, Calif. (S. Einarsson, Leuschner Observatory, Univ. of California, Berkeley 4.)

18–19. Chemical Inst. of Canada (Protective Coatings Div.), Toronto, Ont., and Montreal, Que., Canada. (Scientific Liaison Office, National Research Council, Sussex Drive, Ottawa, Canada.)

18–20. National Soc. of Professional Engineers, winter, Wichita, Kan. (P. H. Robbins, NSPE, 309 Bancroft Bldg., Univ. of Nebraska, Lincoln.)

21–24. American Inst. of Chemical Engineers, Atlanta, Ga. (F. J. Van Antwerpen, AICE, 25 W. 45 St., New York 36.)

22–25. Technical Assoc. of the Pulp and Paper Industry, annual, New York, N.Y. (J. Winchester, TAPPI, 155 E. 44 St., New York 17.)

22–4. Scientific Management, 12th intern. cong., Sydney and Melbourne, Australia. (C. M. Gray, Federal Council of the Australian Inst. of Management, Western House, 83 William St., Melbourne, C.1, Victoria, Australia.)

24–26. Biophysical Soc., 4th annual, Philadelphia, Pa. (O. H. Schmitt, Biophysical Soc., Chairman, Program Committee, Univ. of Minnesota, Minneapolis.)

25–27. American Orthopsychiatric Assoc., Chicago, Ill. (Miss M. F. Langer, 1790 Broadway, New York 19.)

25–27. Cell Physiology of Neoplasia (14th annual symp. on fundamental cancer research), Houston, Tex. (Editorial Office, Univ. of Texas M. D. Anderson Hospital, Texas Medical Center, Houston 25.)

26. Highway Geology, 11th annual