Captain's Corner

Spring is finally here and it is such a busy time of year. It seems everything and everyone is taking advantage of the longer, warmer days. I hope all of you are busy doing things that are both productive and fun.

SCMEA's officers, Board members and committees have been active in several areas during the past few months and I'd like to bring you up to date. Phil Astwood and Stan Ratchelson developed a budget for SCMEA for the calendar year of 1992 and it was approved by the Board. Phil and Stan used expenditures and income over the past four years to develop this budget. This was the first time we have really examined how SCMEA makes and spends its money. The budget will be very helpful for planning SCMEA's future projects. Stan and Phil were very thorough in sorting out our financial situation. This budget will be the basis for future budgets. Financially, SCMEA is in good shape and, at this time, our income and expenses basically offset one another.

The Publications and Promotions Committee (Wendy Allen, Chair) has ambitiously taken on three projects. Letterhead stationary is being designed and printed so SCMEA business can be conducted using our own stationary. A SCMEA brochure and a traveling exhibit are also being designed and developed. These will allow us to promote SCMEA at state and regional conferences that potential members might be attending. Neither of these projects are any small task but, hopefully, they will be debuted at the 1992 SCMEA Conference in October.

Speaking of the conference, the 1992 SCMEA Conference will be held October 9-11, 1992 at the Penn Center on St. Helena Island, just east of Beaufort, South Carolina. Phil Astwood, Conference Committee Chair, is working hard to put together another fun, educational and enriching weekend for all of us. So, mark your calendars!

For those of us who can't get our fill of marine educational experiences, The National Marine Educators Association's Annual Conference - "Seines to Satellites: Taming Technology," is scheduled for August 3-8, 1992 in Portland and Newport, Oregon. From the information that I have seen and heard, this conference promises to be another quality opportunity for marine educators from around the world to meet and learn about marine education in a wonderful setting with a great bunch of people. The call for papers is out and more conference information is included elsewhere in this newsletter. Let's all head west for a great week this summer.

SCMEA wants your input. Contact a Board member with ideas for new projects that you think would help you in your educational efforts. Board members are listed on page 2 of the newsletter.

The deadlines for SCMEA's Marine Education Grant and Scholarship Programs are fast approaching (see page 2.) Apply! It's easier than you think!

I encourage all of you to have a great Spring. Get out and visit the marsh or beach. Take your students with you. Participate in Earth Day. It is a great time of year to "Think Globally, Act Locally!"

Beth Day
SCMEA President
SCMEA's '92 Conference Planned for Penn Center!
Another great marine education conference is scheduled for October 9-11, 1992 at the historic Penn Center on St. Helena Island near Beaufort, SC. The Penn Center was founded as Penn School in 1862 and provided the first formal education to former slaves. It is an important cultural resource center today, dedicated to preserving Sea Island history, culture and the environment. Most conference activities, including the presentations, housing and meals, will take place at the Center which will provide an intimate, culturally rich setting for the conference. Phil Astwood is serving as the conference chair and has included a "Call for Presentations and Exhibits" with this newsletter. Think about what you would like to share with others at the conference and return the enclosed form ASAP! Also, don't forget to mark the dates of the conference on your 1992 calendar today! SCMEA conferences just keep getting better and better, thanks to the increased participation of our members and the '92 conference promises to the best yet!

***SCMEA Tee Shirt Design Contest***
A contest for a new design for SCMEA tees and sweatshirts is underway. How would you like to see your design on these shirts? To enter the contest, send a finished, black and white design to the contest chair, Sarah Wilson, Bellefield Nature Center, Rt. 5, Box 1003, Georgetown, SC 29440, by June 15. The winning design will be selected by a committee of SCMEA members and will appear on shirts for the Fall Conference. The winner will be recognized during the Annual Meeting at the Conference and will have the great satisfaction of seeing hundreds of people wearing his or her design!

$$ Still Available - Apply Today! $$
Marine Education Grant Program:
The Marine Education Grant Program provides support for projects that will further marine education in South Carolina. Two grants of $250 each will be awarded to active SCMEA members during the 1992-1993 school year and can be used to purchase any special materials, equipment and resources, or to defray costs of a marine field study for a group of students. The project possibilities are limitless. Last year's grant recipients were awarded funds to develop a school aquarium and to continue a dune restoration project. Grant recipients will be required to submit a summary article about their project for publication in the SCMEA newsletter. To apply: Contact the Scholarship Committee Chair, Rhet Wilson, address below, to obtain an application. Completed applications must be received by June 15, 1992 to be considered for the 92-93 school year. Grant recipients will be notified by August 15, 1992.

Marine Education Scholarship Program:
The National Marine Educators Association's Annual Conference is one of the best opportunities in the country to keep current on marine education developments. You can apply for a scholarship to offset conference expenses. The Marine Education Scholarship Program has been established to encourage and enable SCMEA members to attend NMEA conferences for the purpose of furthering their interests and knowledge of marine education. During 1992, one scholarship in the amount of $500 will be awarded based on demonstrated interest and is to be applied to the NMEA conference being held August 2-8 in Portland, Oregon. All current SCMEA members are eligible to apply. The scholarship funds will be given to the award recipient after he or she submits a copy of the registration receipt for the NMEA conference and a brief summary article for inclusion in the SCMEA newsletter. To apply: Contact the Scholarship Committee Chair, Rhet Wilson, address below, to obtain an application. Applications must be completed and returned by May 1. Notification of the scholarship winner will be made by June 1, 1992.
Program Feature:
The Bellefield Nature Center

The Bellefield Nature Center is located at the entrance to Hobcaw Barony, a 17,500 acre wildlife refuge in Georgetown County encompassing pristine salt marsh, beach, swamp and upland forest habitats. The Center and Hobcaw Barony are owned and operated by the Belle W. Baruch Foundation, a non-profit organization dedicated to promoting teaching and research in forestry, wildlife biology and marine science. Through a cooperative agreement, Clemson University and the University of South Carolina help the Baruch Center carry out its goals. The Belle W. Baruch Forest Science Institute of Clemson University is engaged in studies of the forests and wildlife on Hobcaw. The Belle W. Baruch Institute for Marine Biology and Coastal Research of the University of South Carolina has established one of the world's foremost research programs on estuaries.

Both natural and local history combine to make Hobcaw Barony a truly unique study experience for both scientists and the general public. The Bellefield Nature Center serves as the Baruch Foundation's "window to the world," showcasing the research activities of the two institutes and informing people about the ecology and history of the surrounding coastal environment. Visitors to the Nature Center view interpretive exhibits on the research programs and local environment, including a salt water touch tank and several small aquaria and terraria stocked with live animals from local woods and waters. A variety of programs for students, teachers, and the public are also offered through the Center including, coastal field studies, outreach programs, guided nature walks, and interpretive tours of the wildlife refuge. Over 35,000 people were served by the Baruch Foundation's education program last year, including more than 2,800 students who participated in the Center's field study program.

Field studies are offered throughout the school year, with the exception of outreach program months of January and February when live critters are brought into local classrooms. The Nature Center uses a write-in registration process whereby names are drawn at random on a specified date, usually in early September, and programs are scheduled. The Center's calendar is booked for the entire school year during this process and many more requests for programs are received than can be scheduled. A waiting list of those who do not win on the luck-of-the-draw is kept in the event of cancellations. Participating teachers are sent packets of information that include pre and post-visit activities as well as guidelines for preparing the students for each program. A teacher's guide to the Field Study Program is available upon request. The different programs offered are described below. The Center staff is flexible and can work with teachers to customize these programs and develop others.

Exploring the Nature Center is a hands on presentation where the different habitats of Hobcaw come to life as the instructor discusses various displays in the museum.

Salt Marsh Ecology is introduced through a slide show where students learn and discuss the different components of the marsh. The group then travels to the salt marsh where they "get their feet wet," experiencing the wetland habitat. Students identify different plant and animal communities by hands-on observation. Seines, dip nets, and cast nets are used to sample the marsh creek.

Coastal Forest and Swamp Ecology is an exploration of interrelationships between water, soil, plants, and animals. Primary students visit a pine and hardwood forest. Upper elementary and secondary students have the opportunity to compare and contrast an upland forest and a cypress swamp ecosystem.

Exploring a Pond Community takes students to a freshwater pond where they use observation skills and dip nets to discover the world above and below the water. Once specimens are collected, they are brought back to the nature lab for closer observation under microscopes.

Plantation Heritage carries students back in time to a 19th century slave village. Directed activity promotes comparison of past and present cultures. Artifacts are uncovered and collected to provide clues into the lives of people in history.

The Bellefield Nature Center is open year round from 10am to 5pm on weekdays, and from 1pm to 5pm on Saturdays. Teachers wishing to be placed on a mailing list to receive a guide to the 1992-1993 Field Study Program should write or call the Center. Brochures describing other public programs can also be obtained by contacting the Center, address listed below.

Bellefield Nature Center
Rt. 5, Box 1003
Georgetown, SC 29440
(803) 546-4623
Spineless Wonders: The World of Plankton - Part I

by Fred James

Plants and animals which are weak swimmers and depend primarily upon currents, winds and tides to move them about are called plankton. While these organisms are typically microscopic, some plankton, such as the giant jellyfish, *Cyanea arctica*, weighing half a ton and measuring 9 feet across, are very large. The ocean sunfish, *Mola mola*, sometimes seen along the Atlantic coast, is such a weak swimmer that it has been classified as plankton even though some individuals weigh up to 2,000 lbs. Wow! I bet that would be something to catch in a plankton net!

Plankton can be subdivided into two major groups: phytoplankton which is the plant plankton and the zooplankton or animal plankton. The question could be asked "Why should we study plankton?" Phytoplankton is the "grass of the sea." All living organisms in the ocean are dependent either directly or indirectly upon phytoplankton as a source of food. There is more organic matter tied up in plankton than all of the rest of the living world. A more surprising fact is that phytoplankton account for 85% of the photosynthesis that occurs in the world!

Since phytoplankton carry on photosynthesis, they need to be near the ocean surface. Most animal plankton feed on phytoplankton and thus, they also need to be near the surface. In order to keep from sinking in the open ocean, these planktonic organisms have evolved many ways to stay afloat. Some plankton such as dinoflagellates, brittlestar larvae, and echinoderm larvae have small spines and various projections which increase their surface area and slow their rate of sinking. Organisms such as copepods and diatoms produce oil in their cells. Since oil is lighter than water it causes these planktonic forms to float! Some marine plankton, such as the Portuguese-Man-of-War, produce air floats to keep them from sinking.

This edition of "Spineless Wonders" focuses on the phytoplankton. Zooplankton will be featured in the next issue. Phytoplankton is composed typically of one-celled plants* that include the diatoms and dinoflagellates. These organisms are producers and form the base of the marine food chain. They take in inorganic nutrients (i.e. carbon dioxide, water) from the environment and, by the process of photosynthesis, make food and release oxygen. Since 85% of the photosynthesis in the world occurs in the ocean, it is not surprising that over three-fourths of the organic food is produced in the ocean!

Diatoms are beautiful algae that live in glass houses. Their house is like a box composed of two shells. One half serves as a lid and the other half forms the bottom of the box. Since the cell wall of these algae can be divided into two parts, the Greeks coined the word diatom from the Greek word for "to cut in two." Diatoms have very fine etchings on their shells which are used to determine how much detail can be seen by a microscope. Deposits of marine diatoms have been lifted out of the sea and form grayish to white deposits of "glass shells" called diatomaceous earth (diatomite). The largest deposits at the surface of the earth are in Lompoc, California where the diatom beds are 700 feet thick! The thickest known ocean deposits are in the Santa Maria oilfield off California where subterranean deposits are 3,000 feet thick! Diatoms are used in many filtration processes including filtration systems in swimming pools and in the clarification of antibiotics, sugar, beer, fruit juices, wines, and oils. Diatoms are also used to reinforce rubber, toughen plastics, and increase the workability of cement. The gritty feeling in silver polish is caused by diatom shells and people used to brush their teeth with a powder which contained diatoms as an abrasive. Diatoms were also once used as an absorbent agent for nitroglycerine in the making of dynamite!

Dinoflagellates have been studied as both unicellular plants and animals since they can make their own food but propel themselves along with two whip-like flagella. This group ranks second to the diatoms in terms of food production in the ocean. They are also the major cause of bioluminescence in the sea. (See Summer 1991 issue of *Seascapes.*) Some species of dinoflagellates, *Gymnodinium* (East Coast) and *Gonyaulax* (West Coast), are responsible for "red tides." These dinoflagellates produce a toxin which can result in huge fish kills. Dinoflagellates are also responsible for paralytic shellfish poisoning that has killed several people who have eaten oysters and clams during such outbreaks. The poison was so deadly that the CIA had it in its arsenal of weapons for assassinations before these acts were outlawed by the U.S. Congress! Some dinoflagellates also serve as zooxanthellae which means that they live symbiotically (mutualistically) in the body of other organisms. They supply the major food requirements for corals in a coral reef and help in the production of calcium carbonate which makes up the exoskeleton of corals. Zooxanthellae are found in other coelenterates including the upside down mangrove jellyfish.

The fascinating world of plankton will be continued in the next issue...

*Newer classification schemes place many of these organisms in the Kingdom - Protista.*

Dr. Fred James is a professor of Biology at Presbyterian College, Clinton, SC 29325. Suggestions for future "Spineless Wonders" columns can be made by writing Fred at the address above or by calling him at (803) 833-8402.
Sex Education in Schools
(of Fish, of Course!)

by Paula Keener-Chavis

Fishes are by far the most numerous of all vertebrates, with an estimated 20,000 species known to mankind. They have adapted to a wide variety of habitats, occurring in both fresh and saltwater environments and ranging in distribution from shallow lagoons to the deep ocean and from freezing Arctic waters to the warmth of tropical seas. Because fishes have adapted to a wide diversity of habitats, it is not surprising that one of the most fascinating aspects of the life histories of these remarkably diverse animals is their mode of reproduction.

In many species of fishes, the sexes are separate, with an individual maturing as a male or a female and remaining as that sex throughout their entire life. However, in some species, both male and female sex organs (testes and ovaries) are present in the same individual and may actually produce eggs and sperm at the same time. This condition is referred to as simultaneous hermaphroditism and, although it is a common mode of reproduction in fishes, self-fertilization seldom occurs. Some simultaneous hermaphrodites may even spawn for a few moments as a female, displaying the behavior pattern and coloration unique to females, only several moments later to spawn as a male, also displaying the coloration and behavior patterns unique to males.

Many deep sea fishes have specialized light organs that flash on and off in species-specific patterns. These "flashing lights," in many cases, serve to locate mates in the dark abyss of the ocean. Nevertheless, to ensure that reproduction successfully occurs, some of the deep sea fishes are simultaneous hermaphrodites and self-fertilize, probably because of the difficulty involved in mate location in this environment.

Some fishes exhibit synchronous hermaphroditism, in which they spawn for several years as one sex, undergo sexual transition, actually "turning into" the opposite sex, and live the rest of their lives as the sex that they transformed into. Groupers are synchronous hermaphrodites and are referred to as protogynous (meaning "first female."). They mature first as a female, spawn for several years as a female, undergo transition, and turn into a male. Once a male, they always spawn as a male and never function as females again. In these fishes, the ovaries actually turn into testes.

Other fishes exhibit protandry (meaning "first male"), spawning first as males, undergoing sexual transition, and changing into females. Once they have turned into females, these fishes always spawn as females and never function as males again. In protandrous fishes, the testes actually become ovaries.

There are numerous scientific theories that describe the advantages of each mode of reproduction in fishes. Additionally, much research has been conducted to investigate at what age, at what size, under what conditions many fishes change sex and most interestingly, "how they know" when to change over to the opposite sex. Suffice it to say that the reason for each type of reproduction is assurance of continuation of a species and, with over 20,000 species known to mankind, whether female first, male first, always female, always male, or both at the same time, the fishes are doing an excellent job of it!
Resource News

Marine Education - A Bibliography of Educational Materials Available from the Nation's Sea Grant College Program - Materials from 30 different Sea Grant programs, including the SC Sea Grant Consortium, are represented in this valuable publication. Each resource is briefly described and costs and ordering information is provided. The nice thing about Sea Grant publications is that many are either free or available for a nominal, cost covering fee. Copies of the bibliography can be obtained for $2.00 from: Sea Grant Marine Education Bibliography, Gulf Coast Research Laboratory, J. L. Scott Marine Education Center and Aquarium, PO Box 7000, Ocean Springs, MS 39564-7000.

"Barrier Island Experience" - Spend three days on pristine Pritchard's Island near Beaufort, SC June 22-25 or July 20-23. You'll spend evenings participating in the protection of threatened Loggerhead Sea Turtles and days exploring the island with USC-Beaufort Coastal Zone Education Center environmental educators. Space is limited to 20 participants per session. The $150 fee includes boat transportation to the island, lodging, instructional materials and meals. A $75 non-refundable deposit is required. Please contact the Coastal Zone Education Center for further information and reservation procedures: (803) 837-4848.

NMEA Annual Conference - "Seines to Satellites: Taming Technologies" - Aug. 3-8, Portland and Newport, OR. An exciting variety of marine education workshops and fresh and saltwater field experiences are planned. NMEA members will receive details in their newsletters. Non-members may want to join now so you don't miss out on this unique opportunity to explore Oregon and network with marine educators from around the world. See NMEA membership form and conference add elsewhere in this newsletter.

Charleston Maritime Festival - "Family Fun and Education" is the theme for this first of a planned annual event, scheduled for Aug. 7,8, and 9, with special displays the week of August 3rd until the end of the festival. Tentative events include a block party, "taste of seafood," boating regatta, Civil War reenactment group, knot-tying and rope-pulling, displays of "buried treasure," and lectures. If you would like to participate in the planning of this event, call Bob Marthai in Charleston at 795-1180.

Teacher Training Workshop in Bermuda - August 11-24. This workshop will include field trips, laboratory exercises and curriculum development. Registration is $1,055/person and includes room and board. The deadline to apply is May 15. For an application, write: Dr. Susan Cook, Education Director, Bermuda Biological Station, 17 Bermuda Station La., Ferry Reach GE 01, Bermuda, (809) 297-1880.

Master's Program in Marine Science for Educators - Educators wishing to earn a masters degree emphasizing marine science may enroll in a program through Oregon State University. Designed to be completed in three to four consecutive summers, the program offers the opportunity to take classes at the Hatfield Marine Science Center. For more information, contact: Vicki Osis, Hatfield Marine Science Center, 2030 Marine Science Dr., OR 97365, (503) 867-0257.

For Children:
Summer Outdoor Camping Programs - Wilderness Southeast is sponsoring four different programs this summer for motivated students: "Coastal Experience" for 6th-8th graders, "Mountain Trek" for ages 14-17, "Mountain Adventure" for ages 12-13, and a "Tropical Adventure" in the Virgin Islands for ages 14-17. To receive a free copy of the camp brochure, contact: Wilderness Southeast, 711 Sandtown Rd., Savannah, GA 31410, (912) 897-5108.

Coastal Ecology Classes for Children - The Baruch Institute, USC and the Bellefield Nature Center are offering week-long half-day ecology classes for children, pre-school through grade 5, during the weeks of June 15 - July 24 this summer. Students will explore a variety of coastal environments and participate in a number of fun educational activities. For a brochure describing these classes and other summer offerings, contact: USC Baruch Marine Lab, PO Box 1630, Georgetown, SC 29442, (803) 546-6219.
Become a Member of the

South Carolina Marine Educators Association

and join a group of dedicated teachers, naturalists, scientists and others interested in studying and teaching about the world of water, both fresh and salt. The Association provides a communication network for members to share information and ideas through newsletters and an annual statewide conference. Membership dues are $5.00 a year and include three newsletters, a discount on the registration fee for the annual conference, and an opportunity to interact with some of the most dynamic educators in the state!

Date: ____________________

Name ___________________________________________ Occupation __________________________________________________________________________

Home Address ____________________________________________________________________________________________ Place of Employment ________________________________________________

Work Address __________________________________________________________________________________________ _ Work Phone Number ______________________________________________________________________________

Home Phone Number ______________________________________________________________________________________

Are you currently a member of the National Marine Educators Association (NMEA)? ______yes ______no

Please send completed form with the $5.00 membership fee (make checks payable to SCMEA) to:

Stan Rachelson, Secretary-Treasurer, SCMEA Center for Science Education, University of South Carolina, Columbia, SC 29208

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Join NMEA . . .

... and begin to network with educators around the country sharing a common love and concern for our water world. Membership benefits include a subscription to Current: The Journal of Marine Education; the newsletter, NMEA News; and registration discounts for some the best annual conferences you’ll ever attend!

Name: ____________________________________________________________________________________________

Occupation or Title: __________________________________________________________

Address: __________________________________________________________________________________________ (Street or PO Box) __________________________________________________________________________

(City) __________________________ (State) ____________ (Zip) ______________________________

Individual Memberships

___ Student - $15
___ Active, 1 year - $25
___ Active, 2 years - $48
___ Active, 3 years - $68
___ Associate - $40
___ Sustaining - $100 or more
___ Life - $300 or more
___ Patron - $500 or more

Institutional Memberships

___ Affiliate (includes libraries) - $35
___ Corporate - $250 or more

Are you currently a member of a regional chapter? ______yes ______no. If yes, which one? ______________________

Please make check payable to NMEA and mail to: National Marine Educators Association, PO Box 51215, Pacific Grove, CA 93950

SCMEA Spring '92
The Northwest Aquatic and Marine Educators are proud to host the Annual Conference of the National Marine Educators Association

**Seines to Satellites: Taming Technologies**

August 3-8, 1992 ➤
August 3-6 — Portland, Oregon
August 6-8 — Newport, Oregon

**Monday** — Registration; Welcome/Night on the Columbia River Sternwheeler.

**Tuesday** — Exciting marine/aquatic sessions; Sea Faire/Night in Portland.

**Wednesday** — NMEA awards; more exciting marine/aquatic sessions; seafood barbeque; fun and laughs at the infamous NMEA Auction with Mr. Fish!

**Thursday** — Sessions/field trips enroute to Newport; evening at new Oregon Coast Aquarium.

**Friday** — Sessions/field trips on coast relating to issues; Stegner lecture: Susan Strauss, Master Storyteller.

**Saturday** — Culminating session/field trips.

Don't miss the chance to learn and have a great time with a great bunch of folks from all over the world!!!

For registration materials, contact Bill Hastie, Oregon Department of Fish and Wildlife, Marine Science Drive, Building 3, Newport, OR 97366. (503) 867-4741.

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Are your dues current?

Check the one digit number above your zipcode on the label. It's not a 2 (standing for 1992) it's past time to renew! Send your renewal check of $5.00 to SCMEA Secretary-Treasurer, Stan Rachelson, Center for Science Education, USC, Columbia, SC 29208.