

# Meetings

## Biological Sciences

The ninth annual meeting of biological societies under the auspices of the American Institute of Biological Sciences was held at Indiana University, Bloomington, 24–28 August 1958, with a record attendance of 4800. The 50th anniversary celebration of the American Phytopathological Society, bringing nearly 1000 plant pathologists to Bloomington, did much to swell the attendance. There were 1487 individual and symposium papers during the four days of meetings by the members of 27 societies. Among these many papers, the ones outlined below represent a few of the more interesting or significant.

W. T. McDonough (University of Maryland) reported on the significantly higher yields obtained from “bearded” Duram wheat in semiarid regions in the West. In the eastern portion of the country, beards have little or no effect on yield. Through the use of radioactive carbon (in  $\text{CO}_2$ ) it was found that 41 percent of all carbohydrate manufactured by the head was made by the beards. At low soil-moisture percentages, the beards remained functional as suppliers for the developing kernels when other plant parts were contributing little or nothing.

W. R. Breneman and M. Carmack (Indiana University) have demonstrated that spray-dried preparations of cold-water extracts of *Lithospermum ruderales* (“lithosperm”) inhibit gonadotropins in the chick. Inhibition of pregnant mare serum and anterior pituitary luteinizing hormone occurred after *in vitro* mixture with lithosperm for 1 hour at room temperature. Injection of lithosperm into cockerels for 10 days prevented testis growth and androgen secretion, indicating the inhibition of endogenous gonadotropin. Endogenous thyrotropin inhibition was also noted. The spray-dried powders used in the study retained activity for 2 years. The preparations have also been demonstrated to inhibit egg-laying in hens, to inactive glucagon, and both to inhibit the uptake of  $\text{I}^{131}$  by thyroid glands and to suppress the release of  $\text{I}^{131}$ .

A hint about the mechanisms of variation in animal growth was supplied by P. J. Van Alten (Michigan State Uni-

versity), who grafted tissue from chickens onto chick embryo membranes. Use of adult duodenum tissue significantly increased the size and weight of the embryo's heart, liver, and spleen, while it decreased the over-all weight of the embryo. Apparently a direct transfer of antigen occurred from the grafted tissue to the embryo organ. In certain types of grafts, however, there was some evidence that this antigenic action had an effect on the whole embryo, rather than on the corresponding organ alone.

In man and other mammals, sectioning of the optic nerve results in irreparable loss of vision. In fishes and amphibians, however, the optic nerve is able to regenerate after complete transection. H. L. Arora and R. W. Sperry (California Institute of Technology) reported on the complete recovery of color vision in cichlid fish following optic-nerve section. All normal training evidence indicates that fish discriminate between such colors as blue, red, green, yellow, and orange, responding to differences in wavelength rather than merely to variations in intensity. The finding that the ability to discriminate color was reinstated in its original form following section and regeneration of the optic nerve implied that the reconnection of optic axon in the brain takes place in an orderly manner and is governed by fiber specificities associated with color perception as well as by the topical specificities associated with direction. The fact that color-discrimination training survived suggests that the memory engrams, whatever their nature, must be located more centrally than the optic axon synapses.

W. R. Tulecke (Chas. Pfizer & Co.) told of inducing *Ginkgo* pollen to form many-celled tissues in culture. Most of the pollen grains germinated in a normal fashion, but many proceeded to form definite tissue masses. Both arginine and urea were used successfully to support this growth.

“Homing” in bats has been demonstrated by H. C. Mueller (University of Wisconsin), and the theory has been offered that it is accomplished by means of their built-in echolocation system. Mueller believes that the bats, released some distance from “home” in unfamiliar territory, “sound-picture” the ter-

rain until it becomes familiar, then rapidly head for home territory.

Red dye and radioactive chemicals, introduced into freshly cut pine stumps, were found a day or two later in the sapwood of nearby living trees, F. H. Bormann and B. F. Graham (Dartmouth College) reported. Of 84 stumps tested, 41 were found to be grafted to at least one neighboring tree. In a number of cases the neighboring trees were in turn grafted to others. Considered until recently merely a botanical curiosity, natural root grafts promise to be of growing interest to those concerned with plant diseases, forest management, and water supplies. Organisms causing Dutch elm disease, oak wilt, and so on may move from tree to tree through such grafts; tree poisons, used by foresters, could move from the treated trees to nearby untreated ones.

Two new drugs, glycarbylamide and nicrabazin, are proving more effective against cecal coccidiosis of poultry than any of four other compounds currently popular (nitrofurazone, Bifuran, sulfaquinoxaline, and Trithiadol). The six chemicals were compared by D. K. McLoughlin and D. K. Chester (U.S. Department of Agriculture, Beltsville). All infected groups of chicks treated with medicants showed less mortality, less evidence of severe hemorrhage, and better weight gains than did infected but untreated groups. Results with the compounds tested differed only in the degree of protection given the treated birds.

Cesium-137, a poisonous fission product from power reactors and atomic fallout, with long radiation life, is concentrated by many aquatic organisms. *Rhizoclonium* concentrated cesium at a level 1530 times the amount in its environment. *Euglena* took out 69 percent of the cesium in 11 days. *Chlorella*, after having been killed with formaldehyde, was able to concentrate cesium at a level 418 times the environmental level in 8 days. Even when high concentrations of potassium were present in the water, many of these organisms seemed to “prefer” the cesium. These findings were reported by L. C. Williams (Furman University).

B. Greenberg (University of Illinois College of Pharmacy) suggests that the common housefly may not be such a disease-carrying villain after all, for it sheds bacteria as it progresses from egg to adult. As the egg hatches into a maggot, tens of millions of bacteria accumulate in the digestive tract. This count drops about 90 percent as the maggot develops a pupal casing. Most of the remaining bacteria are left behind in the pupal case, and the fly emerges relatively “pure,” with an average count of 500 internal bacteria. Even these are not contained in the digestive tract, where they could be spread in waste products. With an external count of approximately

500 bacteria, the newborn fly is in a relatively clean condition.

W. S. Bailey and W. E. Ribelin (Auburn School of Veterinary Medicine) told parasitologists that, although cancer occurs commonly in dogs, it is rare in the esophagus. When it does occur there, the esophageal worm is "an inciting cause." It is of interest that all dogs examined with cases of esophageal cancer were hounds or bird dogs.

Hobart M. Smith (University of Illinois) warned that diagnosis of poisonous snakebite should not rest solely upon the existence of swelling. Bites that go deep into muscle usually produce great swelling, while bites injecting venom just under the skin can be just as dangerous without producing any swelling. Test of blood-clotting time is a more reliable basis for diagnosis. Smith pointed out, as a sad example, the recent death of Karl P. Schmidt of the Chicago Natural History Museum from the bite of a South African boomslang snake; there had been no great swelling or pain, but the bite was fatal.

Species of *Calvatia gigantea*, the giant puffball, have been found to have tumor-inhibiting properties with respect to mice, according to a team from Michigan State University and the Sloan-Kettering Institute—E. H. Lucas, R. Byerum, J. A. Stevens, C. C. Stock, D. A. Clarke, and H. C. Reilly. Only one type of mouse cancer has been tested to date, and the scientists emphasize that the specific responsible substances are not yet known.

A fungus that apparently facilitates the healing of human burns was discussed by J. E. Peterson (University of Missouri). The fungi appeared in the wounds of a severely burned boy as a white, cottony growth. It had apparently been introduced when the boy's father rolled him directly on the earth to put out the flames. Doctors were able to do clean-up surgery in half the usual time and believed that the growth was responsible for the rapidity of healing. Upon isolation in pure culture, the fungus was identified as *Fusarium roseum*.

Interest in Mexican hallucinogenic mushrooms (teonanacatl) has been revived in recent years, doubtless due to increased research in mental illness. In 1957 an expedition visited the Mazatec country to collect and identify mycological material. Rolf Singer, R. Ames, and S. I. Stein (Chicago) reported on their findings. The following species have now been established as producing psychoneurophysiologic effects: (i) *Psilocybe cubensis*, (ii) *P. caerulescens*, and (iii) *P. mexicana*, and possibly *P. candidipes*. A later trip added *P. muliercula* and *P. aztecorum* to the list. All six species have the following characteristics in common: The fruiting bodies, when scratched, handled, or dried out, stain

blue; the odor and taste are distinctive—the odor, that of fresh flour or cucumbers; the taste, more or less astringent or unpleasant. The type of vegetation in which psilocybes occur is not uniform; the habitat varies from tropical and temperate montane to truly tropical rain forest and to subalpine frigid. Stein reported personally on the dramatic effects of eating *P. cubensis* and discussed reports on other species. The recent isolation of a substance, Psilocybin, from *P. mexicana* makes possible the standardization of dosage and indicates the possibility of further isolation of active substances.

G. C. Decker (Illinois Natural History Survey) termed the large-scale use of insecticides "one of the important technological developments of the 20th century." Decker said emphatically that "the general sum and substance of all research in this field [insecticides] has failed to indicate any significant public health hazards," and he continued, "It is not surprising that there have been numerous instances where wildlife of varied types have been adversely affected by insecticides. At the same time preponderance of evidence indicates such incidents can in practically all cases be traced to carelessness, to accidents, or to instances of outright experimentation."

To assist in meeting the current need to provide high-school and college teachers with up-dating courses, the American Society of Zoologists, the Society of Protozoologists, and the National Association of Biology Teachers jointly sponsored an eminently successful refresher course in "Advances in Protozoology" (J. O. Corliss, *Science*, this issue). Organized by T. M. Sonneborn, it consisted of three sessions of lectures, one of discussion, one of demonstrations, and two of motion pictures. The response to this course definitely indicated the value of such cooperative ventures and the need for similar efforts at succeeding meetings.

#### Plant Pathology

The American Phytopathological Society, in celebration of its 50th anniversary, conducted a four-day international symposium which attracted many of the world's outstanding scientists in the field. Robley C. Williams (University of California) told plant pathologists, "At the present time, in the investigation of plant virus structure, the electron microscope has its greatest potential usefulness in examination of the form taken by the substructure of partially disintegrated viruses. What is needed is improvement in chemical techniques whereby many viruses can be degraded in a controlled manner. The form of the building blocks of the 'spherical' viruses is a particularly intriguing matter owing to the evidence

of the geometrical nicety with which they are filled into the complete polyhedral structure. It is my prediction that this specific area of research is the one in which electron microscopy of the future will have its greatest triumphs."

In discussing the landmarks in the use of chemicals to control plant diseases, George L. McNew (Boyce Thompson Institute) stated, "The unresolved problems continue to loom large on the horizon. The farmers of the U.S. still endure a loss of over 7 percent of crop productivity because of disease. This is a toll of \$3 billion annually that may be alleviated by new types of chemicals and better methods of using those that are already available. There is little room for complacency or self satisfaction from the discovery of new chemicals to date." McNew continued, "The principles of how to design molecules for specific attributes are rapidly being established. With all the versatile possibilities of organic chemistry to draw upon, the plant physiologist can look forward with confidence to resolving the problems still before him."

E. C. Stakman (University of Minnesota), who delivered the principal address of the anniversary celebrations, traced the role of plant pathology in the scientific and social development of the world. Quoting from van Loon, that "The history of man is the record of a hungry creature in search of food," Stakman showed that man "had to become at least a practical biologist in order to develop a civilization; and he has had to become a continually better biologist in order to preserve it." The first written records of plant diseases occurred in Hebrew and Egyptian literature; these were followed by very concise records in the writings of Greek and Roman naturalists, poets, and historians. In a scholarly fashion, Stakman traced the complete and steady development of the science of plant disease through the ages to our modern state of knowledge. The speaker concluded, "Plant pathology has helped to satisfy man's hunger for food and his thirst for knowledge. Is not that reason for pride?"

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#### Refresher Course in Protozoology

At the recent meetings (24 to 28 Aug. 1958) of the American Institute of Biological Sciences, held on the campus of Indiana University, Bloomington, a major attraction was a "refresher course" entitled "Advances in Protozoology," sponsored jointly by the American Society of Zoologists, the Society of Protozoologists, and the National Association of Biology Teachers, and supported by

the National Science Foundation. This was not the first refresher course to be held at AIBS meetings, but it was surely the most extensive and intensive one and was unusual in several respects.

#### Aims and Organization

The principal aims of the course, which offered sessions during the better part of two full days and evenings, were to update the level of high-school and college teaching in areas involving protozoa and to excite renewed interest in these microscopic organisms by reviewing recent progress in the major fields of research in protozoology. The high degree of interest shown both by the formal participants and the large audiences in attendance at the several sessions reflected in large part the infectious enthusiasm of the project's energetic organizer, T. M. Sonneborn (Indiana University).

The several unique features of the course included the availability of a mimeographed "Syllabus," which contained 58 pages of comprehensive information (in annotated outline form, with helpful bibliographies) relative to the nine major lectures; an unusually extensive demonstration session, to which mimeographed guides were available, involving nearly 100 exhibits; a special discussion session on the problems and philosophy of "teaching protozoa" at all educational levels; and several showings of a diversified collection of protozoological films.

The nine lectures, arranged with a minimum of overlap and with ample discussion periods, were followed by the demonstration session. Movies were organized into several shows which ran concurrently in different locations and were repeated over a three-day period.

#### Lecture Sessions

J. O. Corliss (University of Illinois) opened the first lecture session, speaking on the broad subjects of systematics and evolution and reviewing some general facts concerning the numbers, diversity, and ubiquity of protozoa. Their complex nature defies a simple definition, and many problems are involved in attempting to establish natural systems of classification. Under the topic of evolution Corliss included consideration of the two major hypotheses of origin of the eumetazoa from protozoa (the colonial-integration notion versus the compartmentalization-of-a-single-cell theory) as well as ideas concerning various interrelationships among the protozoa themselves, at both highest and lowest taxonomic levels. Dorothy Pitelka (University of California, Berkeley), in reviewing advances in protozoan cytology, emphasized particularly the ultrastructural studies now possible with the electron microscope. Of special value to many in the audience

was her clear exposition of the basic homologies which exist between structures possessed by single protozoa and those of single metazoan cells, such as mitochondria, Golgi apparatus, cilia, microsomes, and the endoplasmic reticulum.

P. B. Weisz (Brown University) brought the first session to a close with a lucid lecture on morphogenesis in protozoa. Particularly important was his well-documented presentation of the roles of the nuclear apparatus and of the cytosome in such processes as regeneration; his points were illustrated mainly by references to experimental work carried out on the large heterotrichous ciliate *Stentor*. He concluded with emphasis on the fact that certain basic nucleocytoplasmic interrelationships play an essential part in all morphogenetic phenomena carefully studied to date.

R. W. Siegel (University of California, Los Angeles) led off the second lecture session with a discussion of protozoan life cycles in which sexuality is known or suspected to play a significant role. In particular, he included some of the many problems concerning life histories of the foraminiferidans, the higher zooflagellates, and the ciliates, treating them from a comparative point of view. The classical question of immortality of unicellular organisms was discussed in the light of modern researches; Siegel concluded that asexual species show potential immortality in their life cycle, but that many sexual species seem to obey the "rule of Maupus" in passing through a series of natural stages of immaturity, maturity, senescence, and death. G. H. Beale (Institute of Animal Genetics, Edinburgh) discussed the kinds of genetic problems that can be approached with protozoan material in general, mentioning the species so used to date and reviewing the subject of Mendelian inheritance in protozoa. The antigen system of *Paramecium aurelia* was discussed in some detail, with particular consideration of the three classes of determinants involved: nuclear genes, cytoplasmic states, and factors of the external environment.

W. Balamuth (University of California, Berkeley) spoke on the subject of controlled cultivation of protozoa, treating, among other topics, terminology, technology, general applicability, specific patterns of nutritional requirements in different groups of protozoa, and recent advances in experimental studies of growth as related to controlled cultivation. Perhaps one of the most exciting advances in population-growth work is the recent success in achieving a synchronized fission cycle in mass cultures of the ciliate *Tetrahymena*. S. H. Hutner (Haskins Laboratories), in the last address of the second lecture session, emphasized in still greater detail how protozoa are becoming valuable tools in biochemical research, especially for studying metabolic

systems in higher animals. Primarily as a result of the advent of chemically defined culture media, permitting precise environmental control, a number of species are now being widely used in biochemical work, some in such important areas as cancer research. Forms covered in Hutner's discussion included members of these ten important genera: *Euglena*, *Ochromonas*, *Peranema*, *Trypanosoma*, *Crithidia*, *Leishmania*, *Tetrahymena*, *Paramecium*, *Stylonychia*, and *Podophyra*.

E. R. Becker (Iowa State College and, currently, Arizona State College) reviewed the present status of our knowledge concerning major groups of symbiotic protozoa which exhibit classical host-parasite relationships. His talk included discussion of the microfauna of the digestive tract of termites, the closely related higher zooflagellates of the wood-eating roach *Cryptocerus*, and the ciliate fauna of the stomach of ruminants. In the syllabus, the life cycle of the all-important malarial organisms also was considered. Topics discussed by Becker within the framework of the subjects mentioned above ranged from experimental defaunation of the host to evolutionary trends in the phylogeny of the symbiont, from the complex physiological interrelationships of the host and its microfauna to the special relationship of the sexual cycle of the flagellates in *Cryptocerus* to the roach's own life cycle.

C. P. Read (Johns Hopkins University) followed Becker with an appropriate discussion of the comparative biochemistry of parasitic protozoa—a talk dedicated to the memory of Asa C. Chandler, long a leader in American parasitology, news of whose untimely death in Europe had just reached Bloomington. Read was concerned with four major aspects of his broad subject: catabolism of parasitic protozoa; anabolism of parasitic protozoa; specific patterns of metabolism in the host-parasite relationship; and applied comparative biochemistry of parasitic protozoa. Perhaps most revealing to the large audience, composed mainly of general biologists, was his presentation of the great advance being made in our knowledge of drug resistance, chemotherapy, and pertinent pharmacology by virtue of laboratory studies carried out on protozoa as experimental animals.

It should be mentioned that a number of the lecturers included cross references to personal demonstration material. Corliss posted nine large charts depicting "phylogenetic trees" dating from the 1880's to unpublished work kindly contributed by specialists for the different protozoan groups; most of these were also used in his talk, as illustration of both the complexity and the diversity of classificational and evolutionary schemes. Dorothy Pitelka joined half a dozen other

top-notch electron microscopists interested in protozoa in a beautiful display of electron micrographs on the walls of one of the corridors in Jordan Hall, and Weisz demonstrated microsurgical techniques employed in regeneration and transplantation work on *Stentor*. Siegel presented clear-cut charts representing a general scheme of protozoan life cycles, with separate illustrations of foraminiferan and ciliate life cycles. Hutner demonstrated production of apochlorotic strains of *Euglena* with streptomycin, and uses of certain protozoa as microbiological assay organisms. Balamuth exhibited the greatest quantity of supporting material of all the speakers in his extensive and painstaking demonstration of cultures of a dozen different species of protozoa and of techniques for maintaining such cultures for both research and teaching purposes. Many demonstrations by others, discussed below, also served to illustrate and complement the lecture material.

### Discussion Session

A special discussion session was devoted to methods, problems, and philosophy of teaching, particularly as related to presentation of protozoan material. L. E. Noland (University of Wisconsin) ably acted as a participating chairman; A. M. Elliott (University of Michigan) presented considerations at the college level; P. R. Fordyce (Broad Ripple High School, Indianapolis, and, currently, Oak Park High School, Oak Park, Ill.) discussed aspects at the high-school level. Fordyce's remarks in particular created discussion from the audience, since he was the only person on the entire refresher-course staff directly concerned with students at the pre-college level.

From the scheduled talks and the spontaneous comments from the floor, it was evident that protozoa serve a most useful purpose in biology courses but that they might be used even more extensively if methods of collection, maintenance, and demonstration were more generally known.

### Motion Pictures

The motion-picture sessions were extended over one afternoon and three evenings. R. Vishniac's (New York City) *The Not Too Simple Protozoa* surely was the most picturesque, having been filmed in color by means of his own special technique. Other movies of particular value as teaching aids covered many topics, ranging from life and death of a cell, conjugation in *Paramecium bursaria*, general biology of *Chaos chaos* (or *Pelomyxa*), excystment in *Colpoda*, feeding mechanisms in *Bresslaia*, and movement in *Labyrinthula* to nuclear transplantation in *Amoeba* and exoery-

throcytic stages of avian malaria in chick embryos and tissue culture.

Two outstanding sets of foreign films, which reached Bloomington too late for inclusion in the printed program, also were shown. The first comprised an assorted group of films portraying features in the general biology of a good number of protozoa representative of all four major groups. These were produced by K. C. Wingstrand and A. Øye (Copenhagen). The second set represented an organized microcinematographic study of food-getting in a score of species of ciliated protozoa, the feeding methods shown ranging from those exhibited by the insatiable herbivorous gymnostomes to the highly specialized adaptations revealed in the habits of the carnivorous suctorians. J. Dragesco (Paris) was primarily responsible for these excellent films, taken over a period of ten years in the laboratories of E. Fauré-Fremiet (Collège de France).

A number of the films shown are available for purchase or rental; many would certainly serve as excellent teaching aids. Inquiries concerning costs, addresses, dates of delivery, and so on, of the two groups of foreign films may be directed to T. M. Sonneborn.

### Demonstration Session

Probably the most unusual aspect of the refresher course was the demonstration session. Over 80 exhibits, occupying some 13 separate locations in Jordan Hall of Biology, represented nearly every phase of protozoology. The exhibitions not only covered all kinds of protozoa, plus methods and techniques of studying and using them, but also represented the major centers of protozoological work, at both teaching and research levels, in the United States; nearly 100 contributors were directly involved in the planning and execution of this very impressive affair. Of indispensable aid were two mimeographed "Guides to the Demonstrations," one more detailed than the other, which listed all exhibits, with locations, and also served as a fine summary of the entire demonstration session.

Lack of space precludes mention here of all the demonstrations and demonstrators, but some idea may be given of their scope and variety through a brief enumeration of the major areas or subjects covered. Parasitic protozoa were well represented by exhibits, including extensive ones, of protozoan and host materials associated with malaria, coccidiosis, "blackhead" in birds, and the symbiotic relationships of protozoa with termites, wood-roaches, and ruminants. Cytological techniques, apparatus (and even results!) were in evidence in many of the rooms; one entire corridor was devoted to displays of electron micrographs of protoplasmic constituents of the

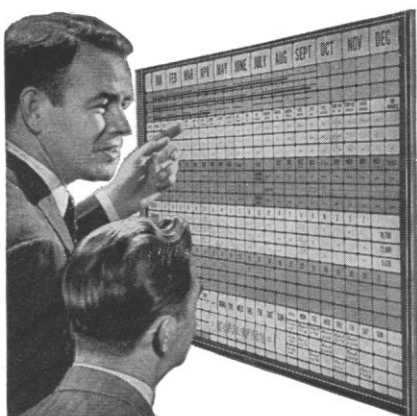
protozoan body, representing the work of half a dozen American laboratories. Culture collections [including R. C. Starr's (Indiana University) collection of algae], culture techniques, and even some of the elaborate methods involved in modern approaches to nutritional, biochemical, and radiobiological studies were available for examination; here, as in the case of certain cytological techniques, the spectator was sometimes invited to "do-it-yourself," to his delight and profit.

Extensive demonstrations of ecology, life cycles, sexuality, evolution, phylogeny, and systematics (by means of living material as well as charts, drawings, and photomicrographs) filled one large room, including most of its wall space. Every aspect of the complex life of *Paramecium aurelia* (all syngens), and related species, was portrayed—principally, but not exclusively, by members of the Sonneborn school of paramecium biology. Such demonstrations covered not only culture methods, syngen distribution, mating reactions, serotypes, general and specific cytology and genetics (including "kappa" particles), and ultrastructure but also precise growth requirements, electromigration, paper electrophoresis, chromatography, and radioautography. W. J. van Wagendonk deserves special mention in connection with the last-mentioned topics, and Ruth Dippell merits commendation for organizing so competently much of the local material involving *Paramecium*.

A large number of the demonstrations, as mentioned above, were quite appropriately slanted towards applicability in *teaching* about the protozoa. This was particularly true of a variety of cytological, experimental, and cultural techniques, such as those displayed by groups from the following schools or laboratories: Indiana University, University of California (Berkeley, Los Angeles, and Davis campuses), State University of Iowa, University of Illinois, Howard University, University of Michigan, University of Wisconsin, Argonne National Laboratory, and Haskins Laboratories.

Originality was apparent on all sides; in this connection a few specific demonstrations may be mentioned: the huge three-dimensional scale models (in plaster) of rhizopod amoebae by E. C. Bovee (University of Florida); the striking demonstration (for which mice were used as the experimental animals) of the strength of the dinoflagellate toxin responsible for mussel poisoning on the West Coast, by L. Provasoli and J. J. A. McLaughlin (Haskins Laboratories); the magnificent illustration of the phylogenetically important *Gonium-Volvox* sequence, in which living material was used exclusively, by R. C. Starr (Indiana University); use of the "Tartar Cyclo-

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paramacetome," the easily constructed whirling razor-blade device so convenient for slicing up small ciliates to determine their powers of regeneration, by E. W. McArdle (University of Illinois); the living exhibition of the "love-dance" entered upon by sexually reactive ciliates of the hypotrichous genus *Stylonychia* immediately prior to conjugation, by L. E. Downs (Sierra College), and the elaborate portrayal of the cytology and complex life cycles of heterotrichous and vorticellid ciliates, by H. E. Finley and his colleagues.

One of the most educational "one-man" shows was the demonstration by L. E. Noland (University of Wisconsin) of the dynamic ecological interrelationships existing in biotic communities of the microscopic world. Surrounded by a host of microscopes, aquaria, and smaller culture chambers, and very busy helping others while enjoying himself thoroughly, Noland exemplified the true protozoologist who makes no apology for loving the protozoa purely for their own sake.

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## Fluid and Solid Mechanics

The Midwestern Conference on Fluid and Solid Mechanics will be held at the University of Texas, Austin, 9-11 September. This meeting, which will be the sixth Conference on Fluid Mechanics and the fourth Conference on Solid Mechanics, forms another element in a series of these conferences. The conferences have taken place at approximate intervals of 2 years, previous ones having been held at the University of Illinois, Ohio State University, the University of Minnesota, Purdue University, and the University of Michigan.

Although the conferences are organized on a regional basis, there are no restrictions on attendance or on the residence of authors of technical papers. A General Conference Committee for handling initial arrangements consists of Walter L. Moore, professor of civil engineering; Enrico G. Volterra, professor of engineering mechanics; and Milton J. Thompson, professor of aeronautical engineering. Abstracts and titles of proposed papers should be submitted to Thompson, who is chairman, before 1 April. Complete manuscripts will be required by 1 June, so that the proceedings may be distributed at the opening of the conference. Inquiries concerning other details of the conference should also be addressed to Thompson.

The University of Texas, as a part of its support of the conference, has arranged some invited lectures on important aspects of mechanics. Samuel A.

Schaaf of the University of California will present a lecture on "Recent Progress in Rarefied Gas Dynamics Research," while Lloyd H. Donnell of Illinois Institute of Technology will talk on "New Developments in Shell Theory." At a dinner meeting, Sydney Goldstein of Harvard University will speak on "Recent Progress in Applied Mechanics."

Cosponsors of the Midwestern Conference include some ten national scientific societies, the Office of Scientific Research of the Air Force, the Office of Naval Research, the Office of Ordnance Research of the Army, and the National Science Foundation.

## Wildlife Federation

One of the highlights of the 23rd annual convention of the National Wildlife Federation, to be held at the Sheraton-McAlpin Hotel in New York, 27 February-1 March, will be a thorough discussion of abatement of water-pollution. Ernest Swift, the federation's executive director, has announced that a six-member panel will discuss pollution, beginning at 2 P.M. on 28 February. The participants will include Rep. John A. Blatnik (Minn.), author of the Federal Pollution Control Act of 1956, which established the grants program for construction of sewage treatment plants.

A panel discussion touching on all phases of insect and plant-pest chemical controls and their effects, particularly upon wildlife, will highlight the opening-day program.

The convention will be attended by delegates representing 50 affiliated wildlife federations and conservation leagues in the states and the District of Columbia. Immediately following the federation convention is the 23rd annual North American Wildlife Conference, sponsored by the Wildlife Management Institute. It will be held in the Statler-Hilton Hotel, New York, 2-4 March.

## Geochemical Society

The annual meeting of the Geochemical Society was held at St. Louis, 6-8 November, under the auspices of the Geological Society of America. Forty-eight papers on geochemistry were presented, of which 14 were chiefly concerned with phase relations, 11 with distribution of trace and minor elements, 11 with geochronology, and 12 with general geochemistry. Eight additional papers were read by title. The retiring president of the Geochemical Society, Farrington Daniels, gave an address on "Kinetics and Thermoluminescence in Geochemistry."

Newly elected officers for 1958-1959



are J. F. Schairer, president; T. F. W. Barth, vice-president; George T. Faust, treasurer; E. W. Heinrich, editor; K. B. Krauskopf, secretary.

## Radar

More than 500 scientists from the United States, Great Britain, and Canada met 27-30 January at the University of Michigan in Ann Arbor to explore new ways of utilizing radar for scientific and military purposes. The conference was sponsored jointly by the Army, Navy, and Air Force. It was conducted by the Radar Laboratory of the Willow Run Laboratories under the auspices of Project Michigan, a combat-surveillance research and development program being conducted by the university for the U.S. Army Combat Surveillance Agency.

This, the university's fifth Annual Radar Symposium, was the largest gathering of radar specialists held at the university to date, according to J. A. Boyd, director of the Willow Run Laboratories. The participants discussed a wide range of military and civilian radar developments, from new methods of detecting battlefield targets to the utilization of radar to enable space ships to avoid sinking into the dustlike cover of the moon when they land on it. Research into supersonic flight radar, space communication, and ICBM guidance systems received special emphasis. The sessions were classified and therefore not open to the general public.

## Forthcoming Events

### March

3. National Vitamin Foundation, 14th annual, New York, N.Y. (W. Rubin, Director of Public Information, National Vitamin Foundation, Inc., 149 E. 78 St., New York, N.Y.)

6. Molecular Structure and Vital Processes, symp., New York, N.Y. (N. Weiner, American Chemical Soc., 84-40 101 St., Richmond Hill, N. Y.)

6-7. Recent Developments in Microscopy as Applied to Biology, symp., New York, N.Y. (C. Tufts, Sylvania Research Laboratories, Bayside, N.Y.)

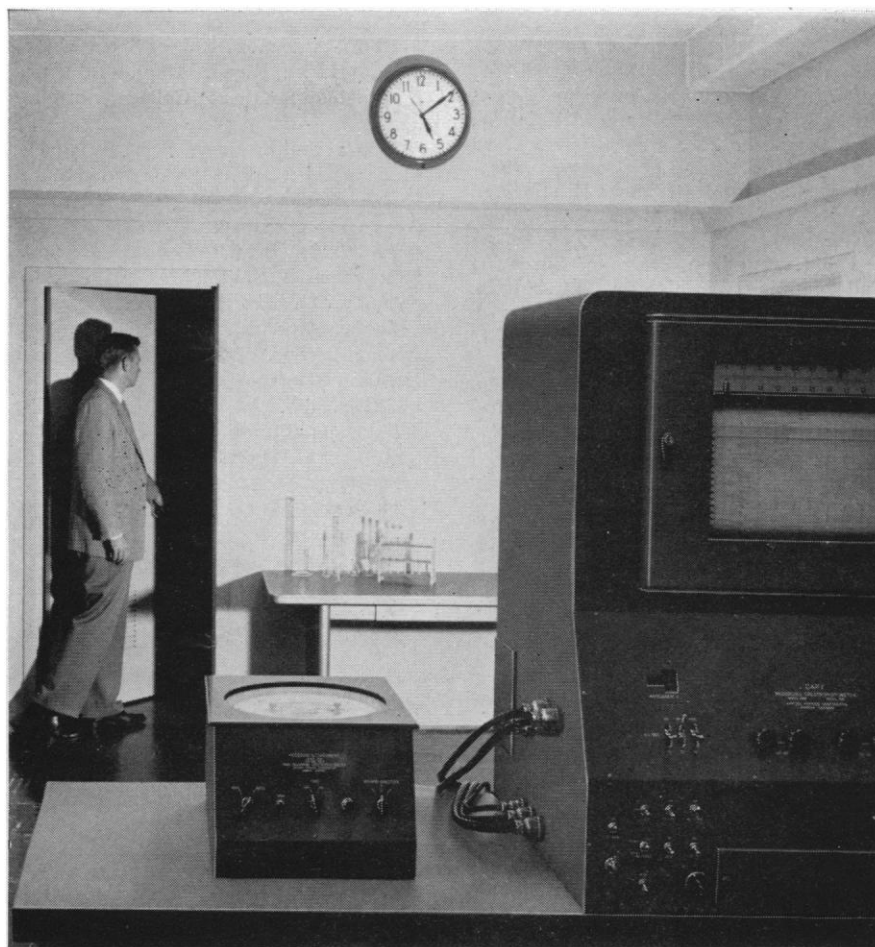
7. American Chemical Soc., Oklahoma Div., tetrasectional meeting, Tulsa. (J. W. Conant, ACS, Grand River Chemical Div. of Deere and Co., Pryor, Okla.)

8-9. American Broncho-Esophagological Assoc., Hot Springs, Va. (F. J. Putney, 1712 Locust St., Philadelphia, Pa.)

8-9. American Laryngological Assoc., Hot Springs, Va. (J. H. Maxwell, University Hospital, Ann Arbor, Mich.)

8-11. American Soc. of Photogrammetry, 25th annual, Washington, D.C. (J. H. Wickham, Jr., 1959 ASP-ACSM Consecutive Meetings, 610 Montgomery St., Alexandria, Va.)

8-12. Aviation Conf., Los Angeles,



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Calif. (O. B. Schier, ASME, 29 W. 39 St., New York, N.Y.)

9-11. International Acetylene Assoc., annual, New Orleans, La. (IAA, 30 W. 42 St., New York 17.)

10-12. American Laryngological, Rhinological and Otolological Soc., Hot Springs, Va. (C. S. Nash, 708 Medical Arts Bldg., Rochester 7, N.Y.)

11-14. American Cong. on Surveying and Mapping, Washington, D.C. (J. H. Wickham, Jr., 1959 ASP-ACSM Consecutive Meetings, 610 Montgomery St., Alexandria, Va.)

13-14. American Otolological Soc., Hot Springs, Va. (L. R. Boies, University Hospital, Minneapolis 14, Minn.)

13-15. Alabama Acad. of Sciences, Auburn, (H. M. Kaylor, Dept. of Physics, Birmingham-Southern College, Birmingham, Ala.)

14-15. Southwestern Soc. of Nuclear Medicine, 4th annual, New Orleans, La. (S. B. Nadler, SSNM, 1520 Louisiana Ave., New Orleans 15, La.)

15-20. American College of Allergists, San Francisco, Calif. (M. C. Harris, 450 Sutter St., San Francisco.)

16-19. American Assoc. of Petroleum Geologists, Soc. of Economic Paleontologists and Mineralogists, 44th annual, Dallas, Tex. (W. A. Waldschmidt, AAPG, 311 Leggett Building, Midland, Tex.)

16-20. American Inst. of Chemical Engineers, Atlantic City, N.J. (F. J. Van Antwerpen, AIChE, 25 W. 45 St., New York 36.)

16-20. National Assoc. of Corrosion Engineers, 15th annual conf., Chicago, Ill. (NACE, Southern Standard Bldg., Houston, Tex.)

16-20. Western Metal Exposition and Cong., 11th, Los Angeles, Calif. (R. T. Bayless, 7301 Euclid Ave., Cleveland 3, Ohio.)

17-19. National Health Council, Chicago, Ill. (P. E. Ryan, 1790 Broadway, New York, 19.)

17-20. Organization of Research, 4th intern. symp., Milan, Italy. (I. Svergie, Produktivitetsnamnden, Linnegatan 87, Stockholm Ö, Sweden.)

18-25. International Social Science Council, 4th general assembly (by invitation), Paris, France. (C. Levi-Strauss, Secretary-General, International Social Science Council 19, avenue Kleber, Paris.)

19-21. Society for Research in Child Development, NIH, Bethesda, Md. (Miss N. Bayley, Laboratory of Psychology, National Inst. of Mental Health, Bethesda 14, Md.)

19-22. International Assoc. for Dental Research, 37th general, San Francisco, Calif. (D. Y. Burrill, Northwestern Univ., 311 E. Chicago Ave., Chicago 11, Ill.)

20. New Jersey Acad. of Science, annual, New Brunswick. (H. L. Silverman, 361 Highland Ave., Newark 4, N.J.)

23-24. Theory of Fluid Flow through Porous Media, 2nd conf., Norman, Okla. (C. G. Dodd, School of Petroleum Engineering, Univ. of Oklahoma, Norman.)

23-26. Institute of Radio Engineers, natl. conv., New York, N.Y. (G. L. Haller, IRE, 1 E. 79 St., New York 21.)

24-27. American Meteorological Soc., general, Chicago, Ill. (K. C. Spengler, AMS, 3 Joy Street, Boston, Mass.)

27-28. Michigan Acad. of Sciences, East Lansing. (D. A. Rings, Univ. of Michigan, Dept. of Engineering, Ann Arbor.)

27-28. Pennsylvania Acad. of Sciences, Gettysburg. (K. Dearolf, Public Museum and Art Gallery, Reading, Pa.)

28. South Carolina Acad. of Sciences, Columbia. (H. W. Freeman, Dept. of Biology, Winthrop College, Rock Hill, S.C.)

29-3. Latin American Congress of Chemistry, 7th, Mexico D.F., Mexico. (R. I. Frisbie, Calle Ciprés No. 176, Zone 4, Mexico, D.F.)

30-31. Third Teratology Conf., Portland, Ore. (D. L. Gunberg, Dept. of Anatomy, Univ. of Oregon Medical School, Portland.)

30-1. American Orthopsychiatric Assoc., San Francisco, Calif. (M. F. Langer, 1790 Broadway, New York 19.)

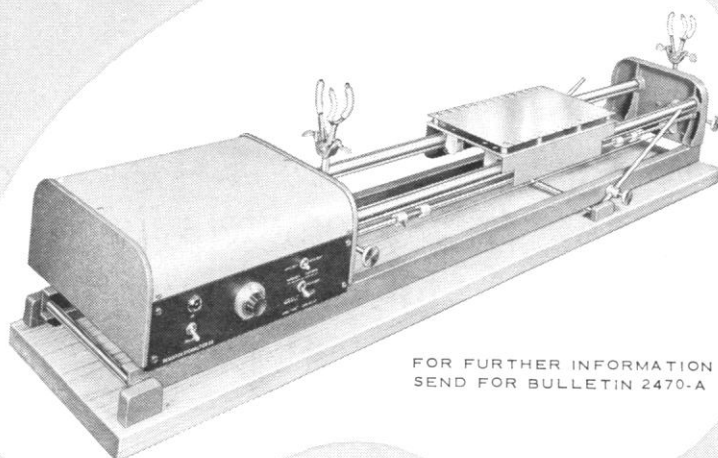
30-12. Bahamas Medical Conf., 7th, Nassau. (B. L. Frank, 1290 Pine Ave., W. Montreal, Canada.)

31-2. American Power Conf., 21st annual, Chicago, Ill. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

31-2. Symposium on Millimeter Waves, 9th, New York, N.Y. (H. J. Carlin, Microwave Research Inst., 55 Johnson St., Brooklyn 1, N.Y.)

(See issue of 16 January for comprehensive list)

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