

National Shellfisheries Association

QUARTERLY NEWSLETTER



Winter 1994

Solomons, Maryland

President's Message

There are two items of immediate importance in this issue of the Newsletter. The information on the upcoming meeting during the week of April 24, 1994 in Charleston, South Carolina is included. Those of you who have not had an opportunity to visit Charleston should make the most of the venue. In addition to the NOAA and SC Department of Wildlife and Marine Resources laboratories at Fort Johnson, the South Carolina Marine Science Consortium, a number of Universities, and Atlantic Littleneck Clam Farm, there are a number of other places of scientific interest to members. For the pleasure seekers, Old Charleston hosts a distinctive architecture, many small gardens, and the Battery and the historical parts of town are ideal for walking around and absorbing the ambiance. Near the historic area there are many fine restaurants, distinctive shops and a cosmopolitan atmosphere. Rick DeVoe tells me the weather at the end of April should be superb.

By now you should have submitted your abstracts and all you have to do is register and make final arrangements for travel and lodging. Bill Fisher is developing the technical program and he tells me that we have an excellent response from students willing to present their work. This, to my way of thinking, is an extremely important part of our organization's mission. NSA makes an effort to support students who attend the annual meeting, offers awards for excellence in presentation, and we have an active student organization. These efforts by NSA make it important that ALL of our more senior members encourage students to attend - or better yet - bring students to the meeting. Don't forget that a subscription to the journal makes an excellent graduation gift.

The second item of immediate importance is the election of officers from the slate provided. The candidates for each office are willing to spend the time and effort to guide NSA. All are excellent candidates and they will do an excellent job in office. Too often only a small number of our members vote for the officers. The individuals running for office have made a commitment to the organization, they deserve your full consideration, and most importantly, they deserve a little time and effort on your part to VOTE.

I hope to see everyone in Charleston.

John Kraemer

Aquaculture '95 Update

I've recently returned from San Diego where I spent the weekend at the Town and Country Hotel, site of Aquaculture '95. It's a perfect place to host a conference...very easy access via San Diego airport (about 10 minutes from the hotel with frequent shuttle service), good facilities, close to the city, lots of extracurricular activities and 4 (yes, four) swimming pools. Current plans are to hold the President's Reception at Sea World and there is an evening trip to Tijuana. We are also considering a pre-conference golf tournament (the course is next door to the hotel).

The overall theme of the conference will be: Quality Environments - Quality Products. Jim Tidwell (Kentucky State University) is the overall program chairman and Steve Tettelbach will be the NSA representative to the program committee. I will be organizing special sessions and am currently soliciting topics and organizers. If you have any ideas or would like to organize a session, please contact me as soon as possible. The deadline for Special Sessions submissions is March 1. Thus far we have sessions planned on scallop culture, pearl oysters, genetics in aquaculture, striped bass, salmon, shrimp, tilapia, and trout. Since this is an aquaculture-oriented meeting, there will also be many sessions for producers including marketing, seafood safety, value-added products, and legal constraints.

Mark the dates on your calendar now... February 1-4, 1995, and bring the family. There will be many activities for them also, including Sea World, the San Diego Zoo and shopping excursions to Old Town.

See you there -

Sandy Shumway

IN THIS ISSUE...

ANNUAL MEETING REGISTRATION INFO

TENTATIVE AGENDA FOR ANNUAL MEETING

BALLOT FOR NSA OFFICERS

Recruits Corner

Hello! I hope those of you presenting papers at the Charleston meeting got your abstracts in on time. As usual, it should be an excellent opportunity to interact with colleagues, make new contacts and learn about current research (not to mention a lot of fun). We need volunteers to help with various activities at the meeting. If you can help please contact the appropriate person below, or ask at the registration desk when you arrive.

As usual, there will be a Student Reception combined with the second annual NSA Auction. Anyone want to be an auctioneer?? Contact Margaret Dekshenicks to help (804-683-3234, e-mail: deks@ccpo.odu.edu). Aswani Voley (804-642-7347, e-mail: ashwin@ches.cs.vims.edu) is organizing students to assist with audio-visual, and Dave Bushek (609-785-0074, e-mail: bushek@gandalf.rutgers.edu) is scheduling students to help Steve Tettelbach staff the NSA sales booth. If you plan to attend and are looking for a roommate, please contact Dave Bushek. We need someone familiar with Charleston to put together a list of inexpensive hotels and restaurants near the Sheraton Inn Charleston - contact anyone listed above if you can help out. Finally, if you are looking for a job, bring your resume to post on a Jobs/Resume board to be located near the registration desk.

In addition to the Jobs/Resume board at the meeting, an employment/employer database will be established in early 1994. This database of resumes (of NSA students and other members looking for jobs) will potentially be posted on a monthly basis on Internet. To initiate this service, we are going to take advantage of the SHELLFISH discussion group set up on Internet by Scott Siddall. If you have access to e-mail and have not yet subscribed to SHELLFISH, send the message SUBSCRIBE to SHELLFISH-REQUEST@KENYON.EDU and become a participant. You will receive job announcements along with other interesting info relating to shellfish. In addition, you may post a single-spaced, one-page description or resume that we will re-post once each month. Details may be obtained from the discussion group on e-mail. We realize this is limited to those who have access to Internet, however, we believe it is important to make the initial movements toward a database through Internet and then let the service evolve and expand over time. Look for Job and Resume postings monthly on SHELLFISH! If you have any questions, comments or suggestions, please contact me at the number or e-mail address listed above. See you in Charleston -

Dave Bushek

Addenda: We are requesting that any and all student members forward their e-mail address to bushek@gandalf.rutgers.edu We will be able to keep you well informed of NSA student activities if we can reach you through the electronic superhighway. Thanks - DB

Industry Notes

New Seastar Trap Developed in Australia

Reprinted from *Fishing Today* 6(6), December 1993-January 1994: "Local Trap Comes Up Trumps - Mussel farmer Des Whayman and his family have been farming leases in the D'Entrecasteaux Channel for many years now. But mussels have not been his only interest, with a pilot reseeding program with scallops, in cooperation with a number of other marine farmers, also claiming his attention. So when populations of the native seastar exploded, threatening to overwhelm the tiny reseeded scallops, he started tinkering with designs to trap them. "We were aware right from the start that if we caught anything else apart from starfish, we'd get in trouble from environmentalists," Des recalls, "and that made the job far more difficult than it might have been."

Indeed, refining the design took over two years of constant experimentation. But as Des tells it, his fishing background held the key. "It's a fisherman's invention," he says, "just as a craypot is a carefully thought-out design, so is this one. Yet this trap is unlike any other. It is open at the top. A starfish is a slow-moving animal. It also walks around the bottom, so it was quite obvious that there would not be a problem of them coming out the top. So the top stays open and all the other fish can escape."

That's the theory; how does it work in practice?

"We have just done a set of trials of our trap alongside some Japanese seastar traps," Des replies. "The Japanese traps caught seastars, as well as flathead, parrot fish, leather jackets, sharks, cod, soldier fish ... every kind of fish there was in the area. Our traps were filled with seastars and two hermit crabs. Nothing else."

The Whayman traps are designed to always stand upright on the seabed - they are heavier on the bottom than the top - and could even be connected, Des says, to a longline with shark clips. Baited with salmon heads - he tried dogsharks, salmon feed, and flathead heads, amongst others, but salmon heads always came up trumps - Des had been able to clear his lease of seastars with a string of traps for very little effort.

So when the Japanese seastar's menace became clearly evident, Des quickly volunteered his trap as a possible control device. He'd proved its effectiveness with the native seastar population around his lease. Could it be a potent weapon against the import?

Preliminary trials indicate that it probably will be. Des' son Glenn has also surveyed the Derwent with fifty traps and a Sharkcat. It took him just two weeks to prove the Japanese seastar's range in the estuary extends from Blackman's Bay right through to the Bailey Bridge.

(continued on page 3)

(continued from page 2)

Once again, Australian home-grown ingenuity may prove superior to whatever the rest of the world can offer, at least in mechanical control measures. Certainly the National Seastar Task Force, whilst scouring the world for helpful hints, and trialling some of the Japanese traps, seems convinced that it will."

Des is interested in making contacts outside Australia. If you are interested in learning more about Des Whayman's trap, contact him at: 6 Frost Street, Snug, Tasmania or FAX 002-674204.

Book Review

A Handbook of Northern Mussel Culture 1993. David Scarratt. Island Press, Ltd., Montague, P.E.I., Canada. 165 pages. ISBN 0-9679610-0-7 Price: \$12.00 US.

When a retired government bureaucrat decides to write a book about the industry, there is potential for trouble. Will the book successfully represent the realities of the business world? Will techniques developed through significant cost by the private sector be broadcast to competitors? Will issues such as regulation and the effect of aquaculture on the environment be dealt with fairly? In my opinion, the *Handbook of Northern Mussel Culture* does an overall good job as it describes the technology used in the long line culture of mussels in eastern Canada, and provides a readable text for fisherman and students who want to "get their feet wet" in this particular type of aquaculture. No prior knowledge of shellfish biology is required, and those who can tie a clove hitch and run a small outboard may benefit greatly in a general understanding of the skills and equipment required to start a long line mussel farm. One thing lacking, however, is a listing of equipment suppliers for the buoys, socks, and other gear required for this type of aquaculture. This would complement the listing of sources, suggested readings and addresses listed in Chapter 12. While the title describes the book as encompassing mussel culture in the waters of New England and the Canadian Maritimes, the coverage of bottom culture in New England is cursory, and readers should refer to Chapter 6 (Mussel Aquaculture in Marine and Estuarine Environments Throughout the World, by Lutz, et al.) in Menzel's *Estuarine and Marine Bivalve Mollusk Culture* (CRC Press, 1991) for a more thorough treatment.

The chapters describe the basics of long line culture, including site selection, farming techniques, harvesting, "things that get in the way of harvesting", processing, regulatory issues, and costs. The book is well illustrated (over 170 figures), although the black and white photographs are somewhat hard to read, but for \$12.00, who cares?! The style of the book is a series of "bullets" that Dave uses as sub-headings under particular chapter headings. With a somewhat

rambling, folksy style, the book does a surprisingly good job in outlining the problems which might be encountered in the business, and what some crafty down east fishermen have done to circumvent some of the problems. Did you know that P.E.I. farmers attach sandbags to drop long lines below the ice, or that in Newfoundland long lines are attached to ledge along shore and stretch across the bays, making anchoring unnecessary? As stated at the start, the book is not a "how-to" manual on mussel farming, but there are some important details that are overlooked. For example, what is the recommended density (number of mussels per linear foot) along a vertical drop from the long line? What current speeds are recommended for good growth? Some of these factors may make or break a particular commercial venture if not attended to properly.

There are a few misspellings, printing errors, and some post-hoc patching of the book as corrections, which could have been prevented by a more careful review before printing. In the effort to distill some science into everyday language, there are a few speculative comments (eg. the cause of reduced oyster growth rates in France has not been attributed to genetic factors but rather to reductions in the carrying capacity due to high oyster densities in some regions). Nonetheless, it is difficult to distill the plethora of published works on mussels into information which may be applied practically to the farming of these tasty molluscs. David does a good job of this in the introductory chapters on mussel biology and general farming principles.

The growth of mussel culture in P.E.I. has been impressive. With 1993 landings of over 4000 metric tons, the long line culture has replaced bottom culture as the leading source of cultured mussels in the northeast. David's point that "the topography of the coastline north and east of the Maine-New Hampshire border creates dozens of sheltered areas of water with excellent growing conditions" may serve to inspire others to engage in the venture of long line culture in the region. Whether the future will bring a mix of mussel bottom culture, long line culture, or raft culture to the region is anybody's guess, but David Scarratt's *Handbook of Northern Mussel Culture* joins John Manzi and John Kraeuter's *Manual for Growing Hard Shell Clams* and Phil Schwind's *Practical Clam Farming* as a valuable introduction to the beginning shellfish farmer in estuaries along the U.S. and Canada. Most readers in the shellfish business will gain at least a handful of new ideas from the text, which makes it a good investment amidst the relatively few good books available in the field.

Carter Newell
Great Eastern Mussel Farms, Inc.
P.O. Box 141
Tenants Harbor, ME 04860 USA

In Memorium

Daniel Branch Quayle

Daniel (Dan) Branch Quayle, a world authority in the field of molluscan biology and bivalve culture, passed away October 19, 1993 at his home in Nanaimo, British Columbia. He was 80 years old.

Dan was raised in Ladysmith, B.C., where he undoubtedly developed his love for the ocean. After completing high school, Dan taught school for three years in southeast B.C. He enrolled at the University of British Columbia in 1934 and completed his B.A. in Zoology in 1937. During this period he worked as a summer student at the Pacific Biological station under Dr. C.R. Elsey studying breeding of Pacific oysters, *Crassostrea gigas*, in Ladysmith Harbour. He received his M.A. from U.B.C. in 1938 and joined the staff of the Pacific Biological Station in that year, assuming responsibility for the molluscan research program. This began an association with molluscan shellfish and the Pacific Biological Station that spanned a period of 55 years.

His biological career was interrupted during World War II when he served with the Royal Canadian Air Force. He spent one and a half years as a prisoner of war after being shot down over Germany.

He returned briefly to the Pacific Biological Station at the end of the war in 1945 before leaving to begin his Ph.D. studies at the University of Glasgow under Sir C.M. Yonge. Upon receiving his degree he returned to British Columbia to work for the Provincial Department of Fisheries as Director of the Biological Services. He built a small laboratory at Ladysmith and commenced extensive studies on oyster and oyster culture. During this period he worked closely with industry, pioneering methods to improve oyster production. He maintained a close association with people in the industry, not only in British Columbia but elsewhere, for the rest of his life.

In 1957 Dan left British Columbia to work with industry, first in the State of Washington and then in the State of Virginia.

In 1958 he returned to Nanaimo and the Pacific Biological station and remained there until his retirement in 1973. During this period he undertook extensive research studies on marine invertebrate populations along the coast. Dan's close association with industry continued and during this period he published his book, "Pacific Oyster Culture in British Columbia", which became a standard text for oyster culture, particularly for the west coast of North America. Much of the success of the British Columbia oyster industry is due to the efforts of Dan Quayle.

After his retirement in 1973, Dan became a consultant for Canadian aid organizations and travelled throughout the world assisting in development of shellfish culture industries. When not involved in overseas consulting, Dan continued as an active volunteer research worker at the Pacific Biological Station until shortly before his death. He published

widely and during this period undertook a major revision of his "Pacific Oyster Culture in British Columbia" publication. He was an inspiration to the staff of the Pacific Biological Station and always had time to talk with younger staff members and give them the benefit of his long years of experience.

Dan had a long association with the National Shellfisheries Association, particularly with the West Coast Section. He served on the Editorial Board of the *Proceedings and Journal* for many years.

In 1993 the University of Victoria awarded him an honorary LL.D. in recognition of his work in the field of marine invertebrates and molluscan culture.

Dan is survived by his wife, Ann, and his daughter, Moura, and by a host of friends whose lives have been enriched by their association with him.

Neil Bourne, Nanaimo, B.C.

Calling All Bibliophiles!!

Kudos to Dick Petit of North Myrtle Beach, South Carolina, for his wonderful efforts in compiling a substantial collection of out-of-print books and papers on the Mollusca. His collection came to my attention when Sandy Shumway sent me a small publication put out by Dick which lists the titles he currently has available for purchase. Being a bibliophile myself, I rapidly paged through to the G's and sure enough found a listing for Galtsoff, P., 1964. *The American Oyster, Crassostrea virginica* - listed for only \$25.00!!! I telephoned Dick immediately and requested the long-sought-after item, and am now the proud owner of an original volume. Dick says that he "disposes of molluscan libraries for fun" while building his own in the process. He also has some journal and serial publications in the collection (including back issues of the *Journal of Shellfish Research* and *Proceedings of the National Shellfisheries Association*). Dick's note on the back of his list says it all: "Wanted - Wanted - Wanted Publications (book, papers, journals, or entire libraries) on Mollusca (marine, fresh-water, land; fossil or recent). If you have molluscan publications you no longer need, why not make them available for others who might need them? Please contact me if you have any molluscan publications to sell."

For more information, please contact:

Mr. Richard E. Petit

P.O. Box 30

North Myrtle Beach, SC 29582

Phone: (803) 249-1651 (after 5 pm or on weekends)

FAX: (803) 249-2878

Karolyn Hansen, Editor

Research News

Jack Pearce, of the National Marine Fisheries Service in Woods Hole, Massachusetts, is in search of information concerning pinnotherid crabs. He writes: "I have recently been investigating the distribution and abundance of the parasitic crab, *Pinnotheres maculatus*, which is typically found in mussels in the more northern parts of its range. To the south, it can be found with bay scallops and pen shells or *Atrina*, among other bivalve species. Earlier work done with the west coast mussel crab, *Fabia subquadrata*, indicated that this crab has a very unusual life history, that it can seriously affect the resource species which serves as a host, and that it has an unusual series of planktonic development instars. In the northeast, it used to be abundant in intertidal waters (Cape Cod Canal and along the shores of Buzzards Bay) and on the Coast Guard buoys, sometimes with 95% infestation. The crab has also been found in deeper waters, for instance in the Gulf of Maine to 100 - 150 meters. In recent years, the crab has virtually disappeared from local intertidal waters. Earlier papers have discussed levels of infestation relative to tidal zones.

Since the crab can severely damage its host, affecting yields of bivalves, it is an important species in terms of shellfish management. Much the same is true for the oyster crab, *Pinnotheres ostreum*.

If any readers of the NSA *Quarterly Newsletter* are aware of pea crabs problems, or are interested in research results on these species, please contact me at the address below. I am interested in issues associated with the crab in their benthic habitat as well as matters relating to existence in the water column, i.e., as zoeal larvae or Stage I crabs might occur in plankton samples."

Please contact: Dr. John B. Pearce, NOAA/NMFS/NEFC, 166 Water Street, Woods Hole, MA 02543-1097 USA.

Sandy Shumway is Migrating

Sandy Shumway is migrating south. As of January 15, 1994, her new address will be:

Natural Science Division
Southampton College
Long Island University
Southampton, New York USA 11968
Phone: 516-287-8400
FAX: 516-287-8419
e-mail: shumway@seaweed.liu.net.edu

Rest assured that if you inadvertently send anything to her former address (Maine), it will be forwarded to her new address.

Membership Drive: Student Competition

Due to the success of last year's general membership competition, the Membership Committee is having a new membership drive in which the student who recruits the most new members receives a one-year membership to NSA. One does not have to be on the Membership Committee to be eligible. Please contact Carolyn Friedman at (707) 875-2067 or by e-mail at csfriedman@ucdavis.edu for more information and for membership forms (mailing address on back cover of this Newsletter). Remember to put your name as sponsor on the top of the form in order to receive credit for the new recruit. Sandy Shumway won last year's competition with 12 new recruits. Let's see if one of you enthusiastic students can beat Sandy's record!

Carolyn Friedman

Employment

Employment Available

Summer Technician Positions Rutgers University Shellfish Research Laboratory, Port Norris, New Jersey. Laboratory and field-oriented positions in several areas of shellfish biology including aquaculture, genetics, physiology, and parasitology, starting May 1994. One position is available starting March 1994. Dormitory facilities are available. We are seeking talented undergraduates or recent college graduates who have an interest in any of the above-mentioned areas. Closing date: ASAP. Send resume and cover letter to Gregory A. DeBrosse, Haskin Shellfish research Laboratory, 1 Miller Avenue, Port Norris, NJ 08349 USA.

Employment Wanted

Computer Support/Database Management
Proficient in use Oracle and Paradox, dBase IV and Lotus 1-2-3 database programs with VAX VMS and IBM-PC (data processing and software development). Interested in personal computer support: database management, record-keeping, report preparation. Facilities include 486 PC with FAX/Modem capability. Please contact: Alexandra Streich, 5368 Rexora, Lot 41, Katy, TX. 77493-1305; Phone (713) 391-4069.

National Shellfisheries Association 1994 Executive Committee Candidates

President-Elect

Bill Fisher Pathobiology Branch Chief, U.S. Environmental Protection Agency, Gulf Breeze Environmental Research Laboratory, Gulf Breeze, FL and Director, EPA Center for Marine and Estuarine Disease Research. B.S. (1971) Carnegie-Mellon University; M.S. (1973) Duquesne University; Ph.D. (1983) University of California - Davis. Postdoctoral research, University of Maryland; Fulbright Senior Research Award, France; Assistant Professor, University of Texas Medical Branch. Editorial Advisor, *Diseases of Aquatic Organisms*. Research interests include infectious and non-infectious diseases of crustaceans and bivalves.

Paul Sandifer Director, Marine Resources Division, South Carolina Wildlife and Marine Resources Department, Charleston, SC, Professor, Marine Biomedical and Environmental Sciences, Medical University of South Carolina, and Research Professor, University of Charleston. B.S. Biology (1968) College of Charleston; Ph.D. (1972) University of Virginia. Marine Scientist, Marine Resources Division, 1972-present; Assistant Director, 1976-1984; Director, 1984-present. Responsible for state marine fisheries and research in aquaculture, and development of Waddell Mariculture Research and Development Center, Bluffton, SC. Research interests/expertise: fisheries management, research and educational programs, aquaculture of shrimp and marine fish, larval development and recruitment of decapod crustaceans, coastal ecology, and fisheries and environmental policy.

Vice-President

Gene Bureson Professor, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA. B.S. Biology (1966) Eastern Oregon State College; M.S. Zoology (1970) Oregon State University; Ph.D. Zoology (1975) Oregon State University. Program Manager, Seabrook Ecological Studies, Normandeau Associates, Inc., Bedford, NH (1975-77). NSA member since 1988. Research interests include parasites and diseases of marine fish and shellfish with a present emphasis on oyster diseases.

Steve Tettelbach Associate Professor of Marine Science and Biology, Southampton College, Long Island University, Southampton, NY (1986-present). B.S. (1976, magna cum laude) University of Miami; M.S. (1979) University of Washington; Ph.D. (1986) University of Connecticut. NSA member since 1979; Thurlow C. Nelson Award, 1986; Treasurer, 1991-present. Teaching responsibilities: Fisheries Biology, Aquaculture, Microbiology, Tropical Marine Biology. Research interests: scallop ecology; shellfish re-seeding programs; predator-prey dynamics; bivalve aquaculture; molluscan taxonomy.

Secretary

Rick DeVoe Associate Director, South Carolina Sea Grant Consortium, Charleston, SC; Associate Faculty Member, Graduate Program in Marine Biology, University of Charleston. B.S. (1974) Fairleigh Dickinson University; M.A. (1979) CUNY/City College of New York; M.M.A. (1980) University of Rhode Island. NSA member since 1983; member World Aquaculture Society; charter member, U.S. Chapter-WAS (Secretary/Treasurer 1989-1991; Vice-President 1991-1992). Planning Committee Co-Chair, 1991 South Atlantic Regional Aquaculture Conference; Organizer and Convenor, Conference and Workshop on *Introductions and Transfers of Marine Species: Achieving a Balance Between Economic Development and Resource Protection*, 1991. Most recently: Co-Chair, 1993 U.S. Chapter-WAS/South Atlantic Regional Aquaculture Conference, and Chair, 12th Biennial International Estuarine Research Federation Conference, 1993. Local Arrangements Chair, 1994 NSA Annual Meeting, April 24-28, Charleston, SC.

Dot Leonard Environmental Analyst, Strategic Environmental Assessment Division, National Oceanic and Atmospheric Administration, Silver Spring, MD. Responsible for the National Shellfish Register of Classified Estuarine Waters; Manager, Molluscan Shellfish Program. Graduate of the Maxwell School of Citizenship at Syracuse University; graduate work, State University of New York at Brockport and George Washington University. NSA member since 1986; Organizer, NSA Shellfish Masters Roundtable; Chair, Membership Committee, 1992. Other memberships include: World Aquaculture Society, American Fisheries Society, and Interstate Shellfish Sanitation Conference. Research focus: East Coast of North America Strategic Assessment Project; Pilot Aquaculture Project with Canada.

Treasurer

Christine Hodgson Shellfish and Marine Plant Biologist, British Columbia Ministry of Agriculture, Fisheries and Food, Courtenay, BC. B.Sc. (1980) University of Alberta; M.Sc. (1986) University of Victoria. NSA member since 1987. Member-at-Large, NSA Pacific Coast Section (1991, 1992); Vice-Chair, NSA Pacific Coast Section (1993); Chair, NSA Pacific Coast Section (1994). Research interests include early invertebrate developmental biology, shellfish production, and shellfish industry development.

Bruce MacDonald Senior NSERC Research Fellow and Associate Professor, Biology Department, University of New Brunswick, Saint John, NB, Canada. B.Sc. (1977) Acadia University; M.Sc. (1981) University of New Brunswick; Ph.D. (1985) Memorial University of Newfoundland. Postdoctoral Fellow, Shellfish Section, Pacific Biological Station (1985-86), Nanaimo, BC; Postdoctoral Fellow, Rutgers Shellfish Research Laboratory (1987-88), Bivalve, NJ. Assistant Professor (Research), Ocean Sciences Centre (MUN), St. John's NF (1988-92). NSA member since 1980. Session organizer and chairman of "Scallop Culture", WAS/NSA Orlando meeting, 1992; session chair of "Crustacean and bivalve biology and culture, WAS/NSA Los Angeles meeting, 1989. Research interests include physiological ecology of marine invertebrates, strategies of energy intake and optimization, mechanisms of suspension-feeding, bivalve aquaculture and fisheries.

Member-at-Large, 1994-1997

Susan Bower Research Scientist, Canadian Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, BC (1984-present). B.S. (1974), M.S. (1976), Ph.D. (1980) University of Guelph. Research Associate, Michigan State University (1980-81); Postdoctoral Fellow, Canadian Department of Fisheries and Oceans, Pacific Biological Station (1981-1983). NSA member since 1985; Chair, Endowment/Student Awards Committee (1993); Vice Chair, NSA Pacific Coast Section (1994). Research interests: identity, biology and ecology of disease agents in marine shellfish as well as defence responses developed by shellfish against pathogens with emphasis on finding mechanisms of preventing and controlling shellfish diseases.

Anja Robinson Assistant Professor, Department of Fisheries and Wildlife, Oregon State University, Newport, OR. B.S. and M.S. University of Turku, Finland; Ph.D. Oregon State University. Involved with molluscan aquaculture since 1968. Research interests include developing techniques to raise various species of oysters and clams in hatcheries. Local Arrangements Committee, 1993 NSA Annual Meeting, Portland, OR.

Please review the biographies, mark your ballot and return it to Tom Soniat before April 15, 1994.

HOTEL INFORMATION 1994 ANNUAL MEETING

NATIONAL SHELLFISHERIES ASSOCIATION CHARLESTON '94

**APRIL 24 - 28, 1994
CHARLESTON, SOUTH CAROLINA**

Hotel: Sheraton Inn Charleston
170 Lockwood Drive
Charleston, SC 29403 USA

Phone: 1-800-968-3569
or (803) 723-3000 (local)

Conference Rates: \$66.00 single/double occupancy plus sales tax and accommodations tax (8%). Extra bed (roll-away) in room is available for an additional \$10.00 per night. Students please note: the Sheraton has confirmed that three or four persons may stay in a room for the \$66.00 rate. Please call and confirm that there are two double beds in the room. **Cut-off Date for Reservations is March 22, 1994. Please make your reservations directly with the Sheraton via phone or mail.** If mailing in your reservation, please call first to verify the amount required to guarantee your room.

REGISTRATION INFORMATION 1994 ANNUAL MEETING

The 1994 National Shellfisheries Association Annual Meeting is scheduled for April 24-28, 1994 in Charleston, South Carolina. The meeting will be held at the Sheraton Inn Charleston and you should make your reservations on or before March 22, 1994 (see information above). Meeting registration is being handled by Local Arrangements Chair Rick DeVoe. If you register **before April 1**, rates are: members, \$160; non-members, \$200; student members, \$100. Registration rates **after April 1** are: members \$205; non-members, \$245; student members, \$145. Daily registration is available at \$70 per day. Please note that your registration fee includes the Sunday President's Reception, Monday-Tuesday box lunches, Wednesday Business Luncheon, and technical session coffee/refreshment breaks. Additional guest tickets are available for the Sunday President's Reception (\$20 each). Ken Chew is again organizing a multi-course Chinese Dinner for the Charleston meeting - please check at the on-site registration desk for ticket prices and date. **Your registration form (enclosed in this Newsletter) and check or money order (drawn on U.S. bank and made payable to: NSA '94) should be sent to: Elaine Knight, South Carolina Sea Grant Consortium, 287 Meeting Street, Charleston, SC 29401 USA.** Please direct any questions concerning registration to Elaine or Rick (Phone: 803-727-2078 FAX 803-727-2080). We look forward to seeing you in Charleston!

1994 NSA ANNUAL MEETING CHARLESTON, SOUTH CAROLINA APRIL 24 - 28, 1994

Program Chair Bill Fisher has prepared a tentative agenda for the Technical Session of the 1994 NSA Annual Meeting. The meeting is scheduled for April 24-28, 1994 at the Sheraton Inn Charleston, Charleston, SC and will include the President's Reception on Sunday evening, the Wednesday Business and Awards Luncheon, a Poster Session, and two concurrent Technical Sessions. The full Program will be published in the Spring 1994 issue of the NSA *Quarterly Newsletter* which is scheduled to be mailed in mid-March. Please direct any questions concerning the program to Program Chair Bill Fisher (address on back cover of Newsletter).

TENTATIVE AGENDA **SUNDAY, April 24, 1994**

PM Executive Committee Meeting
Presidents Reception

MONDAY, April 25, 1994

AM Session A: Bivalve Genetics
Session B: Feeding and Nutrition of Bivalves

PM Session A: Broodstock Management (Panel: C. Langdon, convenor)
Session B: Decapod Crustacean Biology
Poster Session starts

TUESDAY, April 26, 1994

AM Session A: Bivalve Recruitment
Session B: Perkinsus marinus Disease of Oysters

PM Session A: Bivalve Stock Assessment
Session B: Perkinsus marinus Disease of Oysters (con't.)

WEDNESDAY, April 27, 1994

AM Session A: Bivalve Aquaculture
Session B: Diseases of Bivalves

NOON NSA Business and Awards Luncheon

PM Session A: Constraints to the Development and Growth of Commercial Mollusc Aquaculture in the US (Panel: J. Manzi, convenor)
Session B: Diagnosis of Perkinsus marinus Disease of Oysters (Workshop: B. Fisher, convenor)

THURSDAY, April 28, 1994

AM Session A: Stock Enhancement Programs (Panel: G. Flimlin, convenor)
Session B: Bivalve Mollusc Biology; Ecological Roles of Bivalves (Panel: R. Dame, convenor)

NATIONAL SHELLFISHERIES ASSOCIATION REGISTRATION FORM - CHARLESTON '94

April 24-28, 1994 - Charleston, South Carolina

Please return this form (or copy of form) to Elaine Knight, South Carolina Sea Grant Consortium, 287 Meeting Street, Charleston, SC 29401 USA. Make check or money order (drawn on a U.S. bank) payable to NSA '94.

Name and Title _____

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NSA REGISTRATION

NSA Registration fee includes Sunday President's Reception, Monday-Tuesday box lunches, Wednesday Business Luncheon, and technical session coffee/refreshment breaks.

	By <u>April 1</u>	After <u>April 1</u>	# of <u>People</u>	<u>Total</u>
Members	\$160	\$205	x _____	\$ _____
Non-members	\$200	\$245	x _____	\$ _____
Student members	\$100	\$145	x _____	\$ _____
Daily Registration	\$ 70	\$ 70	x _____	\$ _____
NSA Membership	Regular: \$40.00 Student: \$25.00		x _____	\$ _____

OPTIONAL ACTIVITIES

	<u>Per Ticket</u>		
President's Reception	\$ 20	x _____	\$ _____
Guest Ticket (April 24)			

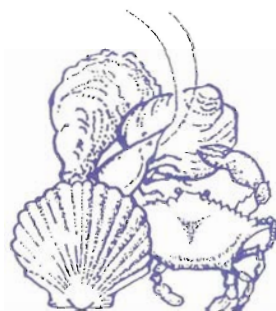
Ken Chew's Chinese Dinner *purchase tickets at registration desk*

TOTAL FEES ENCLOSED \$ _____

Please mail registration form and check or money order to Elaine Knight
(Phone: (803) 727-2078) at the address listed above.

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