RINHewS

The Newsletter of the Rhode Island Natural History Survey

Vol. 4, No. 1 April 1997

President's Corner

Rhode Island Natural History Survey: Chapter 2

by John F. Paul

In the last newsletter, Dr. Peter August, past-president of the Rhode Island Natural History Survey, presented us with a Report Card for the Natural History Survey under his tenure as president. Pete's report card was an up-front appraisal of how well we've been doing and where we need improvement. I personally want to thank Pete and the rest of the members of our Natural History Survey who had the vision and perseverance to get us off the ground and heading in the right direction.

At our Annual Meeting last October I referred to Pete's tenure as president of our organization as Chapter One of our experiment to test if it were possible to generate interest in the formation of a Natural History Survey. We are now in Chapter Two of our experiment, where we are finding out what it takes to sustain the Natural History Survey and keep it viable. I intend to use the next few issues of the newsletter to inform you of what the RINHS Board of Directors is doing in Chapter Two to keep our organization moving in the direction set by the original members, and to address the areas that need improvement.

At our Board of Directors meeting in November, we identified activities that we would focus on over the next year. These activities include:

- RINHS Annual Conference: to be held January 9, 1998 in Chafee Hall on the URI campus in Kingston (see article on p. 6);
- Annual Lecture Series: next lecture is April 8 at Roger Williams Park Museum of Natural History, (see article on p. 12);
- Systematic Collections;
- The Flora and Fauna of Rhode Island project, an ambitious undertaking to create a database of the state's entire biota, and a series of related publications;
- Publications: the first volume in the Flora and Fauna of Rhode Island series is nearing publication, we are reprinting the popular *Illustrated Key to the Seaweeds of New England*, and preparing to reprint Alonzo Quinn's *Rhode Island Geology for the Non-Geologist*. And the RINHS Publications Listing continues to expand (see the article on p. 6 for our search for new and old publications on Rhode Island's natural history, and the enclosed RINHS Publications Listing);
- Ecosystem Slide Sets: we are reprinting the *Terrestrial Systems of Rhode Island* set and planning to prepare sets on five other major ecosystem types;
- Organizational work to support the above activities, such as the preparation of displays, grant-writing, and membership and financial development.

These are all worthwhile activities for an organization whose mission is to bring together Rhode Island's ecologists and naturalists to advance scientific knowledge, to facilitate and coordinate information, and to enhance communications. However, no organization can main-

continued on p. 12

Mission Statement of the Rhode Island Natural History Survey

- To advance scientific knowledge of Rhode Island's biota, ecological communities, and environmental resources;
- To facilitate and coordinate the gathering and dissemination of information on Rhode Island's biota and natural communities;
- To enhance communication among Rhode Island's environmental and life scientists.

Research Reports

An Invasive Red Seaweed Enters Narragansett Bay

by Martine Villalard-Bohnsack[1] and Marilyn M. Harlin[2]

Grateloupia doryphora (Montagne) Howe[3], a large, beautiful but potentially disruptive red alga has been recorded for the first time on the northeastern coast of North America. Since July 1996 specimens have been observed in large numbers in the lowermost portions of Narragansett Bay. *G. doryphora* is common throughout the Pacific Ocean (Abbott and Hollenberg, 1976), the Mediterranean and the eastern Atlantic Ocean (Irvine, 1983), but had never been collected on our shores. The species has been repeatedly reported as an invasive (Farnham, 1980; Ribera and Boudouresque, 1995), possibly originating from the Pacific Ocean or, more specifically, Japan. However, in spite of its aggressive behavior, its biology and ecology are poorly studied and the consequences of this introduction for the local flora and fauna are unknown.

Description

The foliose thalli (Fig. 1a) are pinkish to brownish red, with a gelatinous and distinctly slippery or silky texture. They grow singly or more often in clumps of up to eight individuals. The blade shape and size range from long and narrow (< 75 cm x < 15 cm) with a tapered base, to broad and short (< 15 cm x < 20 cm) with a somewhat heart-shaped base. Individuals are simple or divided longitudinally or irregularly. Margins are frequently undulated and often bear spine-like or lance-shaped proliferations, sometimes single but more often densely clustered. Margins and tips are frequently lacerated and surfaces often bear signs of grazing. Stipes are short (< 1.5 cm), cylindrical (< 2 mm wide) and occasionally branched. They arise from a small, thin, discoid holdfast (< 5 mm wide). Blades are 150-600 µm thick and cross-sections show two distinct layer types (Fig. 1b) : the cortex consisting of 4-7 rows of tightly packed, rounded, pigmented cells and the central medulla consisting of unpigmented, loosely interwoven branched filaments joined end to end.

G. doryphora is one of the most polymorphic species of red algae (Abbott and Hollenberg, 1976), displaying wide variations between specimens of different geographical locations as well as within a single population. The morphology of Rhode Island specimens is distinctive of *G. doryphora* and exhibits the broad range of variable characters described in foreign specimens particularly those from eastern Atlantic shores. *G. doryphora* may easily be confused with *Palmaria palmata* (dulse), but the gelatinous and slippery nature of the thallus, and its filamentous medulla, clearly separate it from the latter.

Ecology

Attached *G. doryphora* blades were found in the East Passage from Beavertail State Park to Taylor Point on Conanicut Island, and from Castle Hill to Coddington Point on Aquidneck Island. Small populations were also found in the West Passage at Fort Getty. Drift specimens were reported in Narrow River. We found no *G. doryphora* at other stations within Narragansett Bay and associated waters, although suitable substrata were present. The thalli were abundant in the lower intertidal (up to +0.5 m Mean Low Water) and in the subtidal zone (down to -1 m MLW), as well as in tide pools throughout the intertidal zone. They were attached to stable bedrock outcrops, loose stones or mussels, in both protected and exposed areas. Older blades were often heavily epiphytized with a filamentous red alga, *Polysiphonia fibrillosa*. Large numbers of small marine mollusks, *Lacuna vincta*, were observed actively grazing on specimens.

Grateloupia doryphora is a common perennial in temperate and subtropical waters, but it is unclear whether specimens have survived a winter in Narragansett Bay. Unconfirmed reports indicate that small populations might have been present in July 1995, although the species was not reported until July 1996. In March 1997, thalli have already withstood water temperatures as low as 4°C and most appear healthy. Forty Rhode Island stations are being monitored year round to determine whether the species becomes established and spreads.

Discussion

Introductions of alien organisms are of great environmental and economic concern since their appearance may have a significant impact on native species (Baskin, 1996; Vitousek *et al.*, 1996) and since the phenomenon is on the increase throughout the world (Ribera and Boudouresque, 1995). Elsewhere, *G. doryphora* tends to be particularly invasive (Farnham, 1980; Ribera and Boudouresque, 1995). Populations thrive in polluted waters and are tolerant of reduced salinities (Farnham, 1996). Thus, there is the potential for *G. doryphora* spreading throughout Narragansett Bay.

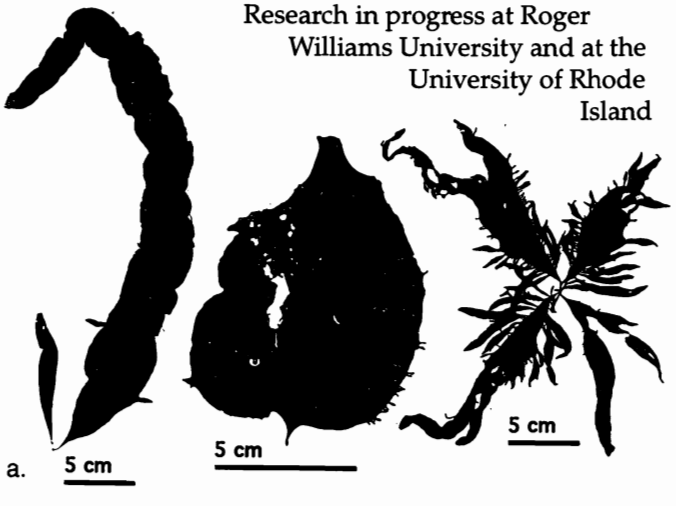
With few exceptions, introductions of marine algae are inadequately studied and as of now, ecological consequences can not be predicted. While some aliens have had little visible effect, others have been disruptive. The most recent introductions of macroalgae to New England waters include *Codium fragile* subsp. *tomentosoides*, *Lomentaria clavellosa*, and *Antithamnion pectinatum*. The potential for harmful effects such as those associated with *C. fragile* inva-

sions is present. They include the well-documented damage to mussels, oysters and scallops, and the less visible displacement or elimination of native algae as well as the alteration of local water quality. However, local concerns for damage to the current eelgrass (*Zostera marina*) transplantation program is unfounded since the two species do not share the same habitat. *Z. marina* grows on soft bottoms ranging from coarse sands to fine silt, whereas *G. doryphora* requires a solid substrate.

The origin of the Narragansett Bay populations cannot currently be identified. It is unlikely that this introduction resulted from a range extension or marginal dispersal, and three putative vectors stand out amongst those listed in the literature for dispersal of marine organisms (Baskin, 1996; Carlton, 1996; Vitousek *et al.* 1996). Based on the direction of water movement through the East Passage and the locations of *G. doryphora* populations, it seems likely that either hulls of ships or ballast water-dumping was involved. A third possible vector is the initiation of oyster mariculture listed as the probable origin of *G. doryphora* in the marine floras of France and England (Ribera and Boudouresque, 1995). DNA studies may help establish the source of the Rhode Island populations.

Although the addition of this species to our marine flora may well turn out to be disastrous in some respects, it may also provide hidden benefits. *G. doryphora* is cultivated and commercially harvested in the Pacific Ocean for its production of carrageenan and funoran, two widely-used polysaccharides. If the populations do become established, a commercially viable aquaculture system could be developed in the bay. Recent reports also show that *G. doryphora* possesses antiviral activities against the AIDS and Herpes viruses.

Research in progress at Roger Williams University and at the University of Rhode Island includes culture work, DNA analysis and a field monitoring program designed to track the possible spread of the species and the resulting effects on indigenous organisms. The study of this invasive species may be of use to marine biologists as well as to individuals and organizations concerned with the health of Narragansett Bay. Results may also help support ongoing national and international efforts to develop regulations aimed at controlling ballast-water discharge. Finally, the lack of information necessary to make environmental decisions about invasive species underscores the critical need for baseline research on the ecology of marine organisms and on transport vectors. The current work represents only one of many approaches to the prevention and control of invasives in our sensitive coastal environments.



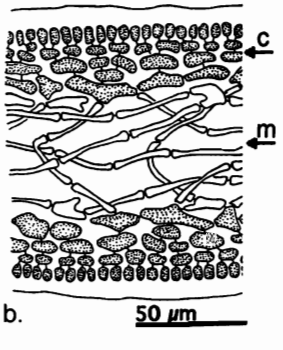


Fig. 1. *Grateloupia doryphora*
a. Herbarium specimens showing polymorphic morphology
b. Cross section with cortex (c) and medulla (m)

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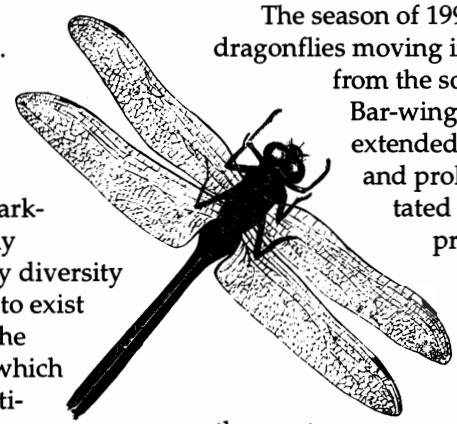
[3] (Rhodophyta, Cryptonemiales, Halymeniaceae)

An Inventory of Rhode Island Odonates
by Virginia A. Carpenter

Their names conjure up images of high-tech military equipment or fierce carnivorous monsters.....the Swift River Cruiser, Sky Pilot, Dragonhunter, and Smoky Shadowdragon to name a few. None of these are the latest in government weaponry or fierce monsters of legend. They are instead some of the most ancient but successful animals on earth, the dragonflies and damselflies. Dragonflies were known to inhabit the earth 250 million years ago, long pre-dating the dinosaurs. Their names are indeed as charming as the insects themselves: the Elegant Spreadwing, Sparkling Jewelwing, Comet Darner, and Petite Emerald are but a few.

Dragonflies and damselflies belong to the insect Order Odonata, which means "toothed one." The name is appropriate, for they are fiercely predacious insects with serrated jaws for catching and eating other living insects. The Order is a small one, with about 5,000 species worldwide, and 500 in North America. New species are being discovered at the rate of about one per year.



In New England, about 180 species have been recorded. Despite Rhode Island's small size, it has a remarkable diversity of high-quality dragonfly habitat, and thus a similarly exemplary diversity of dragonflies. 111 species are known to exist here or have appeared historically in the literature. Several additional species which have been reported from both Connecticut and Massachusetts are likely to be added to the Rhode Island fauna list as we expand our inventory.

In recent years, dragonfly inventory in Rhode Island has focused much attention on the rivers, streams, wetlands, and ponds within the Pawcatuck Watershed, and coverage of this part of Rhode Island is thought to be fairly complete. 97 species have been reported from the Pawcatuck Watershed. The Wood River alone hosts 58 species of Odonata, over half of the total diversity known from the state. However, watersheds in the northern part of the state (Blackstone, Moosup) and Eastbay are under-sampled, and it is our goal to gather data from these regions in future years.

In 1996, nine species new to Rhode Island's Odonate fauna were recorded. Several of these, such as the Mottled Darner (*Aeshna clepsydra*), Black-shouldered Spinyleg (*Dromogomphus spinosus*), and Blue-tipped Dancer (*Argia apicalis*) were not unexpected here. The Spine-crowned Clubtail (*Gomphus abbreviatus*), collected on the Blackstone River in 1996, is a member of a dragonfly family with relatively low tolerance to pollution. Perhaps its presence on the Blackstone is a good sign for that river. The Spine-crowned is uncommon to rare in the northeast, and given its affinity for long runs on larger rivers, it may well be exclusive to the Blackstone in Rhode Island.

The Taper-tailed Darner, *Gomphaeschna antilope*, also taken for the first time in Rhode Island in 1996, was entirely unexpected here. In fact, our Rhode Island record is the first for that species in New England. Its more common relative, the beautiful Harlequin Darner, *G. furcillata*, is widespread here and throughout the northeast. The Taper-tail is a southern species whose northern range-limit is now Rhode Island. Other southern species may be expanding their range gradually northward, including the Bar-winged Skimmer, *Libellula axilena*, which we reported new to New England in 1995 with a collection in South Kingstown. This species was subsequently collected on Cape Cod in 1996, exhibiting even more movement up the coast.

The season of 1995 featured an unusual influx of dragonflies moving into many areas of the northeast from the south, including our Rhode Island Bar-winged Skimmer. It is believed that extended periods of drought in the south and prolonged southerly winds facilitated this movement, which also produced spectacular migratory flights of some of the largest dragonflies in North America. A mass movement of the gigantic Swamp Darner, *Epiaeschna heros*, along the coast to Cape Cod was reported in June of 1995. Apparently some individuals crossed considerable expanses of water, as evidenced by an exhausted individual of this normally swift-flying insect which was hand-caught on Block Island!

Most of Rhode Island's 111 species of dragonflies and damselflies are common but delightful animals which occur in abundance at ponds and wetlands of all types. However, a few are rare, associated with unique or uncommon habitat types, or require pristine rivers or streams. One such rarity which occurs in good numbers in Rhode Island is the Ringed Boghaunter dragonfly, *Williamsonia lintneri*. This species occurs in sphagnum-rich fens from southern Maine and New Hampshire through eastern Massachusetts and Rhode Island to eastern

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Connecticut, with the majority of known populations (28 of 35) concentrated in eastern Massachusetts and southern Rhode Island. Much of what we know of this species distribution has come from the inventory work of state Natural Heritage programs, Fisheries and Wildlife Division staff, and other biologists. The value of extensive field sampling to our knowledge of the Ringed Boghaunter cannot be understated. Efforts are now underway to quantify populations in Massachusetts and understand the dynamics of populations in Rhode Island, where the Ringed Boghaunter appears to exist as a metapopulation.

In the future we hope to launch a more comprehensive statewide inventory project along the lines of those in other states, and there has been discussion of a region-wide atlas project for New England. Anyone interested in participating in such a project in Rhode Island should contact the author.

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Postglacial Vegetation Change in Southeastern New England

by Thompson Webb III

As a paleoecologist, I and members of my pollen lab at Brown University collect sediment cores from lakes and wetlands. The sediments act as strip charts that can be dated by radiocarbon methods, with the accumulated pollen grains showing the numbers and types of trees and plants growing on the landscape.

Our studies show that southern New England vegetation history begins with the retreat of the ice sheet as early as 20,000 years ago, exposing a terminal moraine with high points along it at Block Island, Martha's Vineyard, and Nantucket, all far north of the ocean. The ice retreated north to form the Charles-town Moraine and the hills that later became the Elizabeth Islands and Cape Cod. Meanwhile, tundra developed to the south of the ice sheet and across the moraines, but is often not recorded in kettle lakes because they were still filled with unmelted remnant ice blocks that took 3000 or more years to melt in the periglacial environment south of the ice.

Once the ice blocks melted and the lakes began accumulating sediments, spruce trees had moved in and formed a spruce parkland that gradually developed into a spruce (*Picea* species) and jack pine (*Pinus banksiana*) forest between 14,000 and 13,000 years ago. Conditions cooled for 1500 years after 13,000 years ago and spruce trees increased in dominance over the pines before again declining in numbers to be replaced by white pines (*Pinus strobus*) about 11,500 years, as conditions rapidly warmed by 3 to 6 degrees C and became drier. During the 2000 years of white pine dominance, water levels in lakes and wetlands were lower than previous years and also lower than the present time.

Hemlocks (*Tsuga canadensis*) arrived with the white pines and became more numerous as white pines declined and oak (*Quercus* species) populations increased to dominance about 9500 years ago. Beech trees (*Fagus grandiflora*) arrived about 8000 years ago and hickories (*Carya* species) arrived 6000 years ago, well before a disease or insect infestation (perhaps hemlock loopers) much diminished hemlock numbers 5300 years ago. Oak trees remained dominant on the landscape, but beech and hickory populations increased after the hemlock decline. Hemlocks again increased in numbers 3000 years ago and chestnuts (*Castanea dentata*) became abundant about 2000 years ago in the oak forests.

Within these forests native Indian populations increased and small clearings were opened for growing corn, pigweed (spinach family), and other plants. The arrival of Europeans is evident in the pollen records by the decrease in tree pollen and the increase in pollen from ragweeds that grew in cultivated fields and pastures. The amount of ragweed pollen peaked in the 1800s and has declined since then as tree populations increased on the abandoned farmland. In the 1920s, pollen data record a decline in chestnut pollen as chestnut blight killed that canopy species. Chestnuts were then relegated to sprouting and growing in the shrub layer of oak forests.

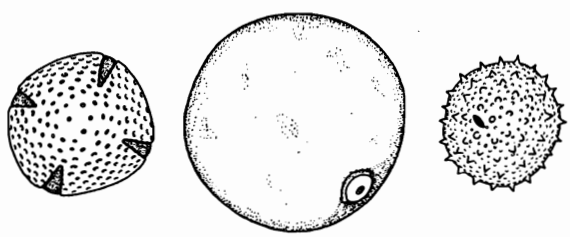


Figure 1. Pollen grains of (left to right) Ash (*Fraxinus americana*), Grass (*Dactylis* sp.), and Ragweed (*Ambrosia artemisiifolia*). From *Botany, 3rd Ed.*, by C. L. Wilson & W.E. Loomis, 1952, NY: Holt, Rinehart & Winston.

This brief account of the postglacial vegetational history applies generally to southeastern New England. Regional differences in soils and climate lead to some differences among sites across the region. For instance, the major increase in chestnut populations after 2000 years ago in eastern Connecticut did not extend to southeastern Massachusetts and the Cape. In describing this history, I used the latest calibration of radiocarbon dates into calendar

years. The dates in calendar years, in general, are younger than those in radiocarbon years by 500 (at 5000 years ago) to 3000 years (at 21,000 years ago). As evident from my descriptions of changes from tundra to deciduous forests, the vegetational changes were large in southern New England.

These changes occurred over several centuries to 1000s of years. The prospect for global warming presents a new challenge to the vegetation and to those concerned with preserving biological diversity. Some of the future changes are predicted to be large but will occur over short time scales of decades to centuries. The 1992 book *Global Warming and Biological Diversity* edited by Robert Peters and Thomas Lovejoy (Yale University Press) discusses this topic and considers the prospects for a wide range of plant and animal groups. One of the main reasons for studying past "natural" changes in the vegetation and environment is to help with understanding the potential impacts for future changes whatever their cause.

Thompson Webb III, *Department of Geological Sciences, Brown University, Providence, RI 02912.*

Hold the Date: January 9, 1998

RINHS Conference: "Ecological Research in Rhode Island: A Continuing Assessment"

The Rhode Island Natural History Survey will host its fourth conference on January 9, 1998 at Chafee Hall on the University of Rhode Island campus in Kingston, RI. The theme and format will be similar to the popular 1994 conference "Ecological Research in Rhode Island: What's Going On?"

Submissions for papers and poster sessions are welcome on any aspect of natural history in Rhode Island, including biota (life history, distribution, taxonomy, status of taxa, ecological information, etc.), ecosystems, geology, hydrology, soils, natural history collections, analyses of impacts to ecological systems, or other pertinent work.

State and federal scientists, land managers, college and university researchers, naturalists, secondary school teachers and students, and others are welcome to submit abstracts. Organizational displays are also invited.

Oral presentations will be a maximum of 15 minutes. If possible, abstracts should be submitted on disk, in Word Perfect or ASCII formats, along with a single paper copy. Abstracts should be 200 words or less using 1.5 inch margins. Indicate whether you prefer to present a contributed paper or poster.

Send abstracts to: RINHS, C.E. Education Center, E. Alumni Avenue, URI, Kingston, RI 02881. A formal Call for Abstracts will be sent in early summer.

A Call for New RINHS Publications

One of the important missions of RINHS is "to facilitate and coordinate the gathering and dissemination of information on Rhode Island's biota and natural communities" (from the Mission Statement of RINHS). We are therefore searching for new works to publish and previously-published material that may no longer be in print.

We have had great success in publishing and marketing Martine Villalard-Bohnsack's *Illustrated Key to the Seaweeds of New England.* In fact, most of the first printing of the book has now been sold, and we are commencing a second printing. Our intent is to subsidize publication of books and then to recover the printing costs, thereby turning over the resources for new publishing ventures. We have also undertaken an ambitious project to provide checklists of the Rhode Island fauna and flora, parts of which are now at an advanced stage.

Another current project is the reprinting of Alonzo Quinn's *Rhode Island Geology for the Non-Geologist,* long out of print.

We are now looking for new manuscripts that deal with Rhode Island or regional natural history, as well as suggestions for reprinting such useful documents as Quinn's *Rhode Island Geology.* We may be able to support publishing and marketing costs for such endeavors. We can consider items that range from large pamphlets (40+ pages) to books. Those with a timely market like the *Illustrated Key to the Seaweeds of New England* are of special interest, but we would like to see other titles as well.

At this time we would like to suggest that you consider authoring a book on some aspect of Rhode Island natural history. Although receptive to a wide range of sizes, we are especially interested in promoting a series of 40-80 page pamphlets, which would be so designed as to provide useful information for the interested public at large, as well as information that is authoritative for a specialist. These would well serve RINHS's efforts to disperse accurate information on Rhode Island's fauna and flora to its citizens. We especially encourage ideas and names of potential authors, and our board will attempt to generate others, as well as to find authors for them. Contact the RINHS office at (401) 874-5800 or email RINHS@uriacc.uri.edu

Douglass Morse, *Department of Ecology and Evolutionary Biology, Brown University and* ***Lisa L. Gould,*** *Rhode Island Natural History Survey.*

Rhode Island Collections

The Diatom Collections in Rhode Island

by Paul E. Hargraves

Of what use are collections of biological specimens? is an often-asked question, by uninformed people who might envision a musty dusty collection of individual species in bottles, artificial poses, or herbarium cabinets. The question could be asked in a semihostile sense by bean counters looking to trim costs, or out of ignorance by the wondering and curious student of natural history. One major purpose of collections is to document species diversity throughout the world, or parts of it, and to provide the basis for research based on the many current issues based on species diversity. That we know anything objective about a species is because there are, or have been, specimens of that species in a personal, public, or private collection. The ecosystems that support life on earth are a composite of biological species, of which perhaps two million are known, and probably 10 million are yet to be discovered. We can't know how ecosystems really work without knowing the diversity, identity, and biology of the living organisms in it, no matter what some ecosystem modelers would have you believe. There is no question in my mind that collections which are actively curated, are continuously growing, and are accessible, are of inestimable value in solving problems of major importance to science and society.

Can we put a monetary value on specimens? This question has drawn considerable interest recently on the internet discussion list "TAXACOM." An Australian scientist made the following calculation: "The total cost of curating a specimen was determined by adding the average costs of collecting ($14.20), identifying ($7.20), databasing ($2.50), and preparing ($15.00) each specimen (i.e., a total cost of $38.90 per specimen) and including a 35% administrative cost ($13.62 per specimen) to reach a grand total of $52.52 per herbarium specimen." In an active collection, administrative costs are ongoing, and of course the average costs are widely variable (the collecting costs, for example, for amphibians in the Peruvian Amazon are different from those for mice in Kingston).

So, collections have a utility and value. Stepping down off the soapbox, what about diatom collections? Diatoms are microscopic unicellular algae (protists) living in the sea, freshwater, soil, and on all kinds of surfaces from the poles to the tropics. With very few exceptions, they are photosynthetic and have an external cell covering of highly ornamented silicon, essentially the same material as window glass. They can be spherical, coin-shaped, needlelike, or shaped like boats, butterflies, saddles, etc. In their extremes, a cell can be 2µm wide and 4500µm long (there are 254,000µm in one inch), or a spheroid with a radius of 1µm, or a drum with diameter of 300µm and thickness of 400µm (a diatom of this size would be just visible to the naked eye). The number of diatom species on the planet is certainly more than 10,000 and probably less than 50,000; scores of new species are described each year. Identifying diatoms depends primarily on analysis of the sculptured patterns in the glass shells in which they live (this reliance on the shape and sculpturing of individuals is often termed "alpha-taxonomy"). These glass shells make preservation fairly easy: they can be preserved in a liquid which doesn't readily dissolve glass; and they can be prepared as permanent "mounts" on microscope slides.

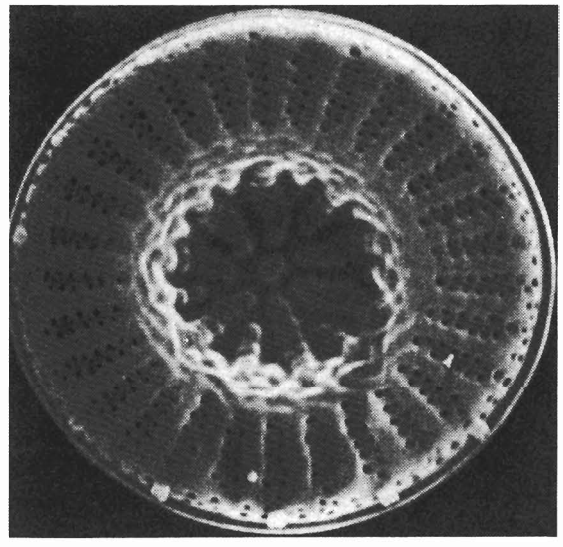


Figure 1. The diatom *Cyclotella*. Total diameter 10 micrometers. Photo by Paul E. Hargraves.

In Rhode Island, there are two substantial collections of diatoms. One is mine. It consists of approximately 3000 microscope slides, prepared over the last 35 years, emphasizing Narragansett Bay and surrounding areas, but also with much material from around the world: Antarctica, the American tropics, Africa, and the Indian and Pacific Oceans. There are also about 1000 samples preserved in liquid, from which many of the microscope slides were prepared. Finally, there are several hundred 35mm projection slides, which are used as a teaching resource and as material for various people who ask to borrow a diatom slide for illustration in textbooks being written. I don't know how many diatom species can be found in my collection—it may take a week or more to thoroughly examine each microscope slide to identify accurately everything on it. A single slide may have up to 100 species on it. Conservatively, I

estimate 2000-3000 species are to be found, if I had the next century to work them all out. We are presently using my collection in the development of a book on identifying diatoms in coastal waters of the northeastern United States. Diatoms in the local plankton number about 150+ species. Having samples going back to the early 1960s has enabled us to determine that some cold-water diatoms are now rare or no longer found in Narragansett Bay, while some warm-water species formerly lacking have crept in. Global warming? Who knows?

The second diatom collection in Rhode Island is stored in the Roger Williams Park Museum. It consists of about 400 samples in jars and vials, and about 1500 prepared microscope slides. It was assembled about 80-100 years ago by Oliver Kendall of Providence, and donated to RWP museum at some point, presumably after Mr. Kendall died. In the collection are freshwater and marine diatoms from around the world, fossil and recent examples, with about 20% from Rhode Island. At the time, it was common for amateur diatomists to exchange samples with their friends and colleagues, and Mr. Kendall was no exception. Some of the collectors' names on the samples in his collection are those who were known to expand their holdings in this way. Preparing and trading diatom slides was an active and popular hobby in the late 19th and early 20th centuries. Unfortunately, the Oliver Kendall collection is not actively being used in research, even though it is potentially a good reference point for discovering any changes in the marine and freshwater diatom flora of Rhode Island in the last 100 years.

While the diatom collections in Rhode Island do not compare with the major research collections at the California Academy of Science (San Francisco), the Academy of Natural Science (Philadelphia), the British Museum, or the extensive (but inactive) collections at Harvard and the Smithsonian, Rhode Island's collections have much more relevance to the problems of biodiversity, natural history, and environmental change on a local level.

Paul E. Hargraves, *Graduate School of Oceanography, University of Rhode Island, Narragansett, RI 02882.*

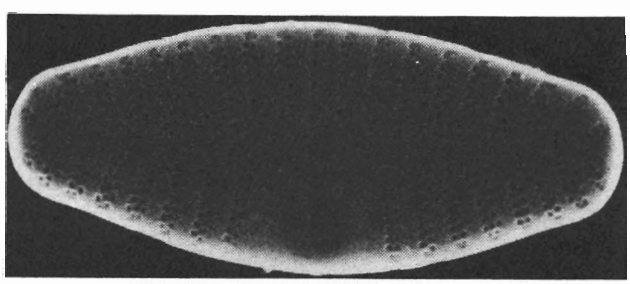


Figure 2. The diatom *Achnanthes*. Total length 15 micrometers. Photo by Paul E. Hargraves.

The Moses Brown School 1861 Bird Tableau

by Anne H. White

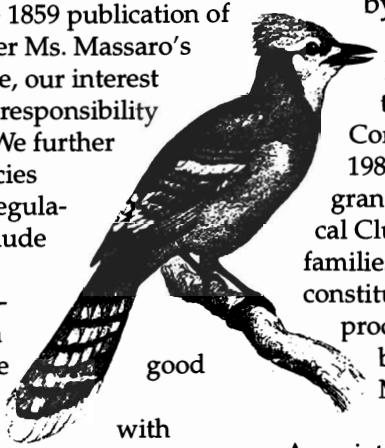
Moses Brown School has a surprising parlor. Named for a beloved administrator, it is officially known as the Stanley Ward Room, a formal but friendly room of portraits, busts, antique furniture, and comfortable sofas and chairs where prospective parents and students await interviews and where guests pause before being escorted through doors and down corridors to the many appointments which occur daily in the life of a busy school.

Informally, the parlor is affectionately called "The Bird Room." I first saw the Moses Brown School bird collection when, waiting for a job interview, I sat across the room from it. I was intrigued. It occupies an entire wall and depicts a natural habitat complete with animals, foliage, rock rests, natural perches, and nests with tiny eggs; until recently, it was shielded by panes of wavy antique glass. Recent attention was drawn to the collection by a serendipitous 1995 meeting of several friends of the school: Frank E. Fuller, teacher and archivist at Moses Brown for 52 years until his recent death; Philip Anderson, class of '53 and former Director of Finance and Operations; Dr. Thomas Perry, former board member and enthusiastic "birder"; Lisa and Mark Gould of RINHS and the parents of two MB alumnae; and Joanne P. Hoffman, head of the school, who encouraged her staff to pursue funding for the project.

Enter Marilyn Massaro, Curator of Collections, Museum of Natural History, Roger Williams Park, who responded to a call and enthusiastically agreed to visit the school, look at the collection, and offer her recommendations. We were in good hands; our education about documentation and preservation began as did our collaboration with Ms. Massaro and Michael A. Gardner, a fine curator. With funding from The Obadiah Brown Benevolent Fund who responded to our proposal for funds for Phase 1 of the work, we began in 1996 with Mr. Gardner as our consultant.

The Moses Brown bird collection is the oldest known single collection of mounted birds in Rhode Island and one of the oldest of such in the country. It is fixed into a permanent tableau and is fabricated into a beautiful work of art. Chiefly a collection of North American bird species, it also contains several European species, a few mammals including a duck-billed platypus, and two extinct passenger pigeons. A small plaque on the case reads "Presented to Friends School by its Officers - 1861." Although both the collector and the origins of the 136-year old collection are unknown in spite of Mr.

Fuller's thorough search of the archives, we can assume that the collector was influenced by the growing interest in natural history that originated in Victorian England following the 1859 publication of Darwin's *Origin of Species*. Under Ms. Massaro's and Mr. Gardner's able guidance, our interest was piqued as was our sense of responsibility for this antiquarian collection. We further realized that loss of habitat, species extinction, and environmental regulations in place today would preclude duplication of this collection. Current collections are irreplaceable resources, and preservation and good documentation are good stewardship and common sense.



Mr. Gardner began Phase 1 with documentation and showed himself to be meticulous, knowledgeable, and committed to the work. He studied the original numbers and specimen names--some of which are obsolete--and noted that some of the old names were traceable to J. J. Audubon's *Birds of America (1821-1838)*. As of this writing, he has updated the nomenclature, confirmed the identification of each specimen, and systematically assigned each individual to avian order, family, genus, and species, noting gender where possible. Mr. Gardner has created a card catalog file which contains all pertinent data for each specimen, and he has assigned each card a sequential number code to facilitate easier reference. Initial work of transferring the original numbers, new "Moses Brown numbers," and common names of each specimen to small archival leg tags is being completed during this phase. We have also replaced the old glass with new panels of tempered glass which are removable for easy access and convenient photographic documentation. Remaining work of affixing labels to specimens will be completed in Phase 2 as will the cleaning and minor repair of the specimens.

We hope that further research during Phase 2 will shed light on the origins of the collection. When the case was opened this past fall to replace the glass, Mr. Gardner found a section of the *Providence Journal* dated March 21, 1861. There was no mention of the gift but much discussion about local events and those surrounding the impending Civil War.

We look forward to sharing the treasure of the Stanley Ward Room with the wider Rhode Island community and welcome those who would like to visit our surprising parlor.

***Anne H. White** is Associate Director of Development, Moses Brown School, Providence, RI. Special thanks to Marilyn Massaro and Michael Gardner for their expert assistance in the writing of this article.*

Museum Completes Bird Collection Conservation Project

by Marilyn Massaro

The Museum of Natural History, Roger Williams Park, Providence, is pleased to announce completion of its Bird Collection Conservation Project. This task, which began in 1989, was recently completed with funds granted the Museum by the Nuttall Ornithological Club, America's oldest bird club. The final families of passerine bird specimens (which constitute the collection's largest holdings) were processed between June 1996 and January 1997 by natural history collections consultant Michael A. Gardner.

Gardner, the Museum's former Associate Curator of Natural History, has conducted hands-on conservation treatment and verified collection data for each of the Museum's 5583 bird specimens since the project began. Treatment included the encapsulation in customized mylar envelopes of all original collector labels associated with each specimen and generating new archival quality ones with updated scientific nomenclature. Identification and documentation were corroborated and cross-checked between specimens and a systematically arranged card catalogue. When the project began, 4754 specimens had been documented. Since 1989, over 600 additional specimens have been identified and catalogued, many having been unprocessed since the century's first decades.

These updated collection records can be easily transferred into a computerized database which will greatly improve user access. Such comprehensive inventory and conservation of any of the Museum's collections (totalling over a quarter million specimens and objects) is unprecedented in its 101-year history. It is appropriate that the final portion of this project began in June 1996, one hundred years after the Museum first opened its doors in June 1896; it was a collection of bird (and mammal) specimens that precipitated the Museum's founding.

Over the past few years the bird collection has been featured in two museum exhibitions (Narragansett Bay Worlds, 1990-97 and Natural Selections, 1992-) and has been used by researchers, artists, and most recently, by university and college biology classes. It has been featured in several local programs including those sponsored by the Audubon Society of R.I., R.I. Natural History Survey, R.I. Ornithological Club, and the Providence Athenaeum. Inquiries about the Museum's collections are welcomed by Marilyn R. Massaro, Curator of Collections at (401) 785-9457.

Focus On
RINHS Institutional Members:
The Rhode Island Sea Grant College Program
by Carole Jaworski

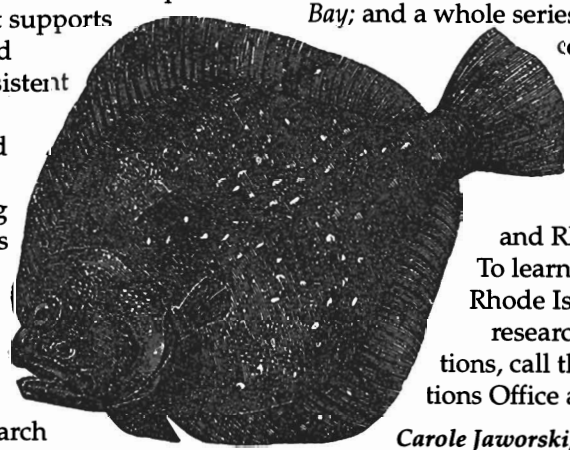
Research, education, outreach: This is the mission of the National Sea Grant College Program, established by Congress in 1966.

The National Sea Grant College Program is a federal-state partnership. The federal portion of the program is housed in the National Oceanic and Atmospheric Administration (NOAA). There, Sea Grant, along with other NOAA agencies, addresses issues as far ranging as fisheries, coastal management, aquaculture, coastal water quality, habitat protection and restoration, management of marine sanctuaries and estuarine reserves, and protection of life and property from natural hazards.

The state part of this federal-state partnership is represented by the 29 state Sea Grant programs--including Rhode Island Sea Grant--which are located in coastal and Great Lakes states, as well as Puerto Rico. These 29 programs represent the core of an additional network of some 300 participating institutions. Each year, Sea Grant draws on the talents of more than 3,000 scientists, engineers, educators, students, and outreach and communication specialists.

Specifically, the Rhode Island Sea Grant College Program's mission is to increase understanding of the marine environment and to promote the wise use and development of marine resources for the public benefit. Rhode Island Sea Grant supports scientific research, outreach, and information dissemination consistent with these goals.

A sampling of Rhode Island Sea Grant's current research projects includes: (1) rebuilding New England groundfish stocks and fisheries; (2) land-based aquaculture of summer flounder; (3) nutrient enrichment of coastal lagoons; (4) restoration of water quality in Greenwich Bay; and (5) biotechnology research on medicines from the sea. Outreach and information dissemination complement and support these research efforts.



Other recent outreach programs include: (1) safety at sea, with fishing vessel safety courses for more than 1,000 fishermen in the Northeast, as well as for divers; (2) the nation's first citizen saltwater monitoring program; (3) harbor management, where Sea Grant helped develop a planning strategy for local harbors, including a harbormaster training program; (4) development of regulatory guidance documents for nonpoint source pollution abatement in marinas; (5) fisheries bycatch reduction through enhanced gear selectivity; (6) and enhanced safety, quality, and profitability of the state's $800 million seafood industry.

Besides its outreach activities, Rhode Island Sea Grant has an active communications office that produces a variety of publications for the general public. Highlights include *Nor'easter, Magazine of the Northeast Sea Grant Programs*, a national award-winning magazine spearheaded by Rhode Island Sea Grant, that highlights the latest marine and coastal information from seven universities and marine institutions in the Northeast: the Massachusetts Institute of Technology, the Woods Hole Oceanographic Institution, the State University of New York, and the universities of Rhode Island, Connecticut, Maine, and New Hampshire.

The communications office also publishes a variety of other publications, including books, booklets, posters, reports, and fact sheets. Our most-recent book, *A Guide to Rhode Island's Natural Places*, became a state best-seller. Other popular Sea Grant publications include posters, such as "Coastal Birds of the Northeast" and "Fish of Narragansett Bay"; books and booklets, such as *The Northern Quahog: The Biology of* Mercenaria mercenaria, *Environmental Guide for Marinas, Vegetated Buffers in the Coastal Zone, Marine Science Careers: A Sea Grant Guide to Ocean Opportunities, Planning an Aquaculture Business in Rhode Island, Tides and Tidal Currents of Narragansett Bay;* and a whole series of two-page fact sheets covering topics such as hurricanes, fishing, red tide, aquaculture, lobsters, quahogs, swordfish, clams and mussels, old sea sayings, and Rhode Island rivers.

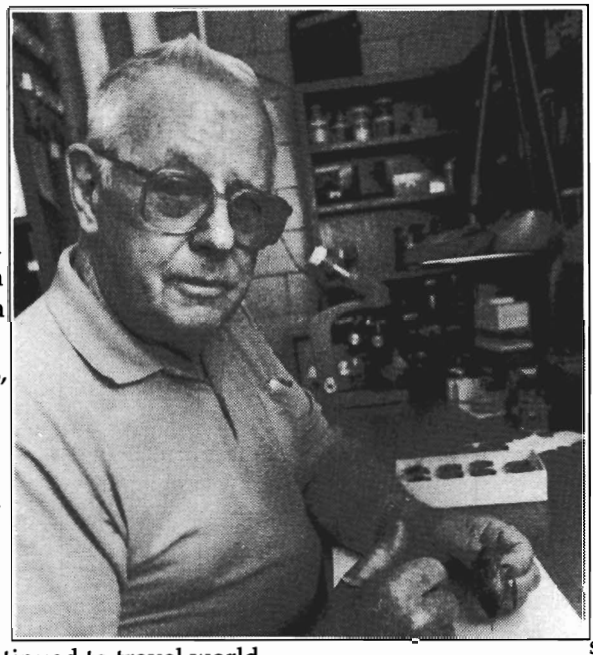
To learn more about Rhode Island Sea Grant research, outreach, and publications, call the Sea Grant Communications Office at (401) 874-6842.

***Carole Jaworski**, Communications Director for Rhode Island Sea Grant, URI Narragansett Bay Campus, Narragansett, RI 02882.*

In Memoriam: Charles V. Reichart

Rev. Charles V. Reichart, O.P, Professor Emeritus of Biology at Providence College, entomologist of international acclaim, and longtime member of the Rhode Island Natural History Survey died on January 17, 1997. He is survived by his sister, Eleanor Burley, a nephew and two nieces and will be missed by them and countless friends and colleagues in the Dominican and academic communities.

Fr. Reichart was born in Zanesville, Ohio to John and Nell Reichart in 1910. Graduating from Providence College in 1931, he received advanced degrees in philosophy at the Dominican House of Studies at River Forest, Illinois in 1935 and in sacred theology in 1939 at the Dominican House of Studies in Washington, D.C. His ordination as a Dominican priest in the Order of Preachers in 1938 was followed by graduate study in biology. Fr. Reichart received his Ph.D. from Ohio State University in 1947 and since then has been a member of the Providence College Dominican community and faculty where he chaired the Department of Natural Sciences, the Biology Department, served as Pre-Medical advisor and pursued his entomological research on Hemiptera. Member of Sigma Xi and other honor societies, recipient of honorary degrees, author of numerous publications, he is credited with discovery of several new species of aquatic Hemiptera.



Despite Fr. Reichart's retirement from the Biology faculty in 1977, he remained active in research until only days before his death. He continued to travel worldwide, and was remarkable in his energy, fascination with and dedication to his research. His enthusiasm was inexhaustible, and he occasionally accompanied other faculty and students on field trips. Most often, however, he quietly and without fanfare, disappeared from the corridors and labs of Albertus Magnus Hall for a few weeks only to reappear with new specimens and photographs from his travels. His collection of thousands of insects which resides at Providence College will be divided and moved to the Smithsonian Institution and Yale University.

Reichart's contributions to biology and pre-medical education are as far-reaching and significant as are his contributions to entomology. Many Rhode Island physicians and dentists remember his stern visage in the classroom, exacting standards, and straight-forward, no-nonsense advice about preparation for the health professions. He was the founder of the Rhode Island chapter of Alpha Epsilon Delta, the pre-medical honor society and was national treasurer for AED for nearly 30 years. As Fr. Mark Nowel, the present AED advisor, notes, "At one or another time, he was teaching most of the future physicians in Rhode Island. His students knew that he was the hardest teacher they would ever have. But as tough as he was, he had such a soft heart." While he may have inspired fear in the hearts of his pre-med students, Fr. Reichart's friendship and guidance was sought and valued by students and faculty who looked past that gruff exterior. One recent graduate who worked in his research lab commented that he became her "surrogate grandfather while she was at PC." To faculty children he was "Dr. Bugs," and an invitation to view his collection was a special treat. As Fr. Nowel noted, "he was complex, honest and straightforward, loving, generous and a truly respected scientist."

His contributions to biology education were formally recognized by his faculty colleagues in the Biology Department with their establishment of the Charles V. Reichart Award, which is presented annually to a graduating senior biology major who "best exemplifies Fr. Reichart's dedication to the advancement of the biological sciences as evidenced by his scholarship, intellectual curiosity, disciplined perseverance and scientific integrity." The student recipient of the C.V. Reichart Award is selected on the basis of promise as a scholar in the biological sciences. In 1996, he was further honored by the establishment of a scholarship fund designed to support and strengthen research and the study of biological sciences at Providence College. Reichart was awarded the first President's Distinguished Faculty Award in September 1995. Faculty from all disciplines applauded the choice which is given to a faculty member whose accomplishments have been widely recognized in his or her field of expertise and who has achieved this scholarly recognition through long and dedicated service to PC. That was Charles V. Reichart.

Carol B. Crafts, *Associate Professor, Biology Department, Providence College.*

Father Reichart's 5-part series, *The Aquatic Hempitera of Rhode Island,* is available through the RINHS Publications Listing.

President's Corner, continued from page 1

tain itself unless it has a stable financial base from which to operate. And the Rhode Island Natural History Survey is no exception.

The Board of Directors has been exploring how to provide the financial base from which we can go out and do all the great things we want to do. RINHS has been moderately successful in securing funding for specific projects (primarily for publications, computer and office equipment, and reference literature). But we have been less successful in securing funding to support our operating costs. As a responsible Board—comprised primarily of scientists, researchers, and practitioners whose primary experience with generating financial support is through the writing of grant proposals—we are preparing to participate in a consultation designed to help small non-profit organizations like the RINHS develop financial strategies and improve organizational structure. I will update you on this in our next newsletter.

RINHS is a private nonprofit 501(c)(3) organization: we are unique among the country's state Biological and Natural History Surveys in that we are the only one that is not state or federally funded. That means that all of our funds must come from memberships, donations, grants, and special projects such as our publication sales. What you, our members, can do right now to help out the Natural History Survey is to make sure that you renew your annual membership (memberships for 1996-1997 were due in October 1996) and encourage others to join. Did you know that we have memberships for institutions? Check and see if your organization is interested in becoming a member.

Until the next newsletter, I hope to see you at one of our RINHS-sponsored lectures. And thank you for your interest in the Natural History Survey and your support.

***John F. Paul** is a researcher at the U. S. EPA Lab in Narragansett, and serves as president of the Rhode Island Natural History Survey.*

RINHS Forming Birdathon Team

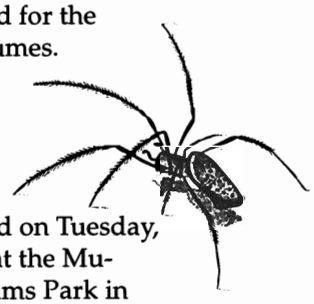
The Rhode Island Natural History Survey is forming a crack team of birders to participate in the Audubon Society of Rhode Island's annual Birdathon, to be held on Saturday, May 17.

If you would like to be part of the team, contact Rick Enser at (401) 277-2776 ext. 4308. Pledges for the team's work are also welcome; proceeds will go to the Audubon Society of Rhode Island. This is a great way to have a fun birding experience and help ASRI celebrate its 100th Anniversary!

Rhode Island Foundation Grant to Support The Flora and Fauna of Rhode Island Project

The Rhode Island Natural History Survey is very pleased to announce the receipt of a $23,800 grant from the Virginia B. Butler Fund of the Rhode Island Foundation, to support the publication of *The Vertebrates of Rhode Island, The Invertebrates of Rhode Island,*and *The Viruses, Monera, Protista, Fungi, and Nonvascular Plants of Rhode Island.*

These funds will be used for the actual printing costs of the volumes, and to help with graphic artwork and announcement of the volumes. RINHS is seeking other funding to help support the maintenance of the database for the project, and for the layout, editing, and indexing of the volumes.



RINHS Annual Lecture Series on Rhode Island's Fauna, Flora, Geology and Ecosystems

The next RINHS Lecture will be held on Tuesday, April 8, at 7:30 p.m. in the Auditorium at the Museum of Natural History at Roger Williams Park in Providence, RI. Brown University Professor Douglass H. Morse will speak on *Spiders at the Shoreline,* and describe the ecology of intertidal spiders. At 7:00 p.m. refreshments will be served and RINHS publications will be for sale. The lecture is co-sponsored by the Museum of Natural History at Roger Williams Park.

RINHS is making plans for its 1997-1998 Lecture Series on Rhode Island's Fauna, Flora, Geology, and Ecosystems. If you would like to be a speaker, or to suggest a speaker, contact the RINHS office at (401) 874-5800.

Providence Athenaeum Publishes Natural History Collection Bibliography

The Providence Athenaeum is pleased to announce the forthcoming publication of *The Natural History Collection of the Providence Athenaeum: A Selected Annotated Bibliography,* compiled by Carol Cook and Marguerite Dorian. More than a mere guide to what is on the shelves, some nine hundred ample annotations also provide biographical details of the naturalists' lives, relating them to their colleagues and their disciplines. The emphasis is on the nineteenth century holdings of the library, with attention to Rhode Island and New England materials. The Rhode Island Natural History Survey helped support the publication of the bibliography.

Copies will be available at the Athenaeum after mid-May. Please call the Athenaeum at (401) 421-6970 for details regarding the publication celebration, which will be held on May 18, 1997.

Northeastern Naturalist:
A New Regional Journal

The *Northeastern Naturalist* is an interdisciplinary natural history journal for northeastern North America, formerly published as the *Maine Naturalist*. It is envisioned as the region's counterpart to the *Southwestern Naturalist*, the *American Midland Naturalist*, and the *Canadian Field Naturalist*.

This peer-reviewed journal is for generalists and specialists alike, and for all who have broad-ranging interests in the overall classical natural history of the region. Articles include original scientific research papers in a format typical for a scientific journal. These articles are balanced by research summaries, general interest articles, field notes, photographic essays, book reviews, and other special features. RINHS Advisor Les Mehrhoff and RINHS Executive Director Lisa Gould serve on the Board of Editors of *Northeastern Naturalist*.

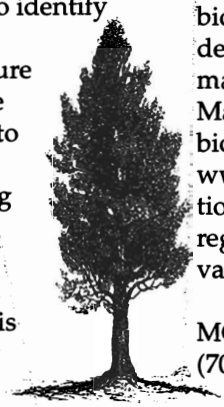
The First Call for Manuscripts welcomes manuscripts on terrestrial, freshwater, and marine organisms and habitats. Subject areas include but are not limited to biology, ecology, behavior, biogeography, geology, taxonomy, archaeology, and anthropology.

For information about subscriptions ($30/year for individuals and organizations; $20 for students) and manuscript submissions, contact *Northeastern Naturalist*, P.O. Box 9, Steuben, ME 04680; (207) 546-2821. Email: humboldt@nemaine.com or check out the website at http://maine.maine.edu/~eaglhill

Tell Us About Trees!

The Rhode Island Urban and Community Forest Council "dedicated to sustaining and improving Rhode Island's tree resources" is now taking nominations for the 1998 *Notable Trees of Rhode Island Calendar.* Trees may be nominated in three categories: Botanical Champions, Culturally Significant, or Historically Significant. Contact the RIUCFC office at (401) 647-3367 for nomination forms.

The RIUCFC is also establishing a Tree Steward Education Program. The stewards are citizen volunteers interested in assisting in the care of trees in their communities. Stewards will be taught to identify trees, diagnose problems, prune, plant, fertilize, water, and in other ways, nurture trees. The program will be offered twice yearly, with the first session scheduled to begin in mid-April, 1997.



Participants must attend six evening and two Saturday sessions in order to receive a Tree Steward Training Certificate of Completion. Call the RIUCFC office at (401) 647-3367 to register for this unique educational opportunity.

Marine Conservation Biology Institute: Science for the 21st Century

The Marine Conservation Biology Institute (MCBI) strives to do for the sea what others did for the land two decades ago: advance a new science to focus scientific research across numerous disciplines on questions regarding the conservation of biological diversity. Twenty years ago, while scientists in disciplines such as zoology, botany, ecology, population genetics, and biogeography had valuable expertise relevant to certain aspects of conservation, little cross-fertilization among disciplines occurred. This changed with the publication of the first book on conservation biology in 1980 and the subsequent creation of the Society for Conservation Biology. Since then, conservation biology has grown as a science and made significant contributions to conservation. But its focus is largely terrestrial.

Headquartered in Redmond, WA, MCBI was created in 1996 by Dr. Elliott Norse, formerly Chief Scientist for the Center for Marine Conservation, to advance the science of marine conservation biology and catalyze interaction among scientists from different disciplines such as marine ecology, oceanography, fisheries biology, marine mammalogy, and ichthyology. We are doing this by: (1) holding multidiciplinary scientific workshops on emerging topics in marine conservation; (2) organizing the first Symposium on Marine Conservation Biology at the annual meeting of the Society for Conservation Biology, University of Victoria, British Columbia on June 6-9, 1997; (3) generating news stories that will raise the visibility of key issues; (4) writing and editing articles and the first book on marine conservation biology; and (5) speaking at Congressional hearings and other forums to reinforce MCBI's message with audiences that can make a difference.

During the next few years MCBI will also be working to establish courses and programs in marine conservation biology at universities, encourage government funders such as the National Science Foundation to support marine conservation biology research, show scientists that marine conservation biology opens up new opportunities at a time of declining funding and job openings, and encourage marine management agencies such as the National Marine Fisheries Service to hire marine conservation biologists. We will soon have a website at: http://www.mcbi.org which will contain MCBI publications, job and research opportunities, plus federal register notices for marine scientists to comment on a variety of public policy issues.

For information contact Amy Mathews-Amos, MCBI, 205 N. Edgewood St.., Arlington, VA 22201; (703) 276-1434; email: amymcbi@erols.com

Unique Summer Opportunity in Marine Conservation Biology

The Duke University Marine Laboratory is offering an unparalled summer educational opportunity from July 21 through August 22, 1997. Marine conservation biology teaches the principles of conservation and preservation of the coastal environment with a focus on problem solving as well as the application of science in shaping environmental managment decisions and policy.

Distinguished faculty from around the country will assemble for this concentrated five-week program. Among the guest faculty are: Baird Callicott, North Texas State University; Norman L. Christensen, Jr., Duke University; John Clarke, Mote Marine Laboratory; Paul Payton, Scripps Institute of Oceanography; Martin Hall, Inter-American Tropical Tuna Commission; Jane Lubchenco, Oregon State University; and others from the summer faculty at the Duke University Marine Laboratory.

In addition to the course in marine conservation biology and this distinguished group of visitors, those enrolled in summer term II have the opportunity to fulfill two college credits by adding one of the seven elective courses offered at that time. Two credits for the price of one!

For information contact Helen Nearing at (919) 504-7502 or email hnearing@mail.duke.edu. Website: http://www.env.duke.marinelab/marine.html

Pollution Prevention in Residential Areas: An Exciting New Program

The Rhode Island Home*A*Syst program, a *voluntary* residential pollution prevention program, is soliciting volunteers to work with residents in pilot neighborhood areas. A 7-week training program will train volunteers in residential pollution prevention techniques. Topics include: drinking water well protection, septic system operation and maintenance, proper management of household hazardous wastes, lawn and garden care, indoor air quality, and stormwater management.

Program trainers include professionals from the University of Rhode Island, Rhode Island Department of Health, Rhode Island Department of Environmental Management, and the USDA Natural Resources Conservation Service. Trained volunteers will help residents determine pollution problems and develop action plans to correct identified problems.

For more information contact Alyson McCann, University of Rhode Island Cooperative Extension, (401) 874-5398; email: alyson@edcserv.edc.uri.edu

Purple Loosestrife Survey

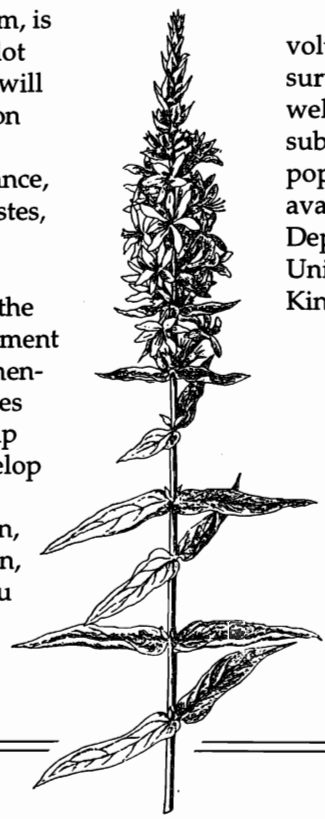
by Lisa Tewksbury

Purple Loosestrife (*Lythrum salicaria*) is an invasive wetland plant of Eurasian origin, in the family Lythraceae. It is a very distinctive plant with densely flowered terminal purple spikes. It is considered a noxious weed in many states because it adversely impacts vegetation and wildlife.

Purple Loosestrife has been a serious problem in the wetlands of the Roger Williams Park Zoo. Chuck Carberry, the horticulturist at the zoo, contacted URI professor Richard Casagrande about possible long-term control measures for the weed. Biological control is a recommended long-term strategy for weed control, and Cornell University has conducted the necessary research to receive permits to import insect natural enemies of Purple Loosestrife.

Three species of insects have been released at the zoo: two leaf feeders, *Galerucella calmariensis* and *Galerucella pusilla;* and one root feeder, *Hylobius transversovittatus*. These insects were chosen because they will feed only on loosestrife. We are closely monitoring the establishment of these insect populations to document their impact on Purple Loosestrife.

In 1995 we began to survey Rhode Island to photograph and document sites of Purple Loosestrife in the state. We intend to map the current distribution, updating it periodically to demonstrate either the increased invasion of Purple Loosestrife, or hopefully, a decline in the spread of the plant due to its natural enemies.



Rhode Island Watershed Watch volunteers are participating in the survey, and we welcome others as well. Participants are asked to submit a survey card for each population found. The cards are available from Lisa Tewksbury, Department of Plant Sciences, University of Rhode Island, Kingston, RI 02881; (401) 874-2750; email: lisat@uriacc.uri.edu

Purple Loosestrife Facts:

Height: up to 9 feet tall, average 2 to 6 feet
Flowering time: late June to September
Flowers: 6 purple petals in spikes up to 15" long
Leaves: opposite or 3 in a whorl, without teeth
Stems: 4-angled, semi-woody at the base

RINHS Institutional Members: Special News & Events

Narragansett Bay National Estuarine Research Reserve Announces the *GRAND OPENING* of Natural History Museum

Have you ever wondered about the inhabitants of that whale-shaped island smack dab in the middle of Narragansett Bay? Did you know that Prudence Island is part of a National Estuarine Research Reserve system? Did you know that, due to its isolation, Prudence was utilized for decades as an ammunition depot and was also part of a torpedo range? Did you know that Prudence has miles of unfragmented wildlife habitat?

If you'd like to learn more about the many faces of Prudence, please visit the Narragansett Bay National Estuarine Research Reserve on Saturday, August 9, 1997 at 1:00 p.m. for the grand opening of its *Habitat and History* exhibit. One purpose of the exhibit is to acquaint visitors with the island's natural resources so that subsequent trail hikes might be a bit more educational. The historical aspect shows the changes in the land from its glacial formation to its deforestation, and current recovery. Other displays include illustrations of the Narragansett Bay ecosystem and a revolving exhibit of the research studies being done at the Reserve.

Mil Kinsella-Sullivan and members of the Audubon Society of Rhode Island (ASRI) designed the exhibits under a cooperative agreement between RIDEM and ASRI. The dioramas in progress will feature autumnal vegetation as seen in the saltmarsh, upland environment, and along the shore.

In January, Mil and the Audubon design team dismantled the Narragansett Bay Room at the Museum of Natural History in Providence, and transported the whole infrastructure (minus the mounted specimen collection) via ferry to the South End of Prudence Island. Many of those panels will be given new life in the Prudence exhibit, with mounted specimens of mink, kestrel, kingfisher, common yellowthroat, red-tailed hawk, and other regular visitors to Prudence Island that will be incorporated into the appropriate habitats in the exhibit.

The Research Reserve has also been fortunate to receive mounted specimens of a deer, merganser, and herring gull. More specimens will be mounted as money allows, and then added to the appropriate habitats, so the exhibits may well be perpetual works-in-progress. Contact Mil Kinsella-Sullivan at the Reserve if you would like to make a donation to the permanent collection; (401) 683-6780 (work) or (401) 683-4549 (home).

Bring the children out to Prudence and fish around the dry tank, or try to match the Island's invertebrates with corresponding clue cards. Or try taking the wooden quahog puzzle apart and putting the adductor and mantle back in the right places. There will be a miniature tripod osprey platform in the exhibit area, for all of you who have wondered about the construction of those inaccessible platforms you may have seen from the highway. And once you've acquainted yourselves with our exhibit, you can head outdoors, and travel down to the bayberry and sweetfern-scented roadways along the west shore, or roll on down to the t-wharf and gaze at the Bay and imagine what it was like when the glacier towered well above the Newport Bridges, before the "hills," now known as Prudence, Patience, and Hope, became islands.

For more information, contact (401) 683-6780

The Narragansett Bay National Estuarine Research Reserve is in the process of awarding two Research Graduate Fellowships (see announcement in the November 1996 *RINHewS*). The successful applicants were:

- John Bruno, Brown University, Department of Ecology and Evolutionary Biology, *The Ecology of New England Cobble Beach Communities* and
- Deborah DiQuinzio, University of Rhode Island Department of Natural Resources Science, *Avian Community Dynamics in the Salt Marshes of the NBNERR.*

The Rhode Island Wild Plant Society is offering a 5-day, hands-on *Wild Plant Identification Course* on June 6, 8, 13, & 14 and August 26, 9 a.m. to 4 p.m. daily. The first 4 days will focus on inland terrestrial and wetland species; the August day on plants of coastal habitats. Naturalist Lisa Gould will be the instructor; for more information contact the RIWPS office at (401) 949-0195.

The Rose Island Lighthouse Foundation announces that April 1 to July 15 is the island's bird-nesting season. Access is limited during this time, when no boats are to be beached and there's no walking around the island on the beaches. It's a perfect time to stay overnight at the lighthouse or for school groups to visit and learn about the birds. Harbor seals stay around until early May.

Public tours of the Lighthouse begin on July 16 and are offered daily through Labor Day. Fare: $10/person, round trip, plus $2/person landing fee at Rose Island for non-members. For information call (401) 847-4242.

Save the Bay is hosting a series of slide presentations on Narragansett Bay's coastal habitats by Prentice Stout, naturalist and photographer. They will be held on April 3 (Jamestown Library), April 8 (Warwick Public Library), and April 10 (Barrington Library). For information call Wenley Ferguson at (401) 272-3540; email savebay@savethebay.org

Upcoming Conferences & Seminars

April 8 ***Spiders at the Shoreline,*** **an RINHS lecture by Douglass Morse of Brown University. Come hear about the fascinating ecology of intertidal spiders. 7:30 p.m., Roger Williams Park Museum of Natural History, Providence, RI. Contact (401) 874-5800.**

April 18-19 *2nd Northeast Conference on Nonindigenous Aquatic Species*, Burlington, VT. Contact Nancy Balcom at (860) 405-9107.

April 19 *Earth Day Cleanup* sponsored by Narragansett Chapter of the Appalachian Mountain Club and URI W. Alton Jones Campus. Contact Joe Metzen at (401) 885-4262.

April 19 *Earth Day: Fourth Annual Saugatucket Clean-Up*, sponsored by the Saugatucket River Heritage Corridor Coalition, Wakefield, RI. Volunteers needed both on foot and with canoes or kayaks. Contact Dorothy Devine at (401) 789-7033 for details and news of other SRHCC events.

April 21 *Rhode Island's Breeding Marine Birds*, a lecture by Richard Ferren of Berkshire Community College. 7:00 pm, Vanderbilt Auditorium, Doubletree Hotel, Newport, RI. Sponsored by the Rose Island Lighthouse Foundation. Call for reservations, (401) 847-4242.

April 26 *Restoring Grasslands to Ninigret National Wildlife Refuge*, a lecture by Ron Flores, USFWS Wildlife Biologist. 1-3 pm, Cross Mills Public Library, Charlestown, RI. Sponsored by the R.I. Wild Plant Society, (401) 949-0195. Call RIWPS for a full listing of Spring-Summer events.

April 29 *Aquaculture Conference*, Soil and Water Conservation Society, Southern New England Chapter. Taunton, MA. Get an overview of the trends and concerns about this fast-growing enterprise. A general session will look at the regulatory, legislative and economic aspects, along with sustainable development and global perspectives on environmental impact. Afternoon breakout sessions will address mariculture issues, resource conflicts, inland aquaculture and success stories. Contact Jackie Pashnik at (401) 822-8829.

May 1,10,14, 17 *Wild Flower Walks at the Alton Jones Nature Preserve*, W. Greenwich, RI. Some walks include lunch. For information & registration, contact (401) 397-3361 x 6056.

May 2-3 *Trail Maintenance Workshop*, URI W. Alton Jones Campus, W. Greenwich. Sponsored by Narragansett Chapter of the Appalachian Mountain Club. Contact Joe Metzen at (401) 885-4262 for this and other AMC events.

May 15 *Hurricane--The Greatest Storm on Earth*, a lecture by David Vallee, National Weather Service, NOAA. 7:00 pm, Vanderbilt Auditorium, Doubletree Hotel, Newport, RI. Sponsored by the Rose Island Lighthouse Foundation. Call for reservations, (401) 847-4242.

May 16 *GIS 97*, Rhode Island's largest conference on use of GIS technology in resource management, business and planning. Come hear of the newest sources of data, newest software, latest applications of GIS, and hottest hardware. Contact Lynn Carlson at (401) 277-3961; website www.edc.uri.edu/gis97

June 6-9 *Society for Conservation Biology Annual Meeting*, Victoria, British Columbia, Canada. Theme: Marine Conservation Biology. Contact Pat McGuire, (250) 721-8746; email SCB97@uvcs.uvic.ca

June 28 *Family Beachcombing*, an educational experience for children of all ages (children must be accompanied by adults). $10/child; accompanying adults free. Preregistration required. Also offered July 19 & August 2 and 16. Narragansett Bay Classroom, Office of Marine Programs.

July 8-11 *Society for the Preservation of Natural History Collections, 12th Annual Meeting*, U. of Wisconsin, Madison, WI. Contact Julia Golden, Univ. of Iowa, Dept. of Geology, Iowa City, IA 52242.

July 12-13 *Quality Management, Quality Collections Care*, A Management Training Workshop. U. of Wisconsin, Madison, WI. Contact Julia Golden, Univ. of Iowa, Dept. of Geology, Iowa City, IA 52242.

July 17 *Field trip to the Woonasquatucket*, Soil and Water Conservation Society, Southern New England Chapter. Providence, RI. Join our members in a tour of the Woonasquatucket under the guidance of Jane Sherman of the Woonasquatucket Greenway Project. Contact Kris Stuart at (401) 295-1311.

July 22-25 *Oceanography Explorer Day Camp*, Mon-Thursday, 9am-3pm, daily field trips to coastal areas, laboratory activities, and a day aboard a research vessel for students entering grades 4-5. Also offered July 29-31, August 5-8 and 12-15. Narragansett Bay Classroom, Office of Marine Programs, URI Narragansett Bay Campus, (401) 874-6211.

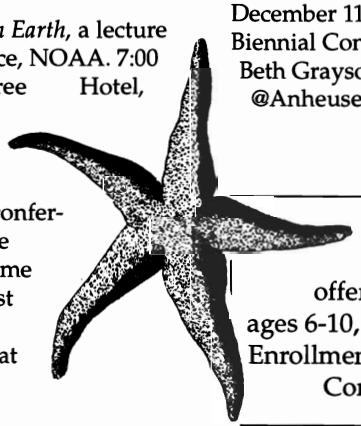
August 27-30 *Bridging Natural and Social Landscapes*, 24th Annual Natural Areas Association Conference and Exotic Pest Plant Council Conference, Portland, OR. Contact Reed Noss at (541) 752-7639; nossr@ucs.orst.edu

September 23 ***RINHS Annual Meeting.***

September 26-28 *Partnerships, Perceptions, and Professionalism*, New England Environmental Education Alliance, Colebrook, CT. Contact Annie Guion at (860) 774-9600 or Richard Haley at (860) 455-9534.

October 12-16 *The State of Our Estuaries*, 14th Biennial Estuarine Research Federation International Conference. RI Convention Center, Providence, RI. Phone: (410) 586-0997; http://cbl.cees.edu/erf

December 11-14 *Zoos Committing to Conservation*, 2nd Biennial Conference, Busch Gardens, Tampa, FL. Contact Beth Grayson at (813) 987-5548; email: Beth.Grayson @Anheuser-busch.com



The Frosty Drew Nature Center

Ninigret Park, Charlestown, RI offers environmental exploration for children ages 6-10, and runs for 6 weeks in July and August. Enrollment is by the week, with 12 children/week. Contact Jane Whyte at (401) 364-9508.

Opportunities for Volunteers & Students

Advisory Council on Trees for South Kingstown, P.O. Box 195, Peace Dale, RI 02883 is looking for volunteers to help locate and count public trees in S. Kingstown. This should be a fun and important community event; no previous knowledge or experience is needed. Contact Carole Costanza at (401) 789-1335.

Audubon Society of Rhode Island, 12 Sanderson Road, Smithfield RI 02917, welcomes volunteers to help with property surveys and inventories, checking property bounds, doing trail maintenance, and serving as trail wardens. Contact Properties Manager Dave Rodrigues at (401) 949-5454.

Earthwatch, 680 Mt. Auburn Street, Watertown, MA 02272; (800) 776-0188 offers volunteers the opportunity to join environmental scientists in the field and assist with data collection and other research. College credit and funding opportunities available. Email: info@earthwatch.org

Frosty Drew Nature Center, P. O. Box 160, Charlestown, RI 02813. Volunteers are needed to help with program coordination and organization; graphics and displays; nature education and walk leading; gardening; caring for aquaria; equipment repair and maintenance; and related activities. Contact Jane Whyte at (401) 364-9508.

Lloyd Center for Environmental Studies, P. O. Box 87037, S. Dartmouth, MA 02748; (508) 990-0505. Spring and summer internships: must have completed sophomore year of college. Position available with housing & stipend of $100/week. Send cover letter, resume, & 2 letters of reference.
(1) 4 Education Interns to work with school children, youth groups, and adults in programs teaching about the coastal zone.
(2) 1 Research Intern for field survey of Lepidoptera in pine barrens and coastal bogs.
(3) 1 Administrative Intern to assist in membership development and publicity.

Massachusetts Audubon Society, South Great Road, Lincoln, MA 01773; (617) 834-9661. The Coastal Waterbird Program needs 6 Piping Plover/Tern Monitors for the 1997 breeding season, and 2 Coastal Waterbird Monitors/Naturalists during the summer. Weekly stipend of $225; housing may be available. Also needed are volunteer Coastal Waterbird Interns (12) and Coastal Plain Pond Interns (3), for a minimum of 32 hours per week during the internship period.

For all positions, send cover letter and resume to Scott Hecker, MA Audubon Society, Lincoln, MA 01773 ASAP.

The Nature Conservancy, Rhode Island Field Office, 45 S. Angell Street, Providence, RI 02906 is looking for volunteers to monitor Piping Plover and Least Tern sites in Rhode Island. Unique opportunity to help endangered species! Contact Ginger Carpenter at (401) 331-7110.

The Newport Aquarium, 18 Market Square, Newport, RI 02840 needs enthusiastic and responsible summer interns to teach visitors about marine animals, assist with school groups, help care for marine animals, and conduct beach tours. Students with a background or interest in natural sciences, marine studies, or education are encouraged to apply. Contact George Klein, (401) 849-1340.

Operation Crossroads, 475 Riverside Dr., Suite 1366, New York, NY 10027; (212) 870-2106 seeks project directors, group leaders, interns and volunteers to help with multidisciplinary projects, research, work camps and field study in Africa and Brazil. Academic credit available. Email: oca@igc.apc.org

Rhode Island's National Wildlife Refuges: Ninigret, Trustom Pond, Pettaquamscutt Cove, Sachuest Point, and Block Island Refuges need your help counting wildlife, banding birds, constructing nesting boxes, maintaining trails, leading nature walks, and assisting refuge visitors. The program offers you several areas of opportunity; these include biological, visitor interpretation, education and orientation, maintenance, and miscellaneous skills. For more information contact Pamela Hess at (401) 364-9124.

Roger Williams Park Museum of Natural History, Elmwood Avenue, Providence, RI 02905 has a number of collection-related projects for (unpaid) student internships; projects include curatorial upgrading, nomenclatural updating, inventory and conservation of the museum's 10,000 specimen herbarium.

Opportunities to work with other natural and physical science collections exist as well. Independent research that earns college or graduate credit toward degree completion is encouraged and welcomed. Contact Marilyn Massaro, Curator, at (401) 785-9457 ext. 248.

Roger Williams Park Zoo in Providence, RI has an intern program designed for people considering a career in the zoo world. It provides initial zoo experience and exposure to different zoo careers. Interns spend a minimum of 4 days/week for 10 weeks in the program. Admission to the program is based on an application and interview.

Docents (must be at least 16 years old) are asked to dedicate at least 72 hours/year to the Zoo. Docents also run and help out with special Zoo events, and make trips to other areas of interest.

For information about the above opportunities

Opportunities, *continued from page 9*

as well as the exciting Fleet Jurassic Journey Dino Guides for the dinotrail this summer, ZooGardeners, Meeters & Greeters, and Party Animals (special events), contact Pamel Fearn, Director of Volunteer Services, Roger Williams Park Zoo, Elmwood Ave., Providence, RI 02905; (401) 785-3510 ext. 356.

Rose Island Lighthouse Foundation, P. O. Box 1419, Newport, RI 02840 has part-time paid positions to guide at the lighthouse in the summer, 20-40 hours/ week. Training begins July 7, then the job runs July 16-Labor Day. Interest in education, lighthouses, history, birds, native plants and/or marine biology is helpful. Enthusiasm and reliability are required. For information contact: Charlotte Johnson, Executive Director, at (401) 847-4242.

Save the Bay, 434 Smith Street, Providence, RI 02908 has both paid and unpaid summer internships for their environmental education program and habitat restoration and monitoring program. Contact Kathryne King, Volunteer and Intern Coordinator, at (401) 272-3540.

URI Learning Landscape, C.E. Education Center, URI, Kingston, RI 02881 is looking for volunteer educators for Fall 1997, to help teach elementary school children in a hands-on environmental education program focused on the soils, water, plants and wildlife of Rhode Island. The program runs Tuesday, Wednesday, and Thursday mornings September-November, with training in September. Contact June Kinigstein at (401) 874-5706.

URI Narragansett Bay Campus, Coastal Institute, Narragansett, RI 02882 seeks volunteers and student interns to assist with a variety of marine and environmental education activities. Contact Chuck Morris, Education Volunteer Coordinator, at (401) 874-6211.

Rhode Island Resource Project Results Available on the World Wide Web

The EPA-sponsored Resource Protection Project was developed to identify critical regions of Rhode Island that contain significant natural resources such as groundwater, biodiversity, critical habitats, etc. The project produced a series of maps and many new GIS data layers all of which are accessible from a web page developed to explain the project and its results. The page is maintained by URI Cooperative Extension and is located at: www.edc.uri.edu/rirpp

Be sure to view the incredible maps showing the distribution of resources and habitats in the state. They are stored as JPEG files and can be viewed with your web browser or downloaded to your PC.

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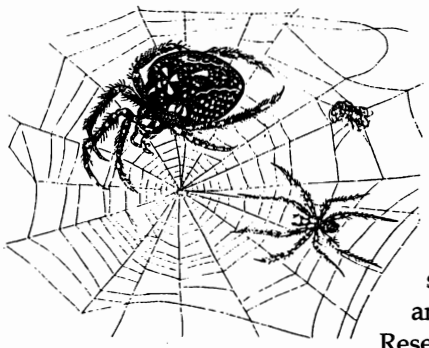
Annual Membership Fees:
$25 Individual
$40 Family
$10 Student/Ltd Income
$100 Institution

Weaving the Web: Electronic Resources



Amphibian and Reptile Conservation, a new international journal devoted to the worldwide preservation and management of amphibian and reptile diversity, has a newly enhanced website: http://www.byu.edu~arcon/

***Arboriculture* websites:** International Society of Arboriculture http://www.ag.uiuc.edu/~isa/ National Arborist Association: http://newww.com/org/naa

Committee for the National Institute for the Environment, has broad support from the scientific, environmental, state & local government, and business communities. Its mission is to improve the scientific basis for making decisions on environmental issues through institutional reform of the federal government and creation of a nonregulatory science agency known as the National Institute for the Environment. Website: http://www.cnie.org

CNIE also has an on-line library, the National Library for the Environment, named one of the 15 "outstanding" environmental sites by WebCrawler. Visit it at: www.cnie.org/nle

Connecticut Tiger Beetles website (in development): http://viceroy.eeb.uconn.edu/CTB/home.html

Earthwave has a website listing public television documentaries available on video about ancestral fishes, and one on the zebra mussel invasion. Website: http://www.earthwave.org

Interagency Taxonomic Information System (ITIS) website: www.itis.usda.gov/itis

Metapopulation biology website, with links to landscape ecology and related topics: http://www.uio.no/~hjermann/metapop/links.html

ENVIRO-NEWS is a private, unmoderated distribution list to provide news and announcements related to environmental issues. It is intended for scientists, information specialists, administrators, librarians, and other professionals of the USDA's Research Service and National Agricultural Library, and other interested persons. For information email: jmakuch@nal.usda.gov

Rhode Island Natural History Survey website: www.edc.uri.edu/rreapage/nathist

Roger Williams Park Museum of Natural History website: http://ids.net/'cormack_pl/museum.html

Riverine Wetlands: Succession and Restoration research group website: http://limnologie.univ-lyon1.fr

Save the Bay website: http://www.savethebay.org

"The Shrew(ist's) Site" is a new website for researchers of Soricidae (Insectivora, Mammalia), with information on shrews, shrew bibliography, an inquiry forum, links, photos, etc. Website: http://members.vienna.at/shrew

The Society for Ecological Restoration offers a series of workshops for professionals involved in ecological restoration or related activities such as habitat or vegetation management, species reintroductions or control of pest species. Email: ser@macc.wisc.edu; http://nabalu.flas.ufl.edu/ser/SERhome.html

U. S. Environmental Protection Agency has a homepage designed to promote "Community-Based Environmental Protection. Website: http://www.epa.gov/ecosystems

√ Please include me as a member of the
Rhode Island Natural History Survey, Inc.

Annual dues (check one) *(see over for membership benefits)*:
____ Individual ($25) ____ Family ($40) ____ Student/Limited Income ($10)
____ Institutional ($100) ____ Corporate ($500)

Name _____ Telephone _____
Affiliation _____ Fax _____
Address _____ E-mail _____
_____

Make checks payable to: ***RINHS*** & send to:
RINHS, C. E. Education Center, E. Alumni Avenue, URI, Kingston, RI 02881-0804
RINHS is a nonprofit 501(c)(3) organization. Dues in excess of $6 (for annual subscription to the newsletter) and contributions are tax deductible to the full extent allowed by law.

Benefits of membership in the Rhode Island Natural History Survey

For Individual, Family, and Student Members

RINewHS, the newsletter
Free membership list
10% discount on all publications
20% discount on annual conference fee

For Institutional Members

RINewHS, the newsletter
2 free membership lists
Listing in Program for Annual Conference
10% discount on all publications
1 free registration at annual conference

Thanks!

The Rhode Island Natural History Survey is grateful for the continued support of the Cooperative Extension Program in Conservation and Management of Natural Resources, and the C.E. Education Center at the University of Rhode Island. Thanks also go to the Sharpe Family Foundation for its support.

We are also grateful to Bill Alexander of North Kingstown, for his work conducting an audit and offering bookkeeping advice.

Nature first, then theory. Or better, Nature and theory closely intertwined while you throw all your intellectual capital at the subject. Love the organisms for themselves first, then strain for general explanations, and, with good fortune, discoveries will follow. If they don't, the love and the pleasure will have been enough. --E. O. Wilson, *Naturalist*

Rhode Island Natural History Survey Distinguished Naturalist Award

The Distinguished Naturalist Award is presented at the annual Rhode Island Natural History Survey conference and recognizes an individual who has made outstanding contributions to advancing knowledge of Rhode Island's fauna, flora, geology, and ecosystems. In particular, we want to identify those who have excelled in one or more of the following areas:

- *made significant contributions in the advancement of scientific knowledge of Rhode Island's fauna, flora, geology, and ecosystems as evidenced by published books, scientific papers, and monographs;*
- *is recognized as an outstanding teacher and educator to students and the public on the form, functions, and ecological significance of Rhode Island's biota and natural systems;*
- *made significant contributions in enhancing public awareness of the importance of understanding the natural history of Rhode Island's ecosystems.*

Nominations are now open for the 1997 recipient of the RINHS Distinguished Naturalist Award. Please prepare a letter of nomination describing how your candidate has excelled in one or more of the above categories, and send your nomination to the RINHS office by 1 November 1997. The RINHS Board of Directors will review nominations and announce the name of the recipient at the January 1998 RINHS conference.

Previous recipients of the RINHS Distinguished Naturalist Award are Irene H. Stuckey and Richard L. Champlin.

RINHS Annual Meeting

The Rhode Island Natural History Survey Annual Meeting will be held on Tuesday, September 23, 1997. A speaker and the location will be announced soon.

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