National Shellfisheries Association

QUARTERLY NEWSLETTER

Winter 1990 Lewes, Delaware

Register Now For The Joint NSA/SINA Annual Meeting - Williamsburg

Everything is ready to go for the 82nd annual meeting of NSA to be held to be held jointly with the Shellfish Institute of North America (SINA) and its affiliate the National Blue Crab Industry Association (NBCIA) at the Williamsburg Hilton from April 1-5, 1990. Registration information for the technical sessions is included in this issue of the Newsletter along with a room reservation card that **must be received by the Williamsburg Hilton Hotel no later than March 1, 1990** to insure accommodations at the special convention rate of $62/night for either a single or double room. The meeting registration fee prior to March 15, 1990 - $86.00 for members and $ 70.00 for students - will increase to $130.00 and $100.00 respectively, if your registration form is received by Secretary-Treasurer Tom Soniat after March 15th or you register at the meeting. The fee will cover all technical sessions and will also include a President's reception featuring oysters, clams, scallops and other hot or cold hors d'oeuvres, plus an awards luncheon and evening banquet (Pig Roast). It pays to register early so don't delay. Take time now to send your completed form to Tom and remember, **the Williamsburg Hilton will not accept room reservations at the convention rate after March 1, 1990.**

Roger Mann and Bruce Barber have done a great job with local arrangements that are sure to make this year's meeting both an interesting and enjoyable one. A Hospitality Suite (for spouses) having coffee, juice and danish will be located on the second floor of the Convention Center from 8-11 AM, April 2-5. Nancy Cole, Director of Special Activities and the Hilton will provide an orientation lecture at 9:00 AM on April 2nd in the Hospitality Suite. All your questions about local sites of interest can be answered at that time. The following trips can be booked a day in advance through Care-Free Tour and Travel (located in the main lobby of the Williamsburg Hilton): Jamestown, Yorktown, Pottery Factory, Carter's Grove Plantation, Busch Gardens and Water Country. Trolley service from the Williamsburg Hilton to the Colonial Williamsburg Visitor Center is available at no cost. Check the front desk for scheduled times of departure and arrival. Colonial Cab Co. provides local cab service. The round trip cost for 4 people to Colonial Williamsburg is around $4.00 per person. Also, some good musical entertainment has been lined up for the evening banquet. There will also be an open music jam sometime after 9:00 PM at the banquet with any members of NSA, SINA or NBCIA who are musically inclined so bring your instruments.

NSA Program Set

Carter Newell, NSA Program Chairman, has prepared a preliminary schedule (included in this issue) of the largest program of special and technical sessions ever held at an NSA meeting. Due to the large number of scheduled presentations (180 oral, 25 poster), this will be a full meeting so please schedule plenty of time to stay through Thursday April 5th. Posters should be set up in the Center Lounge between 12:00 and 1:30 Monday and will be taken down on Wednesday between 2:00 - 2:30. Poster sessions are scheduled for Tuesday and Wednesday mornings. Posters should be no larger than 36"x48" and standard poster easels will be provided. On Monday April 1st at 1:00 a meeting will be held for all moderators in the Main Auditorium. This brief meeting will cover details of projection needs, timing and other aspects of the special and technical sessions.

This year's program will include a plenary session on Water Quality and special sessions on Reproductive Biology of Molluscs, Bivalve Settlement and Recruitment, General Biology and Physiology, Vibrios, Toxic Dinoflagellates and Shell Disease in Crustaceans. Abstracts of all the oral and poster presentations will be published in the next issue 8(2) of **JSR**. Contact Carter (207) 372-6137 if you have any questions about this year's program.

President's Message

April 1 to 5, 1990 is the time. Historic Williamsburg, Virginia is the place. The event? **The largest NSA annual meeting ever held.** And of special importance: this is a joint meeting with our colleagues in industry, the Shellfish Institute of North America (SINA). The NSA Technical Sessions will feature 180 oral and 25 poster presentations, more than any other NSA conference. There will be a Joint NSA/SINA Plenary Session with presentations from policy makers in government, topical overviews by leading researchers, and position papers from industry leaders. The theme of the Plenary session is water quality in shellfisheries, from basic research to applications. Other sessions include 18 presentations on reproductive biology, 10 on the genetics of polyploidy, 19 on settlement and recruitment, 8 on production modeling, 10 on shell disease in crustaceans, 12 on the impact of anthropogenic inputs on bivalves and another 16 on red tides. Then there's another 16 invited papers on introduced species. The remaining 71 papers round out the technical coverage of this meeting, which should be one of the most important meetings NSA has ever sponsored. The fact that SINA and the National Blue Crab Industry Association (NBCIA) are meeting jointly with us substantially expands the scope and value of this meeting. **PLAN TO ATTEND!**

There's more: the registration fee is discounted for those who pre-register, and **registration includes tickets to all NSA's social functions:** the Sunday President's Reception (with foods to please any taste), the NSA/SINA Banquet on Tuesday evening (an authentic pig roast with all the trimmings), and Wednesday's NSA Awards Luncheon. There are plenty of attractions in Williamsburg, and we have a special spouses' registration rate. For those planning on flying to Williamsburg, the Newport News/Patrick Henry and Norfolk airports are close-by, have limousine service to the Hilton and are served by several national and regional carriers, such as USAir.

Housing costs at the Williamsburg Hilton (where we held an outstanding meeting in 1981) are $62 per night, single or double occupancy, and there are triples for students. **MAKE YOUR RESERVATIONS NOW.** There will be competition for rooms at a meeting of this size. (The Hilton's staff will guide late registrants to nearby overflow facilities).

I'm convinced that our 1990 meeting will be one of the most informative, enjoyable and inexpensive meetings we've ever had. Don't miss this chance to be part of one of the most important events in our discipline.

Scott E. Siddall

Missing NSA Members

The following NSA members can't be located for lack of a forwarding address. Please let Tom Soniat know of their whereabouts if you have that information. Remember, if you want to keep receiving your copies of JSR and the NSA Quarterly Newsletter after you move to another area, make sure you send a change of address card to Tom so he can update his mailing list.

Wendy and Anthony Pires, 22 Maryland Ave., Ithaca, NY 14850

Mike DeCoste, RR4 Site Q4 C-19, Nanaimo, B.C., Canada V9R 5X9

Paul Budreski, 5233 Prince Street, Halifax, Nova Scotia, Canada B3J 1L8

Irwin M. Alperin, Atlantic States Marine Fisheries Commission, 1400 16th St. NW, Washington, DC 20036

Roy D. Ary, Department of Biological Science, University of New Orleans, New Orleans, LA 70148

Arthur L. Crowe, Texas Parks & Wildlife Dept., 204 Travis, Port Lavaca, TX 77979

Dr. Robert N. Iwamoto, Domsea Farms Inc., 4398 W. Old Belfair Hwy., Bremerton, WA 98312

Dr. A. Prakash, Management and Emergencies Br., Environment Canada, Place Vincent Mass, Ottawa, Ontario, CANADA

John B. Richards, U.C. Marine Advisory Program, 377 Storke Road, Goleta, CA 93117

W. Arnold Waring, 1437 Elliot Avenue W., Seattle, WA 98119

R. H. Watson, General Delivery, Wiarton Post Office, Ontario NOH 2TO CANADA

Pacific Coast Section NSA

Chris Langdon reports that the following individuals were elected to serve as officers (1990) for the Pacific Coast Section of NSA at their annual meeting this September in Seattle, Washington. Dan Cheney, Chairperson; Ed Melvin, Vice-Chairperson; Chris Langdon, Secretary/Treasurer; Sandy Downing, Christine Hodgson and Amy Leitman, Members-at-Large. The next annual meeting will be held in Portland, Oregon. Contact Chris for more information at Hatfield Marine Science Center, Oregon State University, 2030 S. Marine Science Drive, Newport, OR 97365 (503) 867-3011.

SUNDAY, APRIL 1, 1-6 PM
NSA EXECUTIVE COMMITTEE, Room 8

SUNDAY, APRIL 1, 6-7 PM

PRESIDENT'S RECEPTION, President's Hall

MONDAY -- APRIL 2

PLENARY SESSION: WATER QUALITY AND SHELLFISHERIES
Main Auditorium

TIME	
8:30	Fife and Drum
8:45	President, Shellfish Institute of North America
8:50	President, National Blue Crab Industry Association
8:55	President, National Shellfisheries Association
9:00	Invited Speaker, State of Virginia
9:15	Invited Speaker, U.S. Environmental Protection Agency
9:30	------- BREAK -------
10:00	Dot Leonard, NOAA: Shellfish wter qality
10:15	Dr. Sarah Taylor, Critical Areas Program, Maryland
10:30	Dr. Michael Crosby, A discussion of various approaches for assessing the effects of anthropogenic inputs on bivalves: current trends and suggestions for the future
10:45	Dr. Sherwood Hall, FDA: Perspectives on dinoflagellate toxins relevant to shellfish
11:00	Dr. Jim Oliver, Overview of Vibrio vulnificius in shellfish
11:15	William Pete Jensen, Maryland: Solutions to pollution problems in shellfish
11:30	--------- LUNCH ---------

	EFFECTS OF ANTHROPOGENIC INPUTS ON BIVALVES Moderator: Michael P. Crosby Rooms 1 & 2	REPRODUCTIVE BIOLOGY OF MOLLUSCS Moderator: Arnold Eversole Main Auditorium
1:30 - 1:45	Response of oyster metallothioneins to cadmium exposure (ROESIJADI)	Use of shelter by the small octopus, Octopus tehuelchus d'Orbigny: availability, selection and effects on fecundity (IRIBARNE)
1:45 - 2:00	Immunosupression of oysters by tributyltin (FISHER, Chu and Wishkovsky)	Seasonality in sea scallop somatic growth and reproductive cycles (SERCHUK and Smolowitz)
2:00 - 2:15	Effects of pollutant-exposure on hemocyte-mediated immune function (ANDERSON)	The gametogenic cycle of Placopecten magellanicus in the Mid-Atlantic Bight (SCHMITZER, DuPaul and Kirkley)
2:15 - 2:30	Function of brown cells in Crassostrea virginica and Mercenaria mercenaria (ZAROOGIAN and Yevich)	Semiannual reproduction in the calico scallop, Argopecten gibbus (MOYER and Blake)
2:30 - 2:45	Brown cells of oysters as a pollution indicator (YEVICH and Zarroogian)	The gametogenic cycle of Argopecten circularis (VILLALAZ)
2:45 - 3:15	---------- BREAK ----------	
3:15 - 3:30	The use or uselessness of free amino acids as a biochemical indicator of pollution (HUMMEL, Bogaards, Wolf, and Sinke)	Reproductive cycle of the Kumamoto oyster Crassostrea gigas kumamoto (Thunbergi, and its implications for artificial conditioning, and rearing (ROBINSON)
3:30 - 3:45	The metabolic transformation of aromatic amines in marine bivalves and implications for genotoxic effects (KNEZOVICH)	Serotonin action on Spisula gametes: induction of oocyte maturation and stimulation of sperm motility (KOIDE, Kadam, Kadam, Haneji, Bandivdekar, and Segal)
3:45 - 4:00	Hematopoietic neoplasia in the soft shell clam: possible interactions with anthropogenic inputs into the environment (LEAVITT and Capuzzo)	Effects of gamete storage on fertilization in Mercenaria mercenaria (GOODSELL and Eversole)
4:00 - 4:15	Bioaccumulation of organic contaminants in marine bivalve molluscs: effects on bioenergetics and reproductive effort (CAPUZZO, Lancaster, Leavitt, and Farrington)	Artificial breeding of scallops in hatcheries (BOURNE)
4:15 - 4:30	Lethal and sublethal effects of agricultural nonpoint-source insecticide runoff on the American oyster, Crassostrea virginica (Gmelin): implications of upland management practices (MARCUS, Daniel and Scott)	Parameters associated with the reproductive success of the oyster Crassostrea virginica (RAINER and Morales-Alamo)
4:30 - 4:45	Test for effects of eutrophication on the toxicity of copper to the blue mussel, Mytilus edulis (TRACEY)	Quantitative evaluation of gonadal proteins in male and female oysters (Crassostrea virginica) using an immunological technique (CHOI, Lewis and Powell)
4:45 - 5:00	Discussion	Lipids, peptides and lipoproteins in bivalve eggs (LEE and Heffernan)

TUESDAY -- APRIL 3

	RED TIDE Moderator: Sherwood Hall Rooms 1 & 2	REPRODUCTIVE BIOLOGY (cont.) Moderator: Peter Heffernan Main Auditorium
8:30 - 8:45	Domoic acid, a new shellfish toxin: the Canadian experience (WRIGHT)	Cost of reproduction in Pacific oysters (DAVIS)
8:45 - 9:00	Dinophysoid dinoflagellates responsible for diarrheic shellfish poisoning in eastern North America: toxicity, systematics, and biogeographical aspects (CEMBELLA, Lamoque, Quilliam, and Pleasance)	Gonadal neoplasia and its prevalence within the Indian River clam population (ARNOLD)
9:00 - 9:15	Monitoring DSP in Dutch shellfish growing waters (HAGEL)	Genetic variation in gametogenic cycles of American oyster stock (BARBER, Ford and Wargo)
9:15 - 9:30	An outbreak of NSP along the Texas coast (WILES)	Negative larval response to selection for increased growth rate in the northern quahog, Mercenaria mercenaria (HEFFERNAN, Walker and Crenshaw)
9:30 - 9:45	Red tide in North Carolina: a case study in transport, distribution and persistence (TESTER and Fowler)	Larval ecology of the scallop, Placopecten magellanicus, in the Middle Atlantic Bight: the functional spawning season (MANN)
9:45 - 10:00	Impacts of the 1987-88 North Carolina red tide (FOWLER and Tester)	Factors regulating reproduction and recruitment in populations of the American oyster Crassostrea virginica (NEWELL, Jones, Kennedy, and Alspach)
10:00 - 10:30	---------- BREAK ----------	

POSTER SESSION - Center Lounge

CLAM BIOLOGY AND CULTURE
Moderator: John Manzi
Main Auditorium

10:30 - 10:45	Toxic dinoflagellate blooms and paralytic shellfish poisoning in California - 1927-1989 (PRICE and Kizer)	Characterization of hard clam (Mercenaria mercenaria) habitats in the eastern Great South Bay (KASSNER and Cerrato)
10:45 - 11:00	Paralytic shellfish poisoning (PSP) in offshore waters of the Northeast (LEARSON and Martin)	Periodicity of growth lines in larval and postlarval shells of Mercenaria mercenaria (CENNI, Cerrato and Siddall)
11:00 - 11:15	Current developments in monitoring programs for shellfish toxicity: a government perspective (SOMERSET)	Factors which influence the growth of the hard-clam Mercenaria mercenaria in small-boat marinas (RHEAULT and Rice)
11:15 - 11:30	Rationale for testing for P.S.P. by a primary producer of shellfish (MURRAY)	Predation of juvenile soft shell clam (Mya arenaria) by juvenile Dungeness crab (Cancer magister) (PALACIOS and Armstrong)
11:30 - 11:45	Pyrodinium bahamense and PSP along the Pacific coast of Central America (CANAHUI, Rosales, Loessener, Miller, and Hall)	Pond culture of hard clams (BATTEY and Manzi)
11:45 - 12:00	Gymnodinium catenatum as a source of PSP (GAINES)	Effects of Hurricane Hugo on clam culture activities in coastal South Carolina (MANZI)
12:00 - 1:30	--------- LUNCH ---------	

		ARTICA Moderator: Richard Lutz Main Auditorium
1:30 - 1:45	Alexandrium sp., Gymnodinium catenatumin and PSP in Venezuela (LA BARBERA, Estrella, Gisela,) Miller, Lee, King, and Hall)	Growth patterns within the shell of the ocean quahog, Arctica islandica: a review and recent observations (LUTZ, Fritz, Dobarro, Stickney, and Castagna)
1:45 - 2:00	Paralytic shellfish poisoning toxins as a chemical defense in butter clams: the evidence (KVITEK)	Effects of intraspecific density on the growth of Arctica islandica Linne inside field enclosures located in eastern Maine, USA (BEAL and Kraus)
2:00 - 2:15	The effects of toxic algae on the behavior and physiology of bivalve molluscs (SHUMWAY and Cucci)	Growth rate of Arctica islandica Linne: a comparison of wild and laboratory-reared individuals (KRAUS, Beal and Chapman)
2:15 2:30	Uptake and depuration of PSP toxins from the red tide dinoflagellate Alexandrium fundyense by Mercenaria mercenaria (LEE, Bricelj and Cembella)	Population and fishery dynamics of ocean quahog in the Middle-Atlantic Bight, 1976-1990 (MURAWSKI, Serchuk, Idoine, and Rope)
2:30 - 2:45	Recent developments in detection for shellfish toxins (HALL, King, Miller, Canahui, Price, Gann, and Hurst)	Seasonal condition of Arctica islandica in the Mid-Atlantic Bight (FRITZ)
2:45 - 3:15	------- BREAK -------	

	VIBRIO Moderator: James Oliver Rooms 1 & 2	
3:15 - 3:30	The viable but non-recoverable state in Vibrio vulnificus: a new cause for concern (OLIVER)	Larval ecology of Arctica islandica on the inner continental shelf of the eastern United States (MANN)

		GENETICS/POLYPLOIDY Moderator: Patrick Gaffney Main Auditorium
3:30 - 3:45	Vibrio vulnificus - a new monster of the deep? A review of clinical and epidemiologic features of infection in humans (MORRIS)	Recommendations for commercial production of triploid oysters (SHATKIN and Allen)
3:45 - 4:00	Vibrio species of the U.S. West Coast (KAYSNER)	Hybridization, triploidy and salinity effects on crosses with Crassostrea gigas and Crassostrea virginica (DOWNING)
4:00 - 4:15	The ecology of Vibrio vulnificus in Crassostrea virginica (TAMPLIN)	Aneuploid Pacific oyster larvae produced by treating with cytochalasin B during meiosis I (GUO, Cooper and Hershberger)
4:15 - 4:30	Rapid identification of Vibrio vulnificus from oyster shellfish (SIEBELING and Simonson)	Effects of culling and temperature on family contribution in hatchery reared Pacific oysters (FRANKLIN and Downing)
4:30 - 4:45	Vibrio vulnificus in post-harvest shellstock and processed Gulf Coast oysters (COOK and Ruple)	Allozyme survey of the population structure of Crassostrea virginica inhabiting Laguna Madre, Texas and adjacent bay systems (King and GRAY)
4:45 - 5:00	Depuration of vibrios from Florida shellfish (ROBRICK and Schneider)	Mitochondrial DNA analysis of native and selectively bred Chesapeake Bay Oysters, Crassostrea virginica (BROWN and Paynter)

NSA RECEPTION, 6-7 PM
SOUTHERN STYLE PIG ROAST, 7-10 PM
President's Hall

WEDNESDAY -- APRIL 4

	STATUS AND TRENDS Moderator: Tom O'Connor Rooms 1 & 2	GENETICS AND POLYPLOIDY (cont.) Moderator: Patrick Gaffney Main Auditorium
8:30 - 8:45	NOAA status and trends Gulf of Mexico Mussel Watch Program: the first four years (WADE)	Genetics of transplanted bay scallops in Long Island waters: evidence for selective mortality (KRAUSE)
8:45 - 9:00	The evolution of PCB analyses for the NOAA Mussel Watch Program and overview of PCB levels in bivalves from 1989 Mussel Watch field season (STEINHAUER, Peven and Boehm)	Heterosis and heterozygote deficiencies in Mulinia lateralis (CHURCHILL and Gaffney)
9:00 - 9:15	DDT residues in the U.S. Gulf of Mexico oysters: review and perspective (SERICANO, Wade and Brooks)	Use of gene frequencies to determine "best" parents in a mass spawning of hard clams (HADLEY and Dillon)
9:15 - 9:30	Ten-year trends in chemical contamination in mussels and oysters (O'CONNOR and Lauenstein)	Effective population size for shellfish broodstock management: conflicts between theory and practice (BUSHEK and Allen)
		SETTLEMENT AND RECRUITMENT Moderator: William Arnold Main Auditorium
9:30 - 9:45	Findings of tributyltin in East and West Coast bivalves: 1988-1989 (UHLER, Durell and Steinhauer)	Biotic and abiotic factors influencing the recruitment of soft-shell clams, Mya arenaria L. to soft-bottom intertidal areas in Downeast Maine, USA (BEAL)
9:45 - 10:00	The implications to the taxonomy of Mytilus of histopathological observations of Mytilus edulis collected for the Mussel Watch Program (HILLMAN)	Annual and spatial patterns of oyster (Crassostrea virginica) spat settlement in Delaware Bay, 1954 - 1989 (FEGLEY, Kunkle, Haskin, and Kraeuter)
10:00 - 10:30	--------- BREAK ---------	
	POSTER SESSION - Central Lounge	
10:30 - 10:45	Benzo[a]pyrene metabolism in oysters from Florida sites in NOAA's Status and Trends Monitoring Program (MC DONALD, Wade, Estabrook, Powell, Kennicutt, and Brooks)	Spatial settlement patterns of oysters in South Carolina (MICHENER, Barnard, Jefferson, Kenny, and Brunt)
10:45 - 11:00	The distribution of chemical contaminants in Gulf Coast oyster populations: relationship and climate change (WILSON, Taylor, Wade, Presley, Brooks, Powell, and Gauthier)	Dispersion and distribution of oyster larvae in Caraquet Bay, New Brunswick (SEPHTON and Booth)
11:00 - 11:15	"DERMO" and the Southern Oscillation (GAUTHIER, Powell, Wilson, and Brooks)	Monitoring the initial recruitment patterns of Crassostrea virginica (Gmelin) spat along a tidal gradient (ROEGNER)
11:15 - 11:30	The use of salt dips to reduce coliform levels in soft shell clams (JENSEN, May and Lockwood)	Reduced oyster recruitment in a river with restricted tidal flushing (VISEL, De Coursey and Auster)
11:30 - 11:45	Evaluation of Salmonella typhimurium WG49 host assay method for enumeration of male-specific coliphages in an estuarine environment(Rhodes and KATOR)	Simulating the population dynamics of diseased oyster populations: environmental variation and disease (KLINCK, Powell, Gauthier, Choi, and Lewis)
11:45 - 12:00	Environmental assessment of oyster shell dredging in the upper Chesapeake Bay (JUDY)	Simulating the population dynamics of diseased oyster populations: should brood stock be conserved (HOFMANN, Powell, Wilson, and R.
12:00 - 2:00	--------- NSA BUSINESS LUNCHEON --------- President's Hall	
	SHELL DISEASE IN MARINE CRUSTACEANS Moderator: C.J. Sindermann Rooms 1 & 2	SETTLEMENT AND RECRUITMENT (cont.) Moderator: William Arnold Main Auditorium
2:00 - 2:15	Shell disease in marine crustaceans -- a conceptual approach (SINDERMANN)	Oyster spat recruitment: a menace to oyster culture in coastal Georgia (ADAMS, Walker and Heffernan)
2:15 - 2:30	Shell disease in lobsters: a report of findings in Massachusetts (ESTRELLA)	Endogenous control of oyster settlement and metamorphosis (COON, Bonar and Weiner)
2:30 - 2:45	Shell disease in lobsters from the New York Bight apex (RUGG)	Molecular cues of Crassostrea set that are synthesized by bacteria (WEINER, Walch, Fuqua, Sledjeski, Dagasan, and Coon)
2:45 - 3:15	----------BREAK ---------	
3:15 - 3:30	A lobster shell disease survey of Maine's lobster dealers and pound owners (GETCHELL)	Production and role of ammonia, an inducer of settlement of veliger larvae of oysters (FITT, Haymans and Coon)
3:30 - 3:45	Prevalence and severity of shell disease among deep-sea red crabs of the Middle Atlantic Bight in relation to ocean sewage sludge dumping (YOUNG)	Transport of waterborne chemicals and larval settlement (ZIMMER-FAUST, Morgan and Macintyre)
3:45 - 4:00	Shell disease among the blue crab populations of Pamlico Sound, North Carolina (ENGEL and Noga)	Spatial and temporal distribution of bivalve larvae in Oyster Bay, Long Island, New York (MIDDAUGH and Cerrito)
4:00 - 4:15	Etiology and pathology of shell disease (BULLIS)	Settlement and recruitment of Mercenaria mercenaria in Long Island Sound, Connecticut (GOLDBERG and Widman)
4:15 - 4:30	Shell disease and gill blackening in the rock crab, Cancer irroratus (SAWYER)	Recruitment of hard clams, Mercenaria spp., in the Indian River Lagoon, Florida: repeated failure or successful strategy (MARELLI, Arnold, Gill, and Lund)
4:30 - 4:45	Summary and discussion (NOGA)	Effects of location and type of substratum, and adult stock on bay scallop, Argopecten irradians, recruitment (AMBROSE and Peterson)
4:45 - 5:00	Effects of hypoxia in blue crabs, Callinectes sapidus (DEFUR)	Influence of environmental factors on the maximization of spat settlement in the giant scallop, Placopecten magellanicus (PARSONS, Dadswell and Roff)
5:00 - 5:15		Recruitment of scallops in the Mid Atlantic Bight: is vertical relief important (MANN)

WEDNESDAY -- APRIL 4
INTRODUCTIONS AND TRANSFERS OF MOLLUSKS: RISK CONSIDERATIONS AND IMPLICATIONS
Moderator: Aaron Rosenfield
Amphitheatre

2:00 - 2:30	Introduction (CARRIKER)
2:30 - 3:00	Another oyster for the Chesapeake Bay? A discussion of habitat considerations when selecting species for introduction (MANN)
3:00 - 3:15	--------- BREAK ---------
3:15 - 3:45	Genetic aspects of introduction and transfers of molluscs (ALLEN and Gaffney)
3:45 - 4:15	Pathogens, parasites, and predators of mollusks: spread and control (FORD)
4:15 - 4:45	Discussion

THURSDAY -- APRIL 5
INTRODUCTIONS AND TRANSFERS (cont.)

8:30 - 9:00	The economics of mollusc introduction and transfer: history and future of private and public decisions (STRAND and Lavan)
9:00 - 9:30	Assurrance of human health and safety (HACKNEY)
9:30 - 10:00	The introduced marine and estuarine mollusks of North America: an end-of-the-century perspective on four centuries of human-mediated introductions (CARLTON)
10:00 - 10:30	--------- BREAK ---------
10:30 - 11:00	Discussion
11:00 - 11:30	Molluscan shellfish introductions-concerns of states (HICKEY and Hurst)
11:30 - 12:00	Introduction and transfer of molluscs in the northeast Pacific (WIEGARDT and Bourne)
12:00 - 1:30	--------- LUNCH ---------
1:30 - 2:00	Laws and regulations relative to introduction and transfers of shellfish (PEACO and Kern)
2:00 - 2:30	Social and cultural dimensions of the movement of molluscs (MC CAY)
2:30 - 3:00	The political process as it relates to shellfish (CROCKETT and McCallum)
3:00 - 3:15	--------- BREAK ---------
3:15 - 3:45	Discussion and summary
3:45 - 4:00	Use of a computerized monitoring and control system in a shellfish hatchery/ nursery (HADLEY)
4:00 - 4:15	Transferring oyster hatchery technology: can the east coast learn from the west coast (BOHN)

THURSDAY - APRIL 5

TIME	PARASITES AND DISEASE Moderator: Susan Ford Rooms 1 & 2	PRODUCTION MODELLING Moderator: Carter Newell Main Auditorium
8:30 - 8:45	In vitro recognition and phagocytosis of the oyster pathogen MSX (FORD)	Development of mussel biomass on culture plots in the Eastern Scheldt (Netherlands) as a function of growth, mortality and fisheries (STRALEN van, Dijkema, Bol, and Brand)
8:45 - 9:00	Isonema-like flagellates (Protozoa: Mastigophora) as potentially opportunistic pathogens of bivalve molluscs (NERAD, Dungan and Sawyer)	The functional role of mussels in the Oosterschelde estuary (SMAAL, Prins and Yonck
9:00 - 9:15	The effect of salinity and Perkinsus marinus infection on some immunological parameters of the oyster Crassostrea virginica (LA PEYRE, Chu and Ragone)	The central role of shellfish in the Simulation Model Oosterschelde Ecosystem (SCHOLTEN, Klepper, Smaal, and Herman)
9:15 - 9:30	The role of oyster scavengers in the spread of the oyster disease Perkinsus marinus (MEYERS and Burreson)	Development of a simulation model of a cultured mussel (Mytilus edulis) population: potential and limitations (BRYLINSKY)
9:30 - 9:45	The effect of low salinity exposure on Perkinsus marinus infections in the eastern oyster, Crassostrea virginica (RAGONE and Burreson)	A model to determine optimum seeding densities for blue mussels, Mytilus edulis, on bottom culture lease sites in Maine (CAMPBELL and Newell)
9:45 - 10:00	Simulating the population dynamics of diseased populations: environmental variation and disease (KLINCK, Powell, Gauthier, Choi, and Lewis)	Ecosystem dynamics and bivalve culture (DAME)
10:00 - 10:30	--------- BREAK ---------	
10:30 - 10:45	Classification of the Haplosporidiidae (MC GOVERN and Burreson)	Environmental processes and mussel production in a lagoon system from the Gulf of St. Lawrence (Quebec) (MAYZAUD, Souchu and Roy)
10:45 - 11:00	Susceptibility of MSX-resistant strains of the eastern oyster and of the Japanese oyster to Perkinsus marinus (BURRESON, Meyers, Mann, and Barber)	Use of the BOSS (Benthic Organic Seston Sampler) to investigate the depletion of phytoplankton above a mussel bed in Maine (NEWELL, Muschenheim and Murphy)

OYSTERS
Moderator: Clyde MacKenzie
Main Auditorium

11:00 - 11:15	Low salinity control of Halosporidium nelsoni (MSX) (HASKIN and Ford)	The effects of feed water flow rate on the growth of aquacultured Crassostrea virginica in Hawaii (Lam and WANG)
11:15 - 11:30	Growth, mortality, MSX infection and yield of intertidally grown Crassostrea virginica (LITTLEWOOD, Wargo, and Kraeuter)	Use of a mark-recapture technique to assess crab-attributable mortality rates of subtidal juvenile oysters, Crassostrea virginica (EGGLESTON)
11:30 - 11:45	Comparison of oyster defense mechanisms for MSX-resistant and -susceptible stocks held in Chesapeake Bay (CHINTALA and Fisher)	Alternative cultch materials: physiology and growth of Crassostrea virginica grown on stabilized coal ash (MUELLER)
11:45 - 12:00	Cytology and time-lapse cinematography of the soft-shell clam, Mya arenaria (EBLE, Reside and Auletta)	Production costs associated with playing oyster roulette in Barataria Bay, Louisiana: a seed bedding and harvesting endeavor (MELANCON and Condrey)
12:00 - 1:30	--------- LUNCH ---------	

FEEDING BY BIVALVES
Moderator: Sandra Shumway
Rooms 1 & 2

1:30 - 1:45	Suspension feeding in bivalves: overview of a turbid subject (BENINGER)	Survival, condition, and glycogen and succinate levels in oysters, Crassostrea gigas, during and after prolonged air storage (SEAMAN)
1:45 - 2:00	(BENINGER cont.)	Revitalizing a Northern Gulf fishery: determination of the coast versus benefits for relaying oysters (BURRAGE and Posadas)
2:00 - 2:15	Omnivorous feeding by Crassostrea virginica larvae: consumption of naturally occurring phytoplankton, protozoa and bacteria (BALDWIN, Newell and Jones)	The advantages of making a social assessment of a shellfish community before developing a shellfish culture program (MAC KENZIE)
2:15 - 2:30	Effects of toxic dinoflagellates on feeding and mortality in juvenile bivalves: comparison of six commercially important species (LESSER, Shumway, Barter, and Paseno)	Analysis of the Gulf Region oyster fishery (KEITHLY and Dugas)
2:30 - 2:45	Feeding and growth of Mercenaria mercenaria subject to wave-suspended bottom sediments(TURNER and Miller)	One hundred years later: an intertidal oyster resource comparison (ANDERSON and Keith)
2:45 - 3:10	--------- BREAK ---------	

ANNOUNCEMENT OF THURLOW NELSON AWARD WINNER
Main Auditorium, 3:10 PM

3:15 - 3:30	Chemical mediation of the feeding behavior of bivalves (WARD and Targett)	An economic analysis of returned oyster leases: the Louisiana experience (KEITHLY, Roberts and Dugas)
3:30 - 3:45	Effects of food quality on feeding behavior of the blue mussel, Mytilus edulis (TRACEY)	Enhancing Louisiana's oyster resources through shell planting (PERRET, Dugas and Chatry)

GENERAL BIOLOGY
Moderator: Robert Bayer
Rooms 1 & 2

3:45 - 4:00	Fish-oyster polyculture in warm water marine ponds (SHPIGEL, Lee and Soohoo)	Metabolism of saturated and unsaturated fatty acids in adult oysters (Crassostrea virginica) (CHU)
4:00 - 4:15	Influence of a fish pen on the local lobster harvest in the Weskeag River, Maine (BAYER, Kupelian, Prince, Waltz, and Hamill)	The effect of biosynthetic trout growth hormone on oyster growth (PAYNTER, Tang and Chen)
4:15 - 4:30	Ingestion and digestion of oyster (Crassostrea virginica) larvae by gelatinous zooplankton (KENNEDY, Purcell and Cargo)	Suitability of fly ash-cement aggregate for oyster cultch (HOMZIAK, Simm, Bennett, and Herring)
4:30 - 4:45	Extent of castration of prawns (Pandalus platyceros) by Sylon (Crustacea: Rhizocephala) (BOWER and Boutillier)	Estimation of surface area of shells of the oyster (Crassostrea virginica) using aluminum foil molds of the shell surface (MORALES-ALAMO)
4:45 - 5:00	Aeration of lobster ponds (Hagopian and RILEY)	Dating oyster shell age by the rate of decomposition of the organic matrix (POWELL and King)

POSTER SESSION

Scanning electron microscopy and X-ray analysis of shell disease lesions in the American lobster (Bayer, Prince, Waltz, Corey, and Getchell)

FRNA bacteriophages as indicators of fecal pollution in an estuarine environment (Boyd, Kator and Rhodes)

A seasonal and spatial study of the uptake, sequestering and transformation of paralytic shellfish toxins by the giant scallop, Placopecten magellanicus (Cembella and Shumway)

Seasonal and microgrowth line patterns in the chondrophore of Mya arenaria (Cerrato and Wallace)

Detection of Vibrio vulnificus in environmental samples using gas chromatography (Davis, Barth, Williams, and Rutter)

Biomineralization of barite by Corbicula fluminea (Fritz, Ferrence, Jacobsen, and Lutz)

Characterization of pili of Vibrio vulnificus by electron microscopy and electrophoresis (Gander and Patel)

Reproductive biology of the whelk Succinum undatum in the northwest Gulf of St. Lawrence (Gendron)

The chick assay for PSP: an alternative to the mouse bioassay useful in rural areas (Gornea, Doerr and Hall)

Spatial and temporal differences in the ecophysiology of bivalves from polluted and un-polluted areas of the Dutch delta area (Hummel, Bogaards, De Wolf, and Goossen)

Life history of the small patagonian octopus, Octopus tehuelchus d'Orbigny (Iribarne)

Alexandrium in New England waters (Keafer, Anderson and Franks)

Seafood safety electronic bulletin board (Kuenstner)

Identification of Vibrio vulnificus by cellular fatty acid composition (Landry and Roderick)

Productivity of the giant scallop (Placopecten magellanicus) maintained in suspended cages, for the purpose of aquaculture, in Port au Port Bay, Newfoundland, Canada (Lanteigne and Davidson)

Use of shallow water inshore habitats off Grand Manan, Bay of Fundy, Canada, by mature American lobsters, Homarus americanus (Lawton and Robichaud)

Heritability, genetic correlation, and genotype-environment interaction of larval and juvenile growth rate in the coot clam, Mulinia lateralis (Ludwig)

Water qualities associated with rapid oyster growth (Mallonee and Paynter)

Body burden and tissue allocation of saxitoxin in two clam species (Mann, Rainer and Hall)

Contaminant levels in oysters from the Chesapeake Bay: 1981-1985 (Murphy)

Polynuclear aromatic hydrocarbon levels in shellfish, overview of 1989 Mussel Watch field season (Peven and Steinhauer)

Calculation of condition index in oysters (Rainer)

Estimation of oyster standing stock using SCUBA (Rainer)

Oysters and toxic algal blooms: are they immune (Shumway, Barter and Sherman-Caswell)

Growth and survival of hard clams at various densities in three Long Island Sound locations (Widman and Goldberg)

Publications of Interest

The Directory of Marine Training in Canada includes ongoing education and training programs, courses and associated research programs of 72 universities, colleges, technical schools and government departments. For additional information, contact: International Centre for Ocean Development, 9th Floor, 5670 Spring Garden Road, Halifax, Nova Scotia, Canada B3J 1H6.

Book Review

Design and Operating Guide for Aquaculture Seawater Systems. By J. E. Huguenin & J. Colt. Elsevier Science Publishing Co., Inc., New York. 1989. 264 pages + iv. ISBN 0-444-87157-8. Price: $US 76.25.

This well-organized book has succeeded admirably in its primary objective of providing "basic information and considerations necessary to plan, build and operate seawater systems for culturing purposes" principally for non-experts. It should go a long way to reduce the frustrations which, as biologists, many of us have experienced in working with engineers who frequently have little appreciation of the biological requirements of such systems. Similarly, biologists can begin to overcome their usually poor comprehension of the mechanical and hydraulic aspects of planning, design and construction of seawater systems by reading this book. I recommend it as essential reading and a useful reference for biologists contemplating or working with seawater aquaculture systems.

Written in a concise, readable style, the book proceeds through 19 chapters of text, including the authors' introduction, and one of references. Among these, I found Chapter 2, Problem Definition and Establishing Requirements, among the more stimulating. It provides a logical framework for a common sense approach to system planning and design, emphasizing quantification of all parameters, especially biological requirements, from first steps. The authors provide several guidelines on carrying capacities to assist this quantification, but also recognize the need for a conservative approach to minimize risks in the absence of specific data on species' requirements and sea water quality.

Chapters 3,4 and 5 discuss Site Considerations, Seawater Sources, and System Layout and Elevation, respectively. Together, these provide both biological and engineering perspectives on site factors with an emphasis on engineering considerations which, if taken into account during site selection, will reduce design and construction costs.

The next three chapters (6,7,8), Piping Design and Calculations, Pump Selection, and Materials Selection, provide an introduction to the intricacies of the engineer's domain in clear, understandable terms. Chapter 8 discusses problems with the use of many materials, emphasizing biological toxicity and noting that very few materials and products are designed specifically to meet the needs of marine aquaculture.

Chapters 9-16 cover topics of varying importance in different systems (Seawater Flow Control, Solids Removal, Heating and Cooling, Aeration and Degassing, Disinfection, Alarm Systems, Water Recycling, Wet Laboratory Areas). Much of this information will be useful in evaluating options for new and existing systems. Each chapter states the problem clearly and concisely, provides a brief background and describes the various options available along with their respective advantages and disadvantages. Quantitative information on many of these options is included.

Construction Considerations (Chapter 17) briefly discusses construction arrangements, cost estimating, design changes, seawater line installation and start-up. Similarly, Chapter 18, Operational Considerations, notes potential problem areas in new system operation and emphasizes the critical need for monitoring and control throughout. These and other guidelines are listed under Summary Commandments (Chapter 19) as a means of "maximizing the probability of success".

The final chapter (20), References, regrettably did not include a few of the publications cited in the text which I checked. Some of these were found within the 11 tabular bibliographies covering different aspects of the book's subject and contained in Appendices B-L. The other two appendices (A and M) comprise Definitions, Constants and Conversion Factors, and Indexes for Equipment and Supplies, both of considerable use.

I am a fan of the thorough index, especially in reference books. The 1.25 page index provided here was disappointing, but the book's organization and full Table of Contents compensated.

Overall, I believe that the book provides a through introduction to the design of seawater aquaculture systems. Throughout, the book reiterates the need to reconcile the conflicting demands of present and future costs and developments versus the risks and tradeoffs inherent in any biological systems by careful definition of the risks and quantification of the factors involved. Obviously, information is the key to success in aquaculture and this book provides sound introductory information of engineering aspects that will be off considerable benefit to biologists working in this field.

Graham Fenwick
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New Zealand

This issue of the Newsletter includes a listing of this and other Elsevier books offered to NSA members at special discount prices.

Reprint Relief Appeal

Hurricane Hugo, which recently struck the coast of South Carolina, did a great deal of damage to the U.S.C. Belle W. Baruch Field Lab for Coastal Research and Marine Biology. Also my entire collection of reprints dealing with estuarine and marine bivalves (oysters in particular, but also clams and mussels) was lost. These were primarily reprints dealing with ecophysiology, feeding and bioenergetics, disease, pollution effects, reproduction, and general metabolic processes. I was not one of the organized few, who have their reprints filed on computer (or paper indexing, for that matter). I am, therefore, in a bit of a tough spot! I would be extremely appreciative of any reprints (your own or "benchmark" papers from your reprint collection) that any of my colleagues would donate to my reprint revival collection effort. Please send reprints to me at the address below.

Dr. Michael P. Crosby, Belle W. Baruch Institute for Coastal Research and Marine Biology, University of South Carolina Marine Field Lab, P.O. Box 1630, Georgetown, SC 29442.

Meetings, Courses, Etc.

The 10th Annual Shellfish Biology Seminar - will be held on February 27, 1990 at the Howard Johnson's Motor Lodge, 1052 Boston Post Road, Milford, Connecticut. Fore more information, contact: Dr. Walter Blogoslawski, NOAA, NMFS, NEFC, Milford Laboratory, 212 Rogers Avenue, Milford, Connecticut 06460 (203) 783-4235.

The Eighth Symposium of Astacology - will be held April 22-26, 1990 in Baton Rouge, Louisiana. The Symposium will be hosted by the Louisiana State University Agricultural Center. For additional information, contact: L.W. de la Bretonne, Louisiana Cooperative Extension Service, Knapp Hall, Louisiana State University, Baton Rouge, LA 70803 (504) 388-4141.

The 56th annual meeting of the American Malacological Union (AMU) - will be held from 3-7 June 1990 at the Marine Biological Laboratory (MBL), Woods Hole, Massachusetts. Contact: Dr. Alan Kuzirian, MBL, Woods Hole, MA 02543 (508) 548-3705, FAX (508) 540-6902.

An **International Workshop on Lobster Ecology and Fisheries** - will be held June 12-16, 1990 at the International Conference Center, Havana, Cuba. Contact: Mrs. Georgine Luis, Conference Organizer, International Conference Center, Apartado l6046, Havana, Cuba. Telex: 511609 Fax: 22-8382.

The 23rd meeting of the Association of Marine Laboratories of the Caribbean (AMLC) - will be held June 18-21, 1990 in Havana, Cuba. Contact: Lucy B. Williams, P.O. Box 908, Lajas, Puerto Rico 00667.

World Aquaculture '90 - sponsored by the World Aquaculture Society and the Aquaculture Association of Canada will be held June 10-17, 1990 at the World Trade Centre, Halifax, Nova Scotia, Canada. Contact: K. Charbonneau, World Aquaculture '90, National research Council of Canada, Ottowa, Ontario, Canada K1A 0R6 (613) 993-9009.

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– Fill out and mail a copy of the application blank below. The 1989 dues are ONLY $30(US) per year ($20 for students) and that includes the *Journal* and the Newsletter!

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