

THE PHYCOLOGICAL SOCIETY OF AMERICA

'Ipse super maria fundavit eum.' Psalms.

Volume VIII

News Bulletin, December, 1955

Number 25

P. C. SILVA, Editor and Secretary

THE EAST LANSING MEETINGS

The tenth annual meeting of the Phycological Society of America was held in conjunction with the A.I.B.S. convention at Michigan State University, September 5 to 9, 1955. On Monday, September 5, a foray into western Michigan was led by Dr. W. E. Wade. On Tuesday, morning and afternoon programs of papers were presented in Room 213, Agriculture Hall. On Wednesday and Thursday four symposia were held jointly with the American Microscopical Society on the following subjects: "Trophic relations in the limnetic zone," "Trophic relations in the benthic zone," "Sexuality and genetics among algae," and "Micro-organisms in relation to water supply and sanitation." Attendance at all sessions ranged from good to excellent.

MINUTES OF THE BUSINESS MEETING

The business meeting of the Phycological Society of America was called to order by the President, Dr. G. W. Prescott, at 4:15 P.M. in 213 Agriculture Hall, following the presentation of papers.

Minutes of the ninth annual meeting (Gainesville, Florida) were approved as circulated to members in the News Bulletin (Vol. VIII, No. 23).

OLD BUSINESS

News Bulletin Committee

The following report was submitted by the News Bulletin Committee, consisting of Drs. E. T. Moul (chairman), W. A. Daily, H. Forest, and L. Provasoli:

"The committee, which was established for the purpose of investigating the possibility of more effective use of the Society's publications, decided to poll the membership in regards to the following three plans:

1. A news letter to be issued three or four times during the year, as at present;
2. A bulletin of abstracts to be issued in October following the annual meeting;
3. A bulletin of abstracts supplemented by news letters as required.

The poll was to be conducted especially to clarify the situation as to the regularity of the News Bulletin. Since the committee met, however, the difficulties concerning the News Bulletin were eased to the extent that it was felt unnecessary to poll the membership at this time."

Secretary's Report

The following officers, nominated by the Nominating Committee, were elected on the basis of ballots sent to the membership in June:

H. C. Bold, Vanderbilt University.....	President
R. H. Thompson, University of Kansas.....	Vice-President
P. C. Silva, University of Illinois.....	Secretary
R. C. Starr, Indiana University.....	Treasurer

The membership during the past year showed a net loss of 44 and now stands at 214. A gain of 21 new members was more than offset by four deaths, six resignations, and 55 members dropped for non-payment of dues.

Treasurer's Report

In the absence of Dr. R. D. Wood, the Treasurer's report was summarized by the Secretary.

Balance on hand, May 26, 1954.....	\$1246.91
Income to Aug. 15, 1955.....	616.38
Total.....	1863.29
Expenditures to Aug. 15, 1955.....	342.86
Balance on hand, Aug. 15, 1955.....	1520.43

Present allocation of funds:

Savings account, Industrial National Bank, Wakefield, R. I.....	\$1067.17
Checking account (ibid.).....	409.09
Checks, not yet deposited.....	44.00
Stamps.....	0.17
Total.....	1520.43

(The Secretary pointed out an arithmetical error in the report. A motion was passed accepting the Treasurer's report on condition that the error be rectified. The corrected figures appear above.)

NEW BUSINESS

Executive Committee's Report

On behalf of the Executive Committee, the Secretary gave the following report:

"The eleventh annual meeting of the Society will be held in conjunction with the A.I.B.S. convention at the University of Connecticut, Storrs, September 4-8, 1956.

"Criticism from various members suggests the need for a committee to consider possible revision of the Constitution and By-Laws, especially as regards election procedures, a proposed three-year term of office for the Secretary, and the possible permanent separation of the editorial function from the Secretary's office." A motion was passed authorizing the President to appoint such a committee.

"A proposal has been presented by Dr. H. C. Bold that those members of the Phycological Society who are also members of the Botanical Society

of America petition the Botanical Society to form a Phycological Section." After much discussion as to the implications of such a move, a motion was passed authorizing Dr. Bold to present a petition to the Council of the Botanical Society requesting consideration of the establishment of a Phycological Section.

"A proposal has been presented by Dr. H. C. Bold that the Phycological Society investigate the possibility of establishing an International Phycological Society with national societies retaining their autonomy; and also investigate the feasibility of establishing and supporting a phycological journal on an international basis." A motion was passed authorizing the President to appoint a committee to investigate these matters.

Other Business

A motion was passed that the Society express its appreciation to Dr. G. W. Prescott, who acted as local representative for the Society and to whom much credit is due toward the success of the meetings.

As there was no further business, the meeting was adjourned.

Respectfully submitted,

P. C. SILVA,
Secretary

CURRENT COMMITTEES

Committee on Revision of Constitution and By-laws: R. H. Thompson (chairman), J. M. Kingsbury, R. A. Lewin. The establishment of this committee was prompted by the expression of criticism by various members (see above). The committee invites suggestions.

Committee on International Cooperation among Phycologists: G. F. Papenfuss (chairman), S. H. Hutner, L. Provasoli, P. C. Silva.

Auditing Committee: F. K. Daily, W. A. Daily.

NEW MEMBERS

ANDERSON, Robert G: Dept. Bot. Univ. Nebraska, Lincoln 8, Neb. GR.S. FW (cult. morph. phys. responses of *Chara*).

CLOVIS, Jesse F: Bot. Dept. Univ. Connecticut, Storrs, Conn. T. FW (ecol. limnol. tax.).

FAN, Kung-chu: O'Leary Hall, 1246 W. Campus Road, Lawrence, Kan. GR.S. FW-M. XR.

LIPPERT, Byron E: Dept. Biol. Univ. Oregon, Eugene, Ore. GR.S. RES. (plankton: ecol. tax. morph.; plankton of temporary ponds; pigments of fresh-water Rhodophyta).

LOMMASSON, Robert C: Dept. Bot. Univ. Nebraska, Lincoln 8, Neb. T. FW (morph. phys. *Chara*, *Microspora*). XR, cultures.

OHMI, Hikoei: Faculty of Fisheries, Hokkaido Univ. Hakodate, Hokkaido, Japan. T. M. (ecol. tax. Rhodophyta, esp. Gracilariaceae). XC, R.

SUTHERLAND, James A.: Dept. Biol. Teachers' Coll. Armidale, N.S.W., Australia. T. RES. (plankton, limnol. *Volvox* in Australia). XR, plankton samples.

CHANGES OF ADDRESS

- APIKIAN, Gir: 7 Rond-Point Descas, Casablanca, French Morocco.
 BERNATOWICZ, A. J.: Dept. Bot. Univ. Hawaii, Honolulu, T.H.
 BRUNEL, Jules: Univ. Montreal, Case postale 6128, Montreal 26, Canada.
 DAWSON, E. Y.: 3818 Hauser Blvd. Los Angeles 56, Calif.
 EGEROD, Lois Eubank: Dept. Bot. Univ. Calif. Berkeley 4, Calif.
 FOREST, H. S.: Dept. Plant Sciences, Univ. Oklahoma, Norman, Okla.
 HERNDON, Walter R. Jr.: Dept. Biol. Univ. Alabama, University, Ala.
 METZNER, Jerome: 103-25 68th Ave. Forest Hills, N.Y. 75, N.Y.
 NORRIS, Richard E.: Dept. Bot. Univ. Minnesota, Minneapolis, Minn.
 SCHINDLER, John F.: Dept. Bot. Louisiana State Univ. Baton Rouge, La.
 WILLIAMS, Robert H.: Bot. Dept. Univ. Miami, Coral Gables 46, Fla.

Necrology

It is with regret that we note the death of Mr. Frank L. Hess of 5509 Roosevelt Street, Bethesda, Maryland, on August 29, 1955. Mr. Hess was born in Streator, Illinois, September 4, 1871 and received his A.B. in geology at Stanford in 1903. He was with the U.S. Geological Survey from 1903 to 1925 and with the U.S. Bureau of Mines since 1925. In addition to his attainments as an authority on rare metal deposits, Mr. Hess was an active student of fossil algae and concretion-forming organisms and assembled an outstanding collection of peels and slabs. He was a member of the Phycological Society since 1949.

ABSTRACTS OF PAPERS PRESENTED AT EAST LANSING

Acti-dione, an Antibiotic for Green Algal Contaminants in Cultures of Blue-green Algae

Alfons Zehnder and E. O. Hughes

Division of Applied Biology, National Research Laboratories, Ottawa

The antibiotic, Acti-dione, in concentrations varying from 1 to 50 p.p.m., was found to inhibit completely the growth of ten species of Chlorophyceae (two Volvocales, one Tetrasporales, four Chlorococcales, and three Ulotrichales). Acti-dione concentrations up to 200 p.p.m., however, had no inhibiting effect on the growth of eleven species of Myxophyceae (four Chroococcales and seven Hormogonales).

In cultures inoculated with different mixtures of algae from various natural habitats, green algae developed to such a degree after three to four weeks as to suppress any appreciable growth of blue-greens. With 50 p.p.m. of Acti-dione in such cultures, however, growth of the greens and diatoms was completely suppressed, whereas the blue-greens grew very well. The antibiotic was found to be particularly useful for ridding colonial, planktonic blue-greens (e.g., *Microcystis aeruginosa*) of such unicellular green algae as *Ankistrodesmus* and members of the Polyblepharidaceae, which sometimes are trapped in the gelatinous sheaths of the colonies and are difficult to remove by mechanical means.

Toxicity of *Microcystis aeruginosa* in Pure CultureE. O. Hughes, P. R. Gorham, and Alfons Zehnder
Division of Applied Biology, National Research Laboratories, Ottawa

A strain of *Microcystis aeruginosa* Kuetz. was isolated from a bloom collected from Little Rideau Lake, Ontario, purified by ultra-violet irradiation, and cultured in still flasks, shake-flasks, or aerated columns under continuous fluorescent light in a modified Fitzgerald (1952) nutrient solution.

Under these conditions, cells were of typical size and appearance but occurred singly or in micro-colonies of two to ten cells rather than in the usual large colonies. Cell concentrates from pure cultures, injected intraperitoneally into white mice, were highly toxic. Depending on dosage, both rapid (1 hr.) and slow (24-48 hr.) deaths were observed. Three treatments of freshly harvested cells increased toxicity by a factor of four: incubating overnight in stoppered bottles at 36°C., repeated freezing and thawing, and sonic disintegration. The effects of these treatments were not additive. The increased toxicities were probably caused by the release of cell-bound toxin that could be more readily absorbed by the mice. Toxicity of this strain of *Microcystis* varied with different culture conditions, but was comparable to that of another strain grown side-by-side under the same conditions. A natural bloom collection, containing predominantly *M. aeruginosa*, was more toxic than any of the laboratory cultures tested. In still flasks or shake-flasks, maturing cultures autolyzed spontaneously, often completely. Alcoholic extracts of concentrated autolysate or of used nutrient from a rapidly growing culture (three days old) were highly toxic.

Nitrogen Metabolism, Pigmentation and Growth Measurement in a Blue-green Alga

John M. Kingsbury

Cornell University

Spectrographic analyses of pure cultures of *Plectonema nostocorum* Bornet ex Gomont demonstrate that the nitrogen-containing pigments disappear in the living alga when nitrogen is depleted in the medium. Regreening of cultures upon the addition of nitrogen is rapid and can serve to separate the process of pigment synthesis from other processes of growth. Extraction and measurement of the carotenoid pigments at any stage in growth under controlled conditions can be used as an index of growth.

Relative Toxicity of Six Chemical Compounds to Thirty Cultures of Algae

Thomas E. Maloney and C. Mervin Palmer

Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio

Copper sulfate and five other chemical compounds were tested for their ability to prevent the growth of algae. Since copper sulfate is now commonly used as an algicide, it was incorporated in these tests to serve as a baseline for evaluating the algicidal properties of the other compounds.

Along with copper sulfate, 2,3-dichloronaphthoquinone, dodecylacetamido dimethyl benzyl ammonium chloride, rosin amine D acetate, rosin amine D sulfate, and zinc dimethyl dithiocarbamate were tested, in fourteen concentrations ranging from 4 parts per billion to 32 parts per million, for their ability to prevent the growth of thirty different kinds of algae. The algae used in these tests had the ability to grow in the laboratory under artificial conditions and in synthetic culture medium.

All of the compounds tested were either generally toxic to algae or selectively toxic to certain groups or kinds of algae. In higher concentrations most of the compounds were general in their algicidal effects and were able to prevent growth of a great number of algae. In lower concentrations they were more selective and prevented the growth of only certain kinds of algae. Four of the compounds displayed better general algicidal properties than copper sulfate.

Extracellular Polysaccharides of Green Algae

Ralph A. Lewin

Maritime Regional Laboratory, National Research Council
Halifax, N. S.

Twenty-six clones of Chlorophyceae were isolated from a variety of soil and fresh-water habitats and grown in pure culture, and in every case there was evidence for liberation of soluble polysaccharide into the medium. The species examined included *Chlorosphaera consociata*, *Dictyosphaerium pulchellum*, *Gloeocystis gigas*, *Gonium pectorale*, and about fourteen distinct species of *Chlamydomonas*. In 4-week-old cultures of *Gonium pectorale* and *Chlamydomonas parvula*, the amount of liberated polysaccharide equalled that of cell residues, c. 500 mg. dry weight/l., and was sufficient to render the medium appreciably viscous.

The crude polysaccharides were isolated by alcohol precipitation, hydrolyzed with acid, and subjected to preliminary qualitative analysis by paper chromatography. In all but one of the strains examined, galactose and arabinose predominated: in one *Chlamydomonas*, these were replaced by glucose and xylose. Fucose occurred in about half of the strains, rhamnose in a similar proportion, and mannose in *Chlamydomonas inflexa* and *C. sphagnophila*. Most of the polysaccharides contained some uronic acid, and a few gave evidence for an unidentified sugar with an R_f exceeding that of rhamnose.

It seems likely that such polysaccharides, particularly the soluble ones, may be of considerable ecological importance in soil and natural waters, where they may act directly as chelating agents, etc., or indirectly by providing a substrate for the growth of heterotrophs.

A Clue to the Mechanism of Movement in *Oscillatoria*

John D. Dodd

Iowa State College

A satisfactory explanation of the movements of blue-green algae has eluded biologists for many years. An interesting clue to the mechanism of

these movements was uncovered by the author in recent months. (This should be considered an "uncovery" rather than a discovery since similar observations were made by several workers in the 19th century, possibly the first being those of von Siebold in 1849.)

When a small drop of India ink was added to a water mount of *Oscillatoria sancta* (identified as such by Dr. Francis Drouet) it was observed that, within a few minutes, carbon particles became adherent to a sheathing substance on the outside of the trichome. Whenever the trichome moved forward this sheathing substance was continuously sloughed off the rear end of the trichome in a trailing, tube-like, slime track which often became longer than the trichome itself. This track is normally invisible unless outlined by the adhering carbon particles.

In some instances, when the trichome was not moving, carbon particles were observed to be moving over the surface of the trichome, indicating a creeping movement of the sheathing substance. Occasionally this resulted in the piling up of huge, ring-like accumulations of carbon particles at one or more points along the filament.

It is probable that either type of movement occurring in one filament might cause movements of other filaments in various ways. In particular, the "oscillatory" movements and the "rolling" movements of any particular filament may not be self-induced; rather, might they be interpreted as being caused by movements of other filaments with which they are in contact. There would seem to be a direct relationship between the forward movement of a trichome and the secretion of its sheathing substance. However, it is felt that an oversimplification might result from an attempt to examine such a relationship at this time. Moreover, an extensive survey of species of *Oscillatoria* is necessary in order to determine the degree of universality of these initial observations.

Cladophora Balls—a New Record

Jesse F. Clovis

University of Connecticut

In September 1953, William Werner and the author discovered an abundant supply of luxuriant *Cladophora* balls along the shoreline of Cayuta Lake, Schuyler County, New York. These were identified as *Cladophora holsatica* Keutzman by Dr. G. W. Prescott.

These balls were larger than any previously recorded, to the author's knowledge, being 5 cm. in diameter on the average and up to 12 cm. in large specimens. They were on a shallow, gently sloping, soft bottom, on the windward end of the lake, in one to three feet of water. Measurements of the environment included a pH of 7.8 and a Secchi disk transparency of 4.5 feet.

This discovery brings to six the number of reported occurrences of *Cladophora* balls in the United States. The five previous records (listed by Mrs. Daily in Butler Univ. Bot. Stud. 10, 1952) are as follows: Collins, in Massachusetts, 1895; Kenoyer, in Michigan, 1925; Smith, in Indiana, 1931; Solheim, in Wyoming, 1937; Daily and Daily, in Indiana, 1951.

The Morphology of a New *Ulothrix*-like Alga

Harold C. Bold
Vanderbilt University

The organism was collected in a limestone quarry pool near Nashville in October 1954 and has been studied from natural collections and in uni-algal, clonal and bacteria-free cultures on liquid and agar media. The uniseriate filaments are attached by basal holdfasts, at least initially, but may become free-floating. The apical cells are not pointed as in *Uronema*. Growth is generalized. Rapidly growing filaments are composed of short cells due to rapid cell division but in older cultures cell length exceeds cell diameter several times. Each cell contains a girdle-like plastid with fimbriate margins which are often prolonged into processes. The vegetative cells are uninucleate. Reproduction involves formation of single quadri-flagellate zoospores by the vegetative cells. The zoospores have four contractile vacuoles. In older cultures or in reduced moisture in nature, thick-walled hypnospores are produced singly by the vegetative cells. The hypnospores produce single zoospores at germination. Sexual reproduction has not been observed.

A Study of *Draparnaldia* and *Draparnaldiopsis*

Herman S. Forest
University of Oklahoma

A study of six hundred specimens from all continents indicates that there is a single common species of *Draparnaldia*, *D. mutabilis* (Roth) Bory. It is highly variable, but only two forms are recognized, these representing the evolutionary extremes of the species. Forma *infantilis* (Agardh) Forest is primitive and *Stigeoclonium*-like, while forma *opposita* (Lyngb.) Forest is evolved, with fan-shaped branchlet bundles.

Other, less common species are also recognized. *Draparnaldia Ravenelii* Wolle is an evolved species which has been collected in the United States, South Africa, and possibly Siberia. *D. macrocladia* Nordst., a primitive *Stigeoclonium*-like species, has been collected several times in Hawaii and once in Ceylon. Nine *Draparnaldia* species have been described from Lake Baikal in Siberia. On the basis of their descriptions and illustrations only, it appears that no more than two entities are represented there.

While three species have been described from the few reported collections of *Draparnaldiopsis*, most of them differ only somewhat from each other, and it appears likely that all known material might well be assigned to *D. alpina* Smith et Klyver. This includes material described as *D. indica* Bharadwaja and *D. simplex* Jao.

