



# PHYCOLOGICAL NEWSLETTER

A PUBLICATION OF THE PHYCOLOGICAL SOCIETY OF AMERICA

Volume 40 Number 1

Winter/Spring 2004

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## PSA 2004 - Williamsburg, Virginia

The 58th annual meeting of the Phycological Society of America will be held August 7-12, 2004 in Williamsburg, Virginia. All activities will take place at the Williamsburg Hospitality House, which is across the street from the College of William and Mary and a long two blocks away from Colonial Williamsburg. The meeting will include symposia on progress in the green algae and on phycological history, a workshop on algae in education, contributed paper and poster sessions, and a variety of festive social events. Event details will be published in the April issue of the *Journal of Phycology* and on a meeting web page that will be active on the PSA web site ([www.psaalgae.org](http://www.psaalgae.org)) by March 1, 2004. Both meeting registration and abstract submission will be available via the World Wide Web through links from the meeting web site.

## Education Symposium planned for PSA 2004

The PSA Education Committee hosted a symposium workshop titled: *Using Algae as Model Organisms in Education* at the Phycological Society of America's 57th annual meeting in Gleneden Beach, Oregon June 14-18, 2003. The symposium consisted of oral presentations on how pedagogical advances and methods have improved our teaching approaches in phycology. The symposium was a success thanks to all of the outstanding teaching tools our participants presented. We are now seeking participants for the PSA Conference in 2004. We would like to present a workshop/symposium combination. If you are interested please contact the committee chair (Roy Lehman) at [rlhman@falcon.tamucc.edu](mailto:rlhman@falcon.tamucc.edu). We have funds available to defer expenses of participants.

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## A Week Identifying Algae in the Countryside of Scotland

This past summer I had the wonderful privilege of attending a freshwater algae identification course in the Perthshire region of Scotland. The course was held at the Kindrogan Field Centre, only ten miles from the quaint little town of Pitlochry. Set back in the hills alongside a farm, it was a beautiful getaway to concentrate on the morphology and taxonomy of all groups of freshwater algae. The course is designed for people with various levels of phycological knowledge who desire to augment their algae identification skills. Participants included hobbyists, an artist, water company professionals and a graduate student. The weeklong course was packed with days of lectures, collecting and looking through the microscope, then topped off with algal discussions in the Kindrogan bar. Collection trips involved the surrounding area and samples were taken from various habitats including fast moving streams flowing from highland peat bogs, standing waters of lakes and ponds, and even roadside ditches and bird baths. Some discoveries that were personal highlights included the freshwater red algae *Lemanea fluviatilis* and *Audouinella hermannii*. Additionally, this course solidified that the extensive morphological diversity of desmids and diatoms never ceases to amaze me. During one collecting excursion we were trained on how to

retrieve a lost plankton net without getting wet, a skill that may come in handy for any aquatic biologist. The week was capped off with an evening of algal charades, which turned out to be mentally, and physically, challenging. The course instructors, Dr. Eileen Cox and Dr. Elliot Shubert, made the experience quite enjoyable and worthwhile. This was an excellent opportunity to meet other people with various algal interests and to exercise identifying the diverse groups, and I greatly encourage the attendance of others with algal interests.

**Hilary A. McManus**  
**Ph.D. Student**  
**Department of Ecology and Evolutionary Biology**  
**University of Connecticut, Storrs, CT**  
**USA**



**Algae class experiencing first-hand how to retrieve a plankton net lost amongst *Chara* in Loch Kinardochy, Scotland.**

**NEW BOOK! PROTISTOLOGY**  
**Klaus Hausmann, Norbert Hülsmann**  
**& Renate Radek**

3rd compl. rev. edition. 2003. 388 p., 384 figs., 22 tab.  
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For more information see:  
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## COLLECTION TRANSFER TO UC HERBARIUM

Within the next two months, all algae in the herbarium of the Natural History Museum of Los Angeles County (LAM) will be transferred to the University Herbarium, University of California, Berkeley (UC). The algae comprise about 60,000 specimens housed in 39 herbarium cases. Among them, collections made by William Randolph Taylor and E. Yale Dawson during expeditions sponsored by Captain Allan Hancock are of greatest importance because they include many holotypes. These collections were originally housed at the Allan Hancock Foundation (AHFH), University of Southern California, but were transferred to LAM in 1988. All algae in the herbarium of the Rancho Santa Ana Botanic Garden, Claremont, California (RSA), were transferred to LAM at about the same time. The LAM collections will be available for consultation or borrowing shortly after their arrival in Berkeley. Outstanding loans from LAM, when returned, should be sent directly to the following address: Collections Manager, University Herbarium, Room 1001 Valley Life Sciences Building, University of California, Berkeley, CA 94720-2465.

**Paul C. Silva, Curator of Algae, UC**

## Lose the Wax Paper!

For those of you still pressing macroalgae (even if only vouchers for molecular studies), it's time to use up the Reynolds Cut-rite wax paper on your lunchtime sandwiches. My experience is that in particular *Dictyota* spp., many gooey reds, Delesseriaceae, Halymeniales, and filamentous greens stick better to the wax paper after their time in the plant drier than the herbarium paper on which you are trying to affix them! Old muslin (cotton) sheets are still preferred by some (e.g., MICH), but I've come up with a better and more economical solution: reusable poly-foam packing sheets. Nothing seems to stick to this wax paper alternative. Poly-foam is a low-density white polyethylene foam sheet that is used in packaging, and can be found as "foam wrap" in most packaging catalogs or on-line. You can purchase the poly-foam in large rolls (2000') cut to 12" (30.5 cm) and then perforated every 18" (45.5 cm) so they can be ripped off to herbarium sheet sizes. I've found the 1/32" or 1/64" thickness the best, as thicker polyfoam takes longer to dry the algae in the drier. If you order this product on-line you may need to buy 4-6 rolls, but if you go to a local packing company (MailBox USA, UPS, &c.), you may be able to convince them to sell you just one roll (\$30-40). Alternatively, on your way through Hartford stop in and rip of a few hundred sheets from one of my 4 huge rolls. One roll is a lifetime supply for any lab!

**Craig Schneider, Trinity College, Hartford**

**HAVE YOU RENEWED YOUR PSA  
MEMBERSHIP FOR 2004?**

Visit the website at [www.psaalgae.org](http://www.psaalgae.org) and follow the directions to renew online or get an application form. Questions?

Write Rick McCourt at [mccourt@acnatsci.org](mailto:mccourt@acnatsci.org).

**MEETING ANNOUNCEMENTS**

**Northeast Algal Symposium (NEAS)**

24-25 April 2004 Univ. of Connecticut at Avery Point

**Northwest Algal Symposium (NWAS)**

23-25 April, 2004 Bamfield Mar. Sci. Ctr, BC Canada

**XVIIIth International Seaweed Symposium**

20 - 25 June 2004 Bergen, Norway

**26th Annual Southeastern Phycological Colloquy**

22-24 October 2004 Dauphin Is., Alabama

**11th International Conference on Harmful Algae Blooms**

14-19 November 2004 Captown, South Africa

For more information on these and other conferences, please see <http://www.psaalgae.org/news/news.html>

**DIATOM SAMPLES NEEDED!**

Dr A. Deyhle and Prof. Ralph Lewin are determining the boron content of diatom walls, and would appreciate any samples that you can "sacrifice" (100-500 mg dry weight) of phytoplankton and/or cultured cells. Information on species, source, medium, temperature, pH, etc. would be helpful.

**Contact:** Prof. Ralph Lewin, 3110 Hubbs Hall, Scripps Institution of Oceanography, U. of California, 9500 Gilman Drive, La Jolla, CA 92093-0202, [rlwin@ucsd.edu](mailto:rlwin@ucsd.edu)

**OBITUARY - Jean-Jacques Pichon**

Jean-Jacques Pichon, CNRS Research Scientist at the Department of Geology and Oceanography, University Bordeaux I, died accidentally on 9 November 2003 in his 49<sup>th</sup> year. As a diatom paleoceanographer for more than 20 years, he was a pioneer on quantitative Southern Ocean paleoceanography. Jean-Jacques had always been very actively involved into the preparation and active running of research cruises in the Southern Ocean on the French RV Marion Dufresne I and follow-up RV Marion Dufresne II since their inception in the 80's. Those who had the chance to share ship-time with him remembered his constant good mood, availability, and working efficiency. Jean-Jacques Pichon is survived by his beloved wife and two children, to whom we address our sincere condolences.

**SPIRULINA (*Arthrospira platensis*) COMPLETES  
FDA GENERALLY RECOGNIZED AS SAFE  
(GRAS) NOTIFICATION PROCESS**

Spirulina is a dried form of the common blue-green microalga (Cyanobacteria), *Arthrospira platensis*. Cultivated in the United States by Earthrise Nutritionals of California and Cyanotech Corporation of Hawaii, Spirulina is marketed as a food and nutritional supplement and is noted for its content of fatty acids, vitamins, beta-carotene, zeaxanthin, phycocyanin and vegetable protein.

In March 2003, Earthrise and Cyanotech submitted a joint notice to the FDA reporting their determination, through scientific procedures, that the Spirulina cultivated by both companies is GRAS for addition to a variety of foods. Conclusion of the notification procedure (by the FDA's written response) provides assurance to food manufacturers and consumers that the FDA has had an opportunity to review the scientific safety evaluation of Spirulina for its intended use in specialty food bars, powdered nutritional drink mixes, snacks such as popcorn, and as a condiment in salads and pasta, and has no objection to the notification. This makes Spirulina (*Arthrospira platensis*) to be the first microalga to have GRAS status.

For further details concerning the FDA letter please refer to the following FDA website: [www.cfsan.fda.gov/~rdb/opa-g127.html](http://www.cfsan.fda.gov/~rdb/opa-g127.html).

For details about the scientific aspect of the submission please contact [abelay@earthrise.com](mailto:abelay@earthrise.com) or [abelay@cts.com](mailto:abelay@cts.com).

**CONGRATULATIONS TO DR. PAUL SILVA**

Dr. Paul C. Silva (Curator of Algae, UC Herbarium) has recently been named Socio Honorario de la Sociedad Española de Ficologica (Honorary Fellow of the Spanish Society of Phycology) and Membro Honorario de la Sociedad Ficologica de Mexico (Honorary Member of the Phycological Society of Mexico). Congratulations, Dr. Silva!

**Deadline for submission of information  
for the next PSA Newsletter:**

**September 15th, 2004**

Please contact Alison Sherwood or  
Morgan Vis ([psa@psaalgae.org](mailto:psa@psaalgae.org))

## PHYCOLOGICAL TRAILBLAZER

### No. 20: Johannes Reinke

Johannes Reinke was born on Feb. 3<sup>rd</sup> 1849, in Ziethen, Ratzeburg, northern Germany. He was the oldest of the nine children born to Theodor Reinke, a pastor, and his wife Elisabeth (Kaempffer) Reinke. On both sides of his family there had been many pastors in Mecklenburg going back to the Reformation (Benecke, 1932). Reinke was always proud of his mixed German-Slavic heritage. When he was only 8 years old, he began his botanical instruction under his father's tutelage. Early on he had a fascination with plant geography. He went on to take instruction from Prof. Johannes Roeper, a noted botanist of the time. But during his youth he also had a keen interest in politics and philosophy, areas that he would pursue and publish on later in his life.

Reinke's first publication was a sketchbook of the vegetation of Ratzeburg in 1869. With Griesbach, in 1873 Reinke published a German translation of Oersted's Danish text on fungi, lichens, and algae. He moved to Rostock in 1876 with the full intention of taking courses in theology, a direction that his father encouraged, and studying botany in his free time. But he very much disliked the theology courses and started sitting in on biology courses. He also took courses in philosophy, while he struggled in his studies of mathematics. It was lectures given by Franz Eilhard Schultze that inspired Reinke to later undertake research dealing with the nature of protoplasm. He also took time out to travel a great deal in northern Germany, including a botanical foray to Bonn, and he became acquainted with a wide circle of intellectuals. Besides his botanical pursuits, he also studied zoology and geology. During the war with France, Reinke enlisted in the infantry. After completing his degree in Rostock followed by his 'Habilitation', i. e., 'post-doctoral lecture qualification', in Göttingen, he became a professor of botany in Göttingen at the age of 24. After completing his studies, Reinke suffered some neurological problems (Benecke, 1932). But he was still able to publish a textbook on general botany in 1880, 'Lehrbuch allgemeinen Botanik'. It was in Göttingen that Reinke established the Institute of Plant Physiology that bears his name today.

Reinke was a broadly trained and broadly interested botanist, working not only with benthic marine algae but also with water molds, the anatomy of the flowering plant *Gunnera*, the orchid genera *Corallorhiza* and *Epipogon*, and the myxomycete *Aethalium*. The results of his research on *Aethalium* led him to a different interpretation than what had been previously believed. He was never afraid to let his research guide him into thinking along new lines of thought. He was very much occupied with understanding the nature of the



**Fig. 1. Johannes Reinke  
(from Benecke, W., 1932).**

composition and behavior of protoplasm in plants and fungi. He had some early papers (1873, 1879) on the apogeotropic roots of cycads and their endophytic *Anabaena*. He had numerous papers on light, especially in the mid-1880s. He conducted experiments with living leaves, observing the breakdown of chlorophyll under certain light conditions. He experimented on culturing *Volvox* with the nitrogen-fixing bacterium *Azotobacter* (1903b). He also published on marine phytoplankton (1898a, b).

Reinke was first exposed to benthic marine algae when in 1874 he took a trip with two of his colleagues from Bonn to visit the Zoological Station in Naples. The seaweeds covering the rocks at Santa Lucia completely captivated him, and he decided to spend a winter working at the Station (Mollenhauer & Lüning, 1988). He was the first botanist to be a resident scientist there, and he returned as a guest researcher during the winter of 1875-1876 to study members of the brown algal families Dictyotaceae and Cutleriaceae. He studied patterns of apical growth in both Dictyotaceae and Fucaceae (1877).

In 1877 Reinke participated in a scientific meeting in Munich, meeting such people as Carl Nägeli, Ferdinand Cohn, and Rudolf Virchow. It was here that Reinke heard of the work being done on anthrax by Robert Koch, and Reinke immediately recognized the significance of that research and its value for the Department of Public Health.

Reinke also was one of the co-founders of the Deutsche Botanische Gesellschaft.

In his 1878 study of members of the brown algal family Cutleriaceae occurring in the Gulf of Naples, Reinke articulated the strong possibility that the small, adherent *Aglaozonia* was a stage in the life history of *Cutleria*.

Papenfuss (1955) credited Reinke with his discovery of conjugation by the gametes of the brown alga *Zanardinia*. Feldmann (1949) credited Reinke (1888b) as being the first to notice the occurrence of a single plastid within the cells of Scytosiphonaceae (*Scytosiphon lomentaria* and *Petalonia fascia*), and Reinke stressed the systematic value of this character, later used by Feldmann (1949) in establishing the order Scytosiphonales.

From the period 1888 through 1892, Reinke had several publications dealing with the marine algae of the North Sea and the Baltic Sea, especially Kiel Bay. From the Baltic Sea he (1888c) described several new genera: *Kjellmania*, *Epicladia*, *Pringsheimia* nom. illeg. [= *Pringsheimiella* von Höhnell], and the distinctive green algal genus *Blastophysa* (Fig. 2). He was especially interested in the brown algae, not just their systematics and developmental cycles but their cytology and physiology. He studied the anatomy of kelps and *Sargassum* (1875a, b, 1903a). He published on the Tilopteridaceae (1889c) and the Sphacelariaceae (1890, 1891a). A major work by Reinke was his 'Atlas deutscher Meeresalgen' (1889a, 1892). The fifty plates were executed by Paul Kuckuck and Franz Schütt. Reinke also carried out research on the island of Helgoland (Mollenhauer & Lüning, 1988).

Reinke's abiding interest in philosophy caused him, around the age of 50, to start writing a series of treatises and books on the subject of 'natural philosophy'. These contributions led him to becoming the 'father' of a new branch of science called 'theoretical biology'. All branches of sciences can be divided into two branches, or disciplines, namely, the empirical and the theoretical. The former includes carrying out experiments, the gathering of facts, making observations, and writing descriptions, whereas the latter deals with concepts, principles, models, and generalizations. It was Reinke (1901) who introduced the term 'theoretical biology' with a major book at the start of the 20<sup>th</sup> century. He also published on the relationship of philosophy and religion to science (1905, 1907). He wrote about the history of the Kiel Botanical Garden, with its origins in the early 17<sup>th</sup> century (Reinke, 1912).

In 1885 Reinke left the University of Göttingen for the University of Kiel, where he was professor of botany until his retirement in 1921. In his personal life, after his first wife of 25 years died, he married for a second time, this time to Luise Racine. By the time of his 80<sup>th</sup> birthday in 1929, he had been bestowed with numerous honors. After a long life rich with many accomplishments and much success, he died in 1931 at the age of 82 in Preetz,

Holstein. Benecke (1932) wrote a detailed account of Reinke's life and gave a complete list of his publications.

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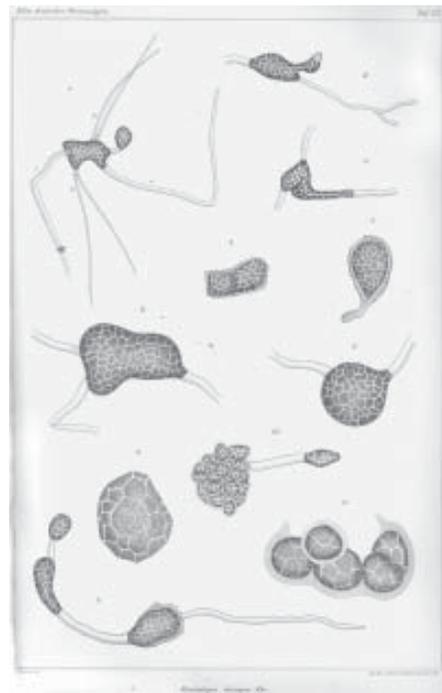


Fig. 2. *Blastophysa rhizopus* Reinke.

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Michael J. Wynne  
University of Michigan, Ann Arbor

### **Making taxonomy approachable: computer assisted identification of microalgae**

It has become clear that process oriented approaches are not sufficient to resolve many questions in community and ecosystem ecology. Consequently there is a renewal of interest in species based ecology. However, as the need for individuals with ability to recognize taxa increases, there is an equally clear decline in student interest in pursuing taxonomy. Here we present a blueprint for a relatively simple tool making taxonomy more approachable and for facilitating transfer of existing taxonomic knowledge into a format more familiar to the current generation of learners.

Identification of an unknown specimen by any method can be a challenging exercise. While this difficulty is largely due to the ever-present variability and diversity that is the foundation of evolution, the process of identification through phenotype morphology is frequently made even more difficult by classical identification keys. Overly expert terminology, inclusion of non-quantifiable characteristics and organization of information in a manner that makes it difficult to re-trace the path taken once an error is discovered may be

significant stumbling blocks to less experienced practitioners (e.g., students). It should not therefore be surprising that university students quickly lose interest in learning taxonomy.

In our teaching experience, we have seen repeatedly that most students feel more comfortable using an instrument than navigating through volumes of multilingual taxonomic literature. Therefore we constructed a "virtual instrument" that explores the usefulness of such a teaching tool in species identification. We chose a well-circumscribed group of diatom species of economic significance to build a prototype instrument using scanning electron microscope (SEM) based morphometrics. The resulting program, called *Pseudo-nitzschia-lator* discriminates between eight species of the pennate diatom genus *Pseudo-nitzschia*.

All eight species possess quantifiable features (by measurement, counts or presence/absence) that are necessary (and most cases sufficient) for correct identification. This information is integrated into a dynamic truth table that the student can manipulate as a virtual instrument. The software updates the table as characteristics are entered for the unknown. When the unknown characters fall within the bounds for a particular species, correct identification is indicated by a color change in the species name. The student is thus freed from manually or mentally keeping diagnostic characteristics updated during the logical deduction process leading to identification.

Human short-term memory can normally identify and sort between five and nine items simultaneously. Since the combination of characteristics and species in our relatively small truth table already exceeds this capacity, a program such as presented here can provide significant external assistance in specimen identification once species measurements are available, e.g., sequestered from taxonomic literature.

The logic of this program is relatively straightforward. We found through informal testing that a visually interactive application can be more intuitively manipulated, less intimidating and more comprehensible to the current generation of students. The advent of fourth generation software development tools and visual component libraries makes construction of such virtual instruments a rapid process with very little "real" programming involved. Despite our initial perception that similar tool development is ubiquitous, we were surprised by their scarcity.

While our application uses SEM-based morphometrics, the concept of a dynamically updated truth table could be adapted for virtually any classification context (e.g., phytolites, pathological symptoms and minerals). Software tools such as described here can aid in de-mystifying taxonomy, reduce time and effort spent on identifying species, improve consistency of identification and limit the need for subjective individual judgments.

Advanced software development packages make construction of applications like *Pseudo-nitzschia-lator* relatively easy for individuals with even rudimentary programming experience.

*Pseudo-nitzschia-lator* is available for download at: <http://www.mta.ca/dmf/psnul8r.htm>

By James Ehrman<sup>1</sup> and Irena Kaczmariska<sup>2</sup>  
<sup>2</sup>Digital Microscopy Facility, Mount Allison University, 63B York St., Sackville, New Brunswick, E4L 1G7, Canada

## PHYTOPLANKTON SPECIES TIME SERIES DATA NOW AVAILABLE ON THE INTERNET

W. E. Allen's Phytoplankton Species Time Series Data are now available on the Internet as an e-book. These data consist of weekly species identifications and enumerations of diatoms and dinoflagellates in seawater samples taken from six North American Pacific Coastal locations during the period 1917-1939. Also included are physical and chemical data on the water samples plus meteorological data taken at daily to monthly intervals from the same locations. This historical data set constitutes a very long time series of biological and hydrographic observations that can be analyzed as curiosity warrants. The data also can be used to introduce students to dealing with a very large data set. Various investigators may perhaps uncover important ecological patterns and/or issues, not presently envisaged, that may be hidden within the data. The data can be accessed at the following website:

<http://repositories.cdlib.org/sio/techreport/1/>

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University of California, San Diego  
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## PSA Student Member News:

### Summer Courses:

#### **Bigelow Laboratory "Foundations of Marine Science" course series**

#### **Algae in Freshwater Ecosystems**

Dates: June 19-August 14, 2004

Location: Univ of MI Biological Station

#### **Biocomplexity of the Algae in the Itasca Region**

Dates: 26 May-30 June, 2004

Location: Lake Itasca Biology Station

#### **Microbial Diversity Workshop**

Dates: June 7-July 2, 2004

Location: Salt Plains Microbial Observatory

#### **Summer course: Marine Algae**

Location: Friday Harbor Labs, Univ. of WA

Dates: June 14 - July 17, 2004

#### **Ecology and Systematics of Diatoms**

Dates: 21 June - 16 July, 2004

Location: Iowa Lakeside Laboratory

For more info on these and other courses, see  
[www.psaalgae.org/student/friday.html](http://www.psaalgae.org/student/friday.html)

### Grants from PSA:

#### **Croasdale Fellowships**

The Hannah T. Croasdale Fellowships are designed to encourage graduate students to broaden their phycological training by defraying the costs of attending phycology courses at biological field stations. The purpose of the award is to broaden phycological training and not necessarily to further research goals. The deadline for post mark of completed application is March 19, 2004.

#### **Hoshaw Travel Awards**

These awards are to help students with their travel expenses to the annual PSA meeting. All other factors equivalent, students who will present their research at the meeting (lecture or poster) will be given priority. The deadline for post mark of completed application is April 30, 2004.

#### **Grants-in-Aid of Research**

Awards are made in amounts of up to \$1000. by PSA in support of graduate student research in any area of phycology. Awards are intended to enable the student to accomplish work not otherwise possible. The deadline for post mark of completed applications is April 2, 2004.

For further information and application materials, see  
[www.psaalgae.org/student/stugrants.html](http://www.psaalgae.org/student/stugrants.html)



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