Captain's Corner

ALOHA! Our October Conference, "Tropical Connections", was a wonderful opportunity to dive in and immerse ourselves in a wide variety of new ideas and experiences in the marine environment. A pod of presenters shared seas of information with over 120 participants. The strong diverse programs and the social sharing made for a memorable weekend. Let's sustain that bloom of net-working throughout the year.

A large "THANK YOU!" goes out to Ken Alfieri and his Barrier Island Staff, especially Chef Steve, who worked from dawn to midnight to make sure that we had everything we needed. The food and the steel drum band at "The Luau" were AWESOME! If only our students had seen the limbo and the costume contest!!

Cindy Renkas did an outstanding job with the Auction, raising close to $2000 with a big surge from Al Segars who bought the five-day Barrier Island Experience donated by the USCB Coastal Zone Education Center. Thanks Al! Jeff Sandler (Mr. Fish) and Fred James (Mr. P.C.) were in their element as our able auctioneers. Fred even auctioned his own T-shirt right off his back!

Much appreciation goes to the conference committee members for all their ideas, time and hard work: Ken Alfieri, Paula Keener-Chavis, Bruce Lampright, Cindy Renkas, Leslie Sautter, Robin Sheek, Joy Levy-Smith, and Marie Vonner. I also want to thank all the participants for coming and contributing. Next year's conference planning is already underway with a wave of enthusiasm from our new President Elect, Leslie Sautter. You won't want to miss this one!

Welcome to our new Board members, John Galbary, Fred James, and Elizabeth King, who is also our new "SeaScripts" editor. It's going to be an exciting year for SCMEA with new and innovative ideas based on your suggestions from the conference evaluations.

Our next Board meeting will be held on March 31, 1995 at 11:30 am in Charleston. Please contact me or any Board member if you would like to attend or if you have ideas or suggestions you would like to share.

Until next time ......

Julie Cliff
SCMEA President
Announcements!

Everyone who is a member of SCMEA will be placed on the mailing list to receive the Eisenhower Spotlights. This is a very helpful publication. There is often information on the Hub Centers and scientific activities throughout the state. The next issue will have a form on the back for you to return and receive the FREE Math and Science Resource Directory for South Carolina Educators. The last edition was 85 pages and lists all the important National, Federal, and State agencies as well as math and science organizations in the state with addresses and phone numbers. This directory is made possible by an Eisenhower grant under the leadership of Dr. Michael H. Farmer of Greenville Technical College.

The SCMEA Board is planning to develop a pictorial directory of all members at the next October conference. The directory will include a black and white photo of each member along with his or her address, phone number(s), school or organization, and grade level(s) taught. A one line statement of any expertise may also be included. If you have any suggestions on the format for this directory, please write Dr. Fred James, Biology Department, Presbyterian College, Clinton, SC 29325. We are also looking for cover (8” x 11”) artwork for the directory. Fred promises a very unusual award for the person whose cover design is selected!

A Wonderful Winter Treat!

Donna Florio, a well-known South Carolina seafood connoisseur and author of a soon-to-be released cookbook, contributed the following recipe to SeaScripts:

**OYSTER PIE**

1 qt. shucked oysters
12 slices white bread
4 Tsp. butter, melted
1/2 cup heavy cream
1/4 tsp. black pepper
1/4 tsp. mace

Toast bread and grate or process into coarse crumbs (you should have about 3 cups). Pour melted butter over crumbs and toss to combine.

Drain oysters, reserving 1/2 cup juice.

Layer 1/3 of crumbs in a 1-1/2 qt. casserole dish. Cover with half the oysters. Repeat the layers and top with remaining crumbs. Combine oyster liquor, cream, pepper and mace in a bowl. Whisk until well blended. Pour evenly over oysters and crumbs. Place in an oven preheated to 350° and bake for 50 to 60 minutes or until casserole is bubble around the edges and golden brown on top. Serve immediately. Makes 6 servings.

Recipe distributed by: SC Wildlife and Marine Resources Department, PO Box 12559, Charleston, SC 29422-2559, (803)762-5017.
The COASTTeam Program
A Unique Course in Marine Science for Elementary Teachers

The COASTTeam Program is a unique year-long graduate level course in marine science, in which teams of two elementary teachers, or COASTTeams, are trained in marine science concepts and hands-on activities. Each COASTTeam represents a single elementary school committed to improving the integration of marine science into the science and non-science curricula.

The objectives of the program are to:
* increase confidence levels of teachers with respect to teaching marine science;
* bridge existing gaps between teachers and scientists;
* disseminate marine science education materials developed specifically for South Carolina teachers;
* create regional networks of schools that have participated in the COASTTeam Program to increase facility and resource sharing;
* assist and encourage each participating school to move toward permanent integration of marine science into the school’s curriculum.

The course begins in the summer, when COAST Teams are trained during a 2-week, 30-hour COAST Team Training Workshop (CTW). The CTW includes topical seminars complemented by hands-on activities, field trips, a trawling cruise, and presentations of original activities by COAST Teams. Curricular materials developed especially for South Carolina elementary teachers form the foundation of the course. The marine science activity book Sea Things ... Objectively, 2nd Edition, (edited by Paula Keener-Chavis, Cammie Camp and Leslie Sautter) is a compilation of more than 45 hands-on activities. The text book for the course, Of Sand and Sea: Teachings from the South Carolina Shoreline (by Paula Keener-Chavis and Leslie Sautter), was written to complement Sea Things.

Instruction during the CTW is unique in that four instructors also work together as a team. Two Master Teachers, teachers who have previously been enrolled in the COAST Team Program, lead the hands-on activity training, using their valuable experience in the classroom. Two course instructors, one each with a biological and geological marine science background, provide the content portion of the course.

Each participating school contributes $100 to the program for additional resource materials including supplemental texts, maps and guide books. Schools then establish their own marine science resource library for use primarily by teachers interested in integrating marine science into the curriculum.

Following the training workshop, COAST Teams reconvene to discuss progress and assess the implementation of their newly acquired skills and knowledge. These post-CTW sessions constitute the remaining 15 hours of the 45-hour 3-graduate credit course. Many of the COASTTeam teachers will also attend the South Carolina Marine Educators Association (SCMEA) annual conference in October.

With funding from the South Carolina Sea Grant Consortium, eight COASTTeam Program courses will be offered over the next two years in four school districts: Charleston County, Georgetown County, Horry County and Richland I. The lead instructors for courses in each district are:

<table>
<thead>
<tr>
<th>District</th>
<th>Instructor Name</th>
<th>Department</th>
<th>College/Educational Institution</th>
<th>Contact Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charleston County</td>
<td>Dr. Leslie Sautter</td>
<td>Department of Geology</td>
<td>College of Charleston</td>
<td>(803) 953-5586</td>
</tr>
<tr>
<td>Georgetown County</td>
<td>Ms. Wendy Allen</td>
<td>Baruch Marine Lab</td>
<td>University of South Carolina</td>
<td>(803) 546-6219</td>
</tr>
<tr>
<td>Horry County</td>
<td>Dr. Robert Young</td>
<td>Department of Marine Science</td>
<td>Coastal Carolina University</td>
<td>(803) 349-2277</td>
</tr>
<tr>
<td>Richland I</td>
<td>Dr. Phillip Astwood</td>
<td>Center for Science Education</td>
<td>University of South Carolina</td>
<td>(803) 777-6920</td>
</tr>
</tbody>
</table>

During this past summer (1994), courses were offered in both Charleston and Horry counties, when approximately 20 elementary schools took part in the kick-off of the COASTTeam Program. Those COAST Teams are now involved in developing and presenting in-services. At the completion of the 2-year grant term, 82 schools will house a COAST Team.

Plans are now under way for expansion of the COAST Team Program to other school districts for the summers of ‘96 and ‘97. If you are and your school are interested in learning more about the COAST Team Program, contact Dr. Leslie Sautter, Department of Geology, College of Charleston, Charleston, SC 29424 (803) 953-5586.

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**Funds Available for Educators**

Marine education and travel funding is available through SCMEA scholarships. Take advantage of a wonderful opportunity! Look for details in the Spring issue of the SCMEA newsletter or contact Rhett Wilson at the South Carolina Aquarium, 57 Hasell Street, Charleston, SC 29401, (803) 720-1990 for more information.
Marine Happenings:

Barrier Island
Environmental Education Program:
Environmental education classes on a barrier island for a 3 day/2 night stay. Hands-on biology, field studies. September - May. Contact: Ken Alfieri, Director, 2810 Seabrook Island Road, John's Island, SC 29455. (803)768-0429.

Belleville Nature Center:
Contact: Hope Smiley and Scott Kennedy, Belleville Nature Center, Route 5, Box 1003, Georgetown, SC 29440. (803)546-4623.

Brookgreen Gardens:
Environmental education day camps, seasonal programs and workshops. Contact: Stuart Dudley, Brookgreen Gardens, 1931 Brookgreen Gardens Drive, Murrells Inlet, SC 29576. (803)237-4218.

Coalition for Natural Resource Education:
Sponsors of Project KATE. Summer teacher training includes the course, "Teaching Teachers to Teach Kids About the Environment," offered in July, at Camp Summerton. Contact: Dr. George Kessler, 272 Lechotsky Hall, Clemson University, Clemson, SC 29634. (803)656-2478.

Tugaloo Environmental Education Center (TEEC):

Cypress Gardens:
Classroom and family programs that explore and celebrate the blackwater cypress swamp. Contact: Cheryl Baskins or Kathy Bradley, Cypress Gardens, 3030 Cypress Gardens Road, Moncks Corner, SC 29461. (803) 553-0515.

Harborwatch:
Located in Charleston. Offers citizen water quality monitoring programs, in-service training, participatory environmental theater for elementary and middle school students, slide shows and graduate level training. Contact: Sharon Robles at (803) 577-2103.

COASTeams Programs:
Graduate program offered for teachers in Charleston County (June 19-29), Horry County, Richland I School District and Georgetown. Participants are asked to lead teacher workshops as part of their graduate work. See article this issue for more information.

North Inlet - Winyah Bay National Estuarine Research Reserve:
Estuarine information, field programs and resources are offered for many audiences. Contact: Wendy Allen, Education Coordinator, North Inlet-Winyah Bay NERR, PO Box 1630, Georgetown, SC 29440. (803)546-6219.

University of South Carolina-Beaufort Coastal Zone Education Center:
Near Hilton Head, Coastal Zone offers beach and salt marsh field studies during fall and spring and outreach programs in winter for school groups K-12. Public programs are also available. Free quarterly newsletter and community calendar. Contact: USCB Coastal Zone Education Center, 285 Sawmill Creek Rd., Bluffton, SC 29910. (803)837-4848.

Riverbanks Zoo:
Educational Programs - Approximately 30 different educational programs, grade specific and multi-grade level, are offered covering human/animal, wildlife and marine topics. These programs focus on natural themes (senses, habitats, adaptations, endangerment, etc.). There are additional topical offerings for secondary and college level students. Audience: K-College. Contact: Riverbanks Zoological Park and Botanical Garden, Education Department, PO Box 1060, Columbia, SC 29202-1060. (803)256-4773.

SC Coastal Conservation League:
A membership organization leading in conservation activities. Family programs and teacher-training programs offered seasonally. Contact: Jane Lareau, SC Coastal Conservation League, PO Box 1765, Charleston, SC 29402. (803)723-8035.

SC Department of Health and Environmental Control (DHEC):
The solid waste recycling curriculum and a variety of materials on pollution and recycling along with contests, awards and curricula are available. Contact: Marie Horton, SC DHEC, 2600 Bull Street, Columbia, SC 29201. (803)734-3941. Ocean and Coastal Resource Management Information on coastal issues, tides, and coastal zone management. Contact: Donna Bates, SC DHEC-OCRM, 4130 Faber Place, Suite 300, Charleston, SC 29405.

South Carolina Marine Extension Program:
"Coastal Minutes" The Midday Show - A monthly program segment on WCSC-TVs The Midday Show discusses a variety of issues of interest and importance to coastal residents. Audience: general public. Contact: Bob Bacon, Program Leader, SC Marine Extension Program, 287 Meeting Street, Charleston, SC 29401.

South Carolina Wildlife Federation:
The state's oldest and largest conservation organization offers a variety of programs and resources for teacher, families and classroom use. Prepared program materials for National Wildlife Week, teacher packets, and weekend family trips are among the offerings. Contact: C. J. Frye, SCWF, 715 Woodrow Street, Columbia, SC 29205. (803) 771-4417.

Project Learning Tree Workshops:
Contact: Charles Moore, SC PLT Coordinator, PO Box 21707, Columbia, SC 29221. (803)896-8851.
Marine Happenings: (cont.)

University of South Carolina, The Center for Science Education: The Center for Science Education at USC was established to strengthen the teaching of science and math in South Carolina schools. The Center’s activities include graduate-level courses in the sciences specifically designed for in-service teachers, a variety of graduate degree programs for in-service and pre-service science teachers, and the development, evaluation and distribution of science teaching materials. Contact: Center for Science Education, University of South Carolina, Columbia, SC 29208. (803)777-6920.

Educators Rainforest Workshops: Explore and learn about the rainforest first hand in these eight-day workshops focused on the needs and interests of educators. Choose from the exotic locations of Costa Rica, Belize, or the Peruvian Amazon. Summer 1994 workshops were approximately $1800 per person, departure from Miami. Call Frances Gatz at International Expeditions, 1-800-669-6806. Although they do not provide scholarships, they can give information about possible scholarship resources.

Coastal Expeditions, Inc.: Interpretive and instructional aquatic tours that encourage enthusiasm in the natural sciences. Will tailor to schedule for teachers. Contact: Anne Goad, 1132 Two Rivers Court, Mt. Pleasant, SC 29464. (803)884-7684.

South Carolina Department of Natural Resources (DNR): With the consolidation of several agencies, DNR offers a wide variety of environmental education programming. Please call the numbers listed for additional information about the programs - they offer so many programs that there is not room to list them all here!

Programs planned for teachers for the summer of 1995 include:

- Dr. Ed Donovan’s graduate level course at USC-Spartanburg. For more information, call Dr. Donovan at (803) 585-7598.
- At the Webb Center, in June/July, a two week wildlife management course for teachers, offered by the Game Section of the Department of Natural Resources, call (803) 734-3886 for information.
- A graduate level course at USC-Beaufort may also be offered. Contact Don Winslow at (803)734-3888 for more information.
- Division of Land Resources: Annual Conservation Poster (K-4); Essay (5-8), and Speaking (9-12) Contests; SC Conservation Workshop (9-12), and Barrier Island Coastal Environmental Workshop (9-12); Environmental Institutes for Teachers; Outdoor Classroom program; Conservation for Scouts; SC Maps (7-9); Teacher of the Year Award. For more information call, (803)734-9100.
- Division of Conservation Education and Communications: Project WILD (K-12); Project Aquatic WILD (K-12); Conservation Education Program; Whale program; WILD School Sites; Young Outdoor Writers Competition (5-12). For more information, call (803)734-3888.
- Division of Marine Education: Touch tank (K-5); Tours of Marine Resources Research Institute (6-12); A Coastal Adventure (9-12); Marsh Classroom Adventure (teachers); Educational Outreach presentations; Mariculture Center tours. For more information, call 795-6350.
- Division of Water Resources: River Conservation Workshops and Seminars (teachers); Speakers Bureau. For more information, call (803)737-0800.
- Division of Wildlife and Freshwater Fisheries: Fishing Rodeos; Transect newsletter; Teacher workshops; Tours of Wildlife Management Areas; Heritage Preserves, Hatcheries and other DNR properties. For more information, call (803)734-3886.

Division of Geological Survey and Mapping: Speakers Bureau. For more information, call (803)896-7713.

Earthwatch Expeditions: Choose your research interest and apply for an educator’s fellowship! Projects available for the 1995 season include "Monterey Dolphins," "Caribbean Fish Food," "Restoring Nepal’s Wetlands," "Inside Oregon Caves," and scores of others. Applications for a summer expedition should be postmarked by March 6, 1995. Full and partial awards are available. Call 1-800-776-0188.

National Aquarium in Baltimore Summer Teacher Institute: This is a National Science Foundation funded program which seeks to build a national cadre of teachers who will provide workshops for other teachers using the hands-on interdisciplinary aquatic science curriculum, "Living in Water." Two-week course, July 10-21, 1995. Meals, lodging, stipend and materials are provided. Graduate credits available. Application deadline is February 1, 1995. Call Dr. Valerie Chase at (410)576-3887 for more information.

South Carolina Aquarium: The "South Carolina Aquarium News" is a periodic newsletter what will keep you updated on the development of South Carolina’s major public aquarium. To receive (free), contact Rhet Wilson, Program Manager, South Carolina Aquarium, 57 Hasell Street, Charleston, SC 29401. (803)720-1990.

Compiled with assistance from the Staff of the South Carolina Aquarium and Cindy Renkas.
Spineless Wonders: Plants that Eat Animals - Part I

by Fred James

People often refer to carnivorous plants as insectivorous but some plants have been found with skeletons of small birds, amphibians, spiders and various other organisms that clearly are not insects! All carnivorous plants use their leaves to "capture" animals. Most of these plants grow in soil which is typically acid, boggy, and lacking in many minerals especially nitrogen. They are green plants and manufacture their own food. However, they can out-compete many other plants in nutrient poor soils by trapping animals to supplement deficient minerals. Botanists often argue about the number of carnivorous plants in the world but at least 450 species have been recognized.

There are two methods for plants to trap food. One method is considered active, the other passive. Active plant traps involve leaves or leaf parts that move "rapidly" to trap their "prey". In South Carolina there are two major kinds of plants with active traps. One group are the plants with closing traps. Closing traps have bent leaf blades which attach, clam-like, to the midrib of the leaf. The outer edge of the leaf has stout marginal hairs and nectar secreting glands which attract "prey". The inner portion of each blade half has three sensitive hairs (sometimes more!) which activate the trap. The "prey" must hit two hairs at once or one hair twice in quick succession in order to close the trap. The Venus flytrap (Dionaea muscipula - Dionaea comes from the Greek for "Dione", the mother of Venus and muscipula from the Greek for "fly catching") is the only example of a plant with a closing trap in South Carolina. As the only member of its family, it is a monotypic species and grows in a 60 to 75 mile radius around Wilmington, North Carolina. The leaves arise in a rosette from an underground stem. The flowers are white and on a scape (a stem with a flower but no leaves, i.e. dandelions). It is believed that the struggle of an organism inside the trap aids in the tightening of the trap and the release of digestive enzymes from specialized glands. There is still a lot of debate on the closing mechanism. The cells on the outside have to grow faster than the cells on the inside for the trap to close. To open, the cells on the inside must grow faster than the cells on the outside. It is thought by some that a small "electric" current (action potential) passes from the trigger hairs to the outer cells which results in a hormonal response bringing about the rapid growth of the outer cells and causing the trap to close. After several hours the inner cells grow and the trap opens. Interestingly, the Venus flytrap has been transplanted experimentally (secretly) in bogs as far north as New Jersey and Pennsylvania and botanists who have found these accidentally have rushed their new find into print! You can imagine the red faces!

The second kind of active trap associated with carnivorous plants found in South Carolina is the trap door. The bladderworts (all belong to the same genus, Utricularia derived from the Latin "uriculus" which means small bladder) have bulbous aquatic traps that actually "suck" an animal (i.e. water flea - Cladocera) into it. The bulbous trap has guide hairs which lead the prey towards a trap door and the trap door is stimulated to open when the prey hits very tiny trigger hairs. The trap door is hinged only in one direction so there is no escape for the water flea, rotifer, or mosquito larva. The trap brings in both water and prey and if you have a good microphone you can pick up the sound of the trap sucking up its prey. By some mechanism still unknown, water passes out of the trap and the trap is reset! The speed of the trap is estimated at 1/640 of a second. Bladderworts can most easily be found floating in acid water of ditches, bogs, or sphagnum (peat moss mats). The most common of the carnivorous plants, they are usually overlooked except when blooming. The flowers arise from a central stalk or scape. Blooms range in color in South Carolina from yellow to purple, with a very rare white species found in Kershaw County. Some species form two different types of flowers, one open in the early spring and the other open during the summer. Some botanists have actually given species names to each of the stages mistaking them for different plants! Bladderworts lack roots but have underground (or underwater!) stems from which branch the small leaf bladders which range in size from .05 to 3.0 mm. They often send up one narrow green leaf that appears to be a small blade of grass.

The flowering bladderwort. Note the small bladders on the stem underwater.
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. SCMEA provides a communication network for members to share information and ideas through newsletters and an annual statewide conference. Membership dues are $10.00 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 ____________________

Address ____________________

Home Telephone Number ____________________

Work Telephone Number ____________________

Are you currently a member of the National Marine Educators Association (NMEA)? ______ yes ______ no

Please send completed form with the $10.00 membership fee (make checks payable to SCMEA) to:

Phil Astwood, Treasurer, SCMEA
Center for Science Education, University of South Carolina, Columbia, SC 29208.

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 of the best annual conferences you will ever attend!

Name: ____________________

Occupation: ____________________

Address: ____________________

(Street or PO Box) ____________________

City ____________________

State ____________________

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 or more
- 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 WINTER 95
1995 SCMEA CONFERENCE

DATES & LOCATION ANNOUNCED!

This year's SCMEA Conference will be held October 20-22, 1995. We'll gather at the Litchfield Resort, just north of Georgetown. Plan now to attend! More information will be included in the Spring issue of SeaScripts.

If you are interested in volunteering on a conference committee, please contact Leslie Sautter at (803) 953-5586 (or write Department of Geology, College of Charleston, Charleston, SC 29424).

SEE YOU THERE!

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