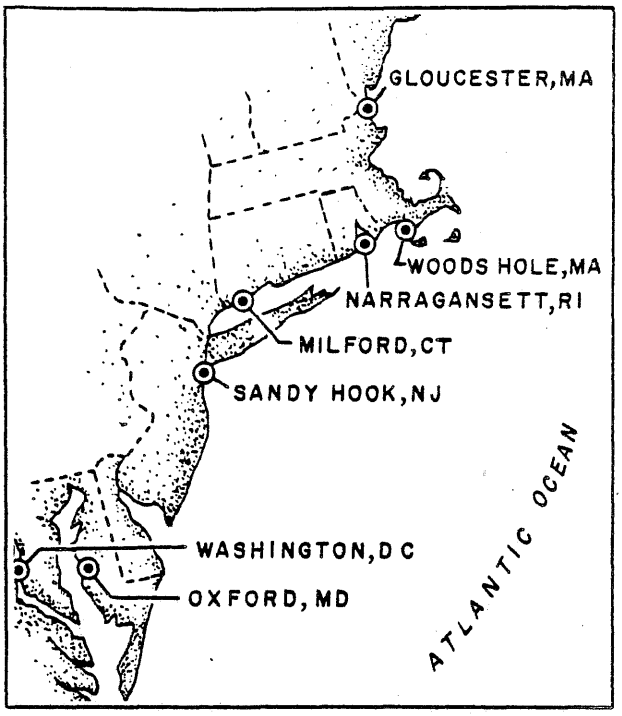
NEFC

Northeast Fisheries Center

NEWS



MAY 1978

US DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The third leg of the spring bottom trawl survey was conducted during 17 April - 3 May aboard the Albatross IV (Linda Despres, Chief Scientist) in the Georges Bank area. The fourth and final leg was conducted during 8-26 May aboard the Albatross IV (Henry Jensen, Chief Scientist) in the Gulf of Maine and Nova Scotian shelf areas.

In order to monitor more precisely the types and distributions of marine mammals, a Zodiac raft was launched from the Albatross IV during Part IV. John Nicolas was able to identify positively and photograph from the raft a Minke whale which probably would have been identified as a fin whale if observed from the Albatross IV.

Thanks to the special effort of the scientists and especially the chief scientists during the spring surveys, the bulk of the hand processing of data was accomplished at sea. This effort enabled the Investigation to have the data ready for keypunching 1 or 2 days after the end of a cruise, considerably sooner than in the past.

Malcolm Silverman helped to conduct a gear comparison study from 15 to 31 May aboard the Spanish fishing trawler Pescapuerta Segundo. The experiment was designed to determine the efficiency of different mesh sizes in Spanish squid trawls.

During May the Investigation completed the auditing of five cruises and worked on 10 additional cruises.

Age and Growth Investigation

Specifications for the proposal for developing an instrument to age fish scales by electronic means have been completed and sent to the regional contracting officer for review.

Fred Nichy assisted Dr. Richard Haedrich of the Woods Hole Oceanographic Institution in the preparation of sections from American eel otoliths for age studies.

Mike Campbell has completed the aging of commercial and research collections of scup for 1974-77. Sufficient age data are contained in this study for developing preliminary growth curves, so aging of scup will be terminated for awhile. Mike is presently examining the ages of spiny dogfish by use of the dorsal spurs with less than satisfactory results. Vertebrae are being collected to determine their value for aging this species.

Gary Shephard began a comparison of summer flounder scales and fin-ray sections with very good results. Zonal markings on fin-ray cross sections are quite clear and should provide comparative age data to compare to scale age data. Gary will also be examining age structures from summer flounder under 10 cm collected by Massachusetts Division of Marine Fisheries' biologists to determine the formation of the first year on these age structures for validating their use.

Age samples completed during the month were: Atlantic cod (Albatross IV Cruises No. AL 77-07 and No. AL 77-12); Atlantic mackerel (commercial samples for 1977-78); Atlantic herring (commercial samples for 1977, Argus Cruise No. 78-03, and Albatross IV Cruise No. AL 77-08); sea scallops (12 commercial samples and Albatross IV Cruise No. AL 77-08); and white hake (Albatross IV Cruise No. AL 77-02).

Sandy Hook Investigation

The survey of the Atlantic mackerel (Scomber scombrus) 1978 spring fishery continued through May. Mackerel left Delaware and southern New Jersey waters during the week of 7-13 May. By the middle of the following week, they left the rest of the New Jersey area and by the end of the month only anglers fishing Long Island Sound were still catching them. Data received from cooperating state personnel in Delaware and New Jersey are being analyzed along with NMFS data. New York personnel concentrated their efforts on the Long Island Sound fishery.

Dr. Mike Pennington of the Woods Hole Laboratory spent several days at the Sandy Hook Laboratory helping Darryl Christensen to establish proper methods to determine variance and confidence intervals for the 1975-77 New Jersey party and charter-boat creel survey data.

Coding and keypunching were completed for 6,000 observations of maturity stages recorded during the spring bottom trawl survey. Retrieval of historic data on bluefish (Pomatomus saltatrix) was initiated. Some 25,000 observations of age and length are being coded and submitted for keypunching.

Fishery Analysis Investigation

Steve Murawski continued data analysis of surf clam and ocean quahog survey data from NMFS shellfish surveys. Marj Aelion and Maureen Griffin completed laboratory processing and data entry for over 3,000 ocean quahog and surf clam samples for length-weight analysis. Marj also completed audits on all ocean quahog survey data from 1965 to 1978.

Paul Wood assumed responsibility as program coordinator for sea-sampling activities. Paul met with several vessel captains in New Bedford and Gloucester, and found them receptive to the program's aim and objectives. Paul also continue analysis of sea scallop data in preparation for an assessment document. Analysis was also performed on Atlantic cod survey abundance indices in an effort to delineate recent trends in fishing mortality.

Harold Foster continued analysis of the recreational Atlantic cod landings from the Georges Bank stock in preparation for virtual population analysis simulations to ascertain the effects of the recreational removals on stock size and composition. Harold participated in the final leg of the spring bottom-trawl survey during 8-26 May.

Ralph Mayo completed the 1977 USA Statlant 21A catch report for FAO and ICNAF. Ralph began work on updating the ICNAF Subarea 5 redfish assessment using commercial and survey data. Liz Bevacqua has assisted Ralph in completing the 1977 redfish biostatistics program, and plotting small redfish length frequencies to delineate nursery areas in the Gulf of Maine. Ralph has analyzed recent redfish growth rate age composition of commercial redfish landings, and catch per effort by tonnage class of commercial vessels. Work began on a revised redfish surplus production model using standardized catch-per-effort data from 1942 to 1977, and 1952 to 197

Bill Callahan and Ralph completed data requests from the New England Regional Fishery Management Council for groundfish (Atlantic cod, haddock, and yellowtail flounder) catch data by tonnage class and gear category, and from Fred Olsen, NMFS Washington, DC, for US catch and value data for Statistical Areas 523 and 524.

Steve Murawski and Fred Serchuk wrote a paper entitled "Population Dynamics and Management Strategies for Offshore Surf Clam Populations in the Middle Atlantic," to be published as part of the contributed papers given at a recent Northeast Clam Conference held in Hyannis, MA, on 27 and 28 April.

Fishery Assessment Investigation

Investigation personnel have been involved in a variety of activities, as usual, including preparation of data for updating species assessments, report writing, and attending assorted meetings.

Steve Clark chaired a meeting of the Northern Shrimp Scientific Committee held in Woods Hole on 2 May. A draft FMP/EIS for northern shrimp was completed and commitments were made by the various organizations represented for summer research activities. Steve has completed an assessment of the Scotian shelf - Gulf of Maine - Georges Bank pollock stock, and earlier, with Brian Hayden, prepared a brief review of the status of white hake in the Gulf of Maine - Georges Bank area.

Emory Anderson spent most of the first 2 wk of the month finishing a review paper on the Northwest Atlantic mackerel fishery for presentation at the ICES/FAO/ICNAF Symposium on the Biological Basis of Pelagic Fish Stock Management scheduled for 3-7 July in Aberdeen, Scotland.

Emma Henderson worked primarily on the summer flounder assessment during May, with some additional work on red hake.

Thurston Burns was involved in processing effort and length-frequency data on American lobsters for 1972-77 which will be used in forthcoming analyses. Bill Overholtz has nearly completed assembling historical numbers-at-age catch data for haddock to be used in virtual population analysis.

Hilary Herring has been involved in a variety of projects including recording and calculating miscellaneous catch statistics and biological parameters for summer flounder, preparation of materials for aging goosefish, coding and auditing of commercial length-frequency sample data, and coding data for red hake biostatistics.

Brian Hayden has also participated in assorted activities such as making computer retrievals of northern shrimp and bluefish catch data from bottom trawl surveys, assembling pollock and white hake data, working on a plot program for survey catches, and working on a short paper entitled, "Observations on the Parasite Fauna of Deep-Sea Benthic Fishes from the New York Bight, Northwest Atlantic," as a joint author with R. A. Campbell and T. A. Monroe from Southeastern Massachusetts University, Dartmouth, MA.

Frank Almeida was aboard the Albatross IV for the final leg of the spring bottom trawl survey during 8-26 May. The remainder of the month he devoted to working up assessment data for silver hake.

Fishery Systems Investigation

Assessment activity continued during May. In addition, Michael Sissenwine participated in public meetings chaired by Mr. Terry Leitzell, the new Assistant Administrator of NOAA for Fisheries. The meetings were intended to improve communications between NMFS and the public and fishing industry. They also served to inform better Mr. Leitzell on the unique character and problems of the New England industry. Meetings were held in Gloucester, Boston, Eastham, and New Bedford, MA; Pt. Judith, RI; Portland, ME; and New London and Avery Point, CT.

Fred Serchuk and Brad Brown also participated in most of these meetings. Mike Sissenwine also attended a meeting of the Steering Committee of the Workshop on Climate and Fisheries held at the University of Rhode Island, and a public hearing on the Atlantic herring PMP in Point Judith, RI (also attended by Gordon Waring), and the groundfish PMP in Peabody, MA (also attended by Steve Clark).

Gordon Waring met with David Stevenson of URI and Francisco Carranza-Picado of Costa Rica to discuss fish tagging methods. The Costa Rican Government with the aid of the fishery development project at URI is planning to tag thread herring.

Anne Lange participated in an Illex squid workshop in Halifax, NS, presenting a paper on the historical and current trends in the squid fisheries off the north-eastern US coast. The intent of the meeting was to bring together researchers working on the various aspects of Illex biology, to exchange ideas, and raise questions about areas where further research is needed. The workshop was well attended and very informative.

Meetings, Talks, Visitors, Publicity

Tom Azarovitz attended a Biological Survey Subcommittee meeting of the ICNAF Standing Committee on Research and Statistics in Bonn, FRG, during 16-24 May. Major topics of discussion at the meeting were the accuracy of trawl survey data and the development of an international manual for bottom trawl surveys.

Fred Serchuk served as a juror for the University of New Hampshire Sea Grant Projects Course held on 2 May in Durham, NH. Fred, together with Brad Brown and Mike Sissenwine, accompanied Terry Leitzell during his visit to New England ports during 8-18 May. Fred attended the May meeting of the New England Fishery Management Council in New London, CT, on 17 and 18 May, and also public hearings on the 1978 Groundfish Plan in Portland, ME, on 24 May, and Riverhead, Long Island, on 31 May. Fred additionally participated in a sea-sampling trip aboard the F/V Mary A. Kelly out of Portland, ME, during 23-24 May, and spoke with the Maine Division of Marine Resources on 25 May about sea-sampling activities.

Emory Anderson and Brad Brown participated in a public meeting in Gloucester on 18 May sponsored by the Gloucester Fishermen's Wives Association at which time Assistant Administrator Terry Leitzell discussed fishery matters and answered questions. Also participating were Joseph Slavin and John Everett from the NMFS Washington Office and William Gordon, Regional Director.

On 22 May, Emory Anderson and Steve Clark attended a public hearing in New Bedford concerning recommended revisions to the groundfish FMP. Steve and Mike Sissenwine also attended a similar hearing on 30 May in Peabody, MA.

Emory Anderson was in Halifax, NS, during 24-26 as a scientific advisor to the US delegation for the first meeting of the US-Canada Atlantic Consultative Committee. The purpose of this committee is to facilitate joint management of those stocks to which both countries claim some share of ownership and jurisdiction

Manuscripts

Anderson, E. D., and A. L. Paciorkowski. 1978. A review of the Northwest Atlantic mackerel fishery. Intern. Counc. Explor. Sea Symp. Biol. Basis Pel. Fish Stock Mgmt. Pap. No. 11. 63 p.

Clark, S. H., and B. P. Hayden. 1978. A review of the current status of white hake (Urophycis tenuis) in the Georges Bank/Gulf of Maine area. NEFC Woods Hole Lab. Ref. No. 78-29. 8 p.

Clark, S. H., and P. W. Wood. 1978. Sea sampling program of the Northeast Fisheries Center, Woods Hole, Massachusetts. NEFC Woods Hole Lab. Ref. No. 78-31. 18 p.

Grosslein, M. D., R. W. Langton, and M. P. Sissenwine. 1978. Recent fluctuations in pelagic fish stocks of the Northwest Atlantic, Georges Bank region, in relationship to species interactions. Intern. Counc. Explor. Sea Symp. Biol. Basis Pel. Fish Stock Mgmt. Pap. No. 25. 52 p.

MacKenzie, C. L., A. S. Merrill, and F. M. Serchuk. 1978. Sea scallop resources off the northeastern U.S. coast, 1975. Mar. Fish. Rev. 40(2):19-23. (P)

Murawski, S. A. 1978. Consideration of the maximum sustainable yield from the northwestern Atlantic butterfish stock. NEFC Woods Hole Lab. Ref. No. 78-30. 8 p.

Sissenwine, M. P., B. E. Brown, J. Brennan-Hoskins, and O. L. Jackson. 1978. Brief history and state of the arts of fish production models and some applications to fisheries off the northeastern United States. Symp. Study Main Factors Govern. Functioning Mar. Ecosystem, USSR, June 1978. 78 p.

MARINE ECOSYSTEMS DIVISION

Benthic Dynamics Investigation

Good progress was made on the analysis of quantitative data pertaining to the Georges Bank - Gulf of Maine macrobenthic invertebrate study. Another section, describing the distribution of the Gastropoda, was completed and a second section on Scaphopoda was partially completed.

A report entitled, "Recent Fluctuations in Pelagic Fish Stocks of the Northwest Atlantic, Georges Bank Region, in Relationship to Species Interactions," was prepared by Marv Grosslein, Rich Langton, and Mike Sissenwine. This report, which draws heavily on the food habits of finfishes assembled by this Investigation, will be presented at the ICES Symposium on the Biological Basis of Pelagic Fish Stock Management in July. The study of the food habits of juvenile haddock collected during 1956-76 has been re-instituted after an interruption for higher priority work.

Arrangements were completed for the processing and analysis of hydrocarbon contamination of ring-net samples collected in the vicinity of the Argo Merchant oil spill. This work will be carried out by a private institution on contract and will be completed this fiscal year.

Preparations have been made for a fish food habits and feeding chronology cruise aboard the Albatross IV. The cruise will begin on 31 May and terminate on 2 June with Rich Langton as Chief Scientist. Operations will take place in the area south of Martha's Vineyard in water depths between 45 and 80 m.

Apex Predators Investigation

Recaptures reported for May include three blue sharks at liberty for as long as 408 days. The farthest distance traveled was 1,810 mi from Long Island to Grenada, British West Indies, and 1,380 mi from east of Oregon Inlet to Barranquilla, Venezuela. A silky shark tagged off Miami Beach was recaptured off Beaufort, NC, after 61 days and 539 mi. Other recaptures include a sandbar shark, an unidentified shark (probably a dusky), and a jack crevelle.

Sport tagging data for 1975 were verified for accuracy and added to the historical sport tagging data base. Tagging data for the years 1962-75 are now ready for ADP analysis.

In cooperation with studies at the Woods Hole Laboratory on food chain dynamics, stomach contents of red hake, ocean pout, and longhorn sculpin were examined to compare the weight of food in the stomach with that in the intestine.

Jack Casey, Chuck Stillwell, and Nancy Kohler met with Bori Olla at the Sandy Hook Laboratory to discuss methods and some preliminary results of a food habits study. Pam Staveley, a new 1040 appointee, began working this month. Her duties will be associated primarily with the tagging program.

Ichthyoplankton Investigation

We successfully completed the fourth in our series of six ichthyoplankton surveys scheduled for this fiscal year. The Middle Atlantic Bight, Georges Bank, and most of the Gulf of Maine were surveyed by the Soviet R/V Argus. The eastern part of the Gulf of Maine and the Nova Scotian shelf were surveyed by Albatross IV. Plankton samples from this two-ship effort have been crated for shipment to the Polish Sorting Center in Szczecin, Poland. Log sheets and bridge logs have been forwarded to the ADP Unit at the Sandy Hook Laboratory for keypunching. Work at the Polish Sorting Center is going well. They have completed the sorting, identification, and enumeration of 0.505-mm bongo samples from the November-December 19 survey and are halfway through the samples collected in October.

We have received from NODC the digitized temperature data for several of the semiannual surveys conducted from 1973 to 1976. Problems with the MARMAP Information System (MIS) at the Narragansett Laboratory are slowly being ironed out and we are again beginning to receive outputs from the Biostatistics Unit there. The CRT terminal at the Sandy Hook Laboratory has been operational for several weeks and we are now able to enter data directly into the computer at the University of Rhode Island.

Plankton Ecology Investigation

Plankton Sorting Group

Invertebrate samples analyzed during May were those collected in the Gulf of Maine during April-May 1977. Also, samples for May-June from the Mid-Atlantic Bight, Georges Bank, and Gulf of Maine were sorted. The complexity of the samples taken from the Mid-Atlantic Bight in July-September has caused a reduction in the rate of processing samples. The invertebrate composition has changed from two or three species to an average of 20 or more per station. To date (31 May), 17 stations have been completed for this data set and area. It is now possible for the majority of the sorting group to identify many of the rare or seldom-seen species of Copepoda. We are able to identify four species of Acartia without dissection.

Martha O'Brien of Suffolk University spent 4 days with the group learning plankton processing and identification of major taxa. George Donnelly participated in Albatross IV Cruise No. AL 78-05.

Image Analysis Project

Ray Maurer participated as Chief Scientist on the annual Atlantic mackerel egg survey during 9-20 May sponsored by the Milford Laboratory. This research in the New York Bight area is supported by MESA. The water and plankton samples are taken for hydrocarbon and heavy metal analyses. This data will be analyzed for correlation with the mutagenics studies on the development of mackerel eggs sampled at the same stations. Preliminary results suggest that mackerel eggs were being concentrated along water-mass boundaries. A phytoplankton bloom was associated with the same boundary. Tows taken in the bloom area yielded high concentrations of mackerel eggs.

An initial planning session is scheduled for 5 June with Perry Jeffries from the University of Rhode Island to outline tasks for the Image Analysis Project.

Biostatistics Unit

Problems are still being encountered by the Biostatistics Unit in assuming responsibility for the maintenance and operation of the MARMAP Information System (MIS). Some data processing by the MIS was accomplished during May as portions of the system became operational. Data processing efforts were resumed on portions of the BLM contract data. Efforts were also initiated to service a request from Walter Nelson of the Beaufort Laboratory for data to be used in an atlas of Atlantic menhaden egg and larval distribution.

Oke Lundin, a graduate student in computer science at the University of Rhode Island, has joined the Biostatistics Unit for the summer to assist with programming chores associated with the MIS.

Jerry Prezioso and Jack Green participated in the fourth leg of the spring bottom-trawl survey during Albatross IV Cruise No. AL 78-04. In addition to standard groundfish sampling, 21 plankton stations were sampled in Canadian waters to complete the MARMAP plankton survey stations begun by the Soviet R/V Argus.

Ecosystem Dynamics Investigation

Ecosystem Dynamics Task Group

In the Ecosystem Dynamics Task Group major activity focused on completion of manuscripts. Ed Cohen continued work on the paper describing phytoplankton production cycles in 1975 and 1976 on Georges Bank. Marv Grosslein (with Rich Langton and Mike Sissenwine) finished a final draft of the paper for the ICES symposium on pelagic fish stock management, and Mike Pennington completed the revision of his paper on accuracy of trawl survey indices (see Manuscripts). Finally, Marv Grosslein, in conjunction with various authors, completed final drafts of synopses on sand lance, summer flounder, bay anchovy, tilefish, and ichthyoplankton distribution for the New York Bight Atlas. A summary section remains to be written and final editing of the synopses and other sections must be completed before the monograph on fish distribution will be finished.

Ed Cohen estimated the zooplankton biomass cycle on Georges Bank based on the new data on zooplankton volumes supplied by the Polish Sorting Center (via Lorrie Sullivan). Using these data and the new production and biomass estimates for Georges Bank finfish (taken from the Grosslein et al. paper noted above),

he reevaluated the energy budget for Georges Bank in preparation for the June symposium in the USSR on marine ecosystems.

Mike Pennington continued his work on determining confidence limits for moderately sized samples from highly skewed populations. He traveled to Pennsylvania State University to consult with Dr. Patil and his associates on this and related problems. Also, he assisted Darryl Christensen at the Sandy Hook Laboratory with analysis of creel survey data; it was noted that sample sizes for many of the estimators were large enough so that normality could be assumed. Mike also spent some time working with Robert Edwards on analysis of food consumption by fishes.

Recruitment Processes Group

Significant progress was made in May on analysis of the ICNAF larval Atlantic herring data base (56 cruises) from 1968 to 1978 for the Georges Bank and Gulf of Maine regions. Separate production estimates of recently hatched larvae have been completed for the subareas of Georges Bank, Nantucket Shoals, western Gulf of Maine, and Nova Scotian shelf for 1971-77 and the group is now at the point of comparing larval production with spawning-stock size and recruitment size at age III+. Sorting of ichthyoplankton collected on Albatross IV Cruise No. AL 78-02 was finally completed and the results incorporated into the growth and mortality estimates for the 1977 winter period. Although larval production was low this last season, comparable to the 1970 and 1971 seasons, overwinter mortality was also low -- nearly as low as that observed in the winter of 1975-76. Larvae collected in December 1977 and February 1978 had a mean length much greater than any previous season.

Dave Potter has returned from his educational leave at the Virginia Institute of Marine Science.

Fishery Oceanography Investigation

Much of May was devoted to sea duty and preparation for Albatross IV Cruise No. AL 78-06 in June. Tim Cain and Ron Kirschner were on the last leg of the spring cruise of the Soviet R/V Argus, performing hydrographic sampling as part of a MARMAP II survey. Steve Ramp was on loan to the Buoy Group at WHOI, setting and retrieving current-meter moorings for POLYMODE from Atlantis II. Steve Fogg has been assembling equipment and fabricating a dozen drogues to be used in the June cruise, with the help of Pat Twohig, Gil Dering, and the shop crew. Tim Cain has checked out the Niskin bottles for the cruise; Gil Dering has prepared the STD, thermosalinograph, and electronic meter blocks; and Sam Nickerson has organized the salinometers, thermometers, log sheets, and miscellaneous equipment.

Steve Fogg has also completed the plots for the paper by Ed Cohen and Red Wright on the relationship between nutrients and hydrography on past cruises. Anne Dorkins has completed the log sheets for the winter MARMAP cruises and has begun plotting sections for the larval Atlantic herring data reports. Dan Patanjo has organized the thermometer files and is preparing a summary of cruises on which oceanographic observations were taken. He and Anne Dorkins have also kept up to date on determining surface salinities from the bottom trawl surveys. Ron Kirschner completed the report on the May SCOP run across the Gulf of Maine.

Data listings were received from NODC for 13 cruises from 1973 to 1976; a copy was given to Dr. Sigaev on Argus. Another five cruises should be completed soon.

Gil Dering has finished building and testing the current-meter test box. At the completion of Albatross IV Cruise No. AL 78-06, he will spend a week at Nova University learning about procedures there and will then be ready to start checking and repairing our own instruments for deployment in September. Meanwhile, the Tektronix Graphic System, purchased last month, has arrived, and Ron Schlitz has been setting it up and familiarizing himself with its use.

Kathy Bush started work in May. She is studying fluctuations in the flow between Georges Bank and the Middle Atlantic Bight by means of a box model. For preliminary data she has been working with computer plots of surface salinity, arranged by year and season, in the shelf and slope water regimes from Cape Hatteras to Georges Bank.

Larval Physiology and Biochemistry Investigation

Studies of larval Atlantic cod and haddock growth and survival in a competitive situation at different prey concentrations were completed. Cod larval survival and growth was substantially greater than haddock in all replicates at each prey concentration. Results of the larval winter flounder natural mortality study at a fixed prey concentration yielded an exponentially decreasing mortality curve with time during the first 2 wk following feeding initiation. A preliminary study of the chemical nature and size of the primary amine excreted by haddock larvae was initiated along with a study of the relative fluorescent yield of amino acids and proteins in the fluorescamine assay for primary amines. A paper dealing with nitrogen utilization in summer flounder larvae is in preparation.

Dr. Vyacheslav V. Konchin, Moscow State University, has completed his embryological studies of cod and haddock larvae and returned to the Soviet Union.

Meetings, Talks, Visitors, Publicity

Red Wright and Steve Ramp gave seminars on the Fishery Oceanography Investigation's hydrography and current-meter work in the WHOI Coastal Dynamics Series, and Red Wright combined the material in a talk at the New England Estuarine Research Society spring meeting in Boothbay Harbor, ME. Ron Schlitz and Red Wright met with Mert Ingham and others from AEG to discuss cooperative programs and future plans. Visitors to the Fishery Oceanography Investigation during the month included Bob Williams and Fred Everdale from CEDDA and Bill Woodward from the Office of Ocean Engineering.

Wally Smith participated in a meeting of the ICES Working Group on Larval Fish Distribution in Charlottenlund, Denmark, during 16-19 May, then visited the Polish Sorting Center in Szczecin, Poland, during 21-25 May to review sorting protocol, discuss taxonomic problems, and establish sorting priorities for samples collected during FY78.

Greg Lough attended the first meeting of the ICES Working Group on Larval Fish Distribution during 16-18 May 1978 in Copenhagen. Results of the ICNAF larval Atlantic herring surveys and a description of the October 1978 patch study were presented as a case study for developing a strategy for combining microscale and mesoscale observations in larval fish studies.

Roz Cohen attended a 4-day workshop at the Marine Biological Laboratory on the application of the Scanning Electron Microscope. SEM techniques have been shown to aid in the identification of zooplankton; in particular, species of copepods can be identified from just their jaws, which may be the only fragments remaining in the guts of larval fish.

Geoffrey Laurence and Kenneth Sherman attended the first meeting of the ICES Working Group on Larval Fish in Copenhagen, Denmark.

Kenneth Sherman has been in Europe the entire month of May attending meetings in Copenhagen, Denmark; Kiel, West Germany; Szczecin, Poland; and will be attending joint US-USSR meetings in the Soviet Union in June.

Bruce Fellman, a writer for several local Rhode Island newspapers interviewed members of the Apex Predators Investigation's shark project for an article about apex predators. Jack Casey attended an incentive awards meeting at the Woods Hole Laboratory this month. Wes Pratt had several underwater photographs included in a "Providence Journal" Sunday magazine supplement article on marine life in Narragansett Bay assembled by the Sea Grant Office of URI.

Terry Leitzell, Joe Slavin, and John Everett (Washington, DC, Office of NOAA/NMFS) and Bob Temple (Regional Office) visited the Narragansett Laboratory on 9 May.

Manuscripts

Grosslein, M. D., R. W. Langton, and M. P. Sissenwine. 1978. Recent fluctuations in pelagic fish stocks of the Northwest Atlantic, Georges Bank region, in relation to species interactions. Intern. Counc. Explor. Sea Symp. Biol. Basis Pel. Fish Stock Mgmt. Pap. No. 25. 52 p.

Laurence, G. The comparative growth, metabolism and feeding of cod and haddock larvae. Mar. Biol. (A)

Pawlowski, R., S. Nickerson, and R. Wright. Spring and fall sea-surface temperature and salinity on the northeastern continental shelf; Cape Hatteras to Cape Sable, 1972-1977. NOAA Tech. Rep. NMFS-SSRF. (S)

Pennington, M. R., and M. D. Grosslein. 1978. Accuracy of abundance indices based on stratified random trawl surveys. Intern. Comm. Northw. Atlant. Fish. Res. Doc. 78/VI/77. 42 p.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

No report received. Both April and May reports will be included in next month's (June) report.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

Laboratory experiments are continuing on the influence of thermal edges on the distribution of juvenile bluefish, Pomatomus saltatrix. It is clear, even at this early stage of the research, that temperatures of about 12°C appear to be limiting; fish will approach this layer in a thermal gradient, obviously sampling it, move away, and then return. Thermal discontinuities, even though at temperatures which are low enough to be potentially lethal, are attractive to these fish. This is in spite of the fact that warmer, more preferred temperatures, are available to them. Experiments are continuing and will eventually include adult bluefish.

Biological Oceanography of Stressed Environments Investigation

During May, Joe Ruane and Ray Menell participated in a joint US-USSR research cruise aboard the USSR Argus. One hundred-three stations (880 depths) between New York and the Gulf of Maine were sampled for chlorophyll, resulting in 1,760 samples being returned to the Sandy Hook Laboratory for netplankton and nannoplankton chlorophyll a and phaeopigment analyses. Analyses of samples from the February-March cruise of the FRS Delaware II were completed and the calculation of the data is nearly complete.

Geoff Flimlin, Joe Ruane, and Ray Menell completed their temporary assignments. We wish them bon voyage and welcome Stephen Ward and Susan Barker as their replacements in the Phytoplankton Biomass Survey Subtask.

Dr. Anthony Neihardt has recently joined us on a temporary assignment to assist us in computer processing and graphic display of our data. We hope this will greatly accelerate our data reduction into manageable and valuable contributions.

Nutrient analysis of water samples from the Advance and Albatross IV cruises has been completed and data reduction is now in progress. Symptotic maps of nutrients and related parameters from a series of 1974 cruises in Raritan Bay and the New York Bight are being organized for a technical report.

Assistance was given to the New Jersey Marine Sciences Consortium in setting up their nutrient analyzer.

Coastal Ecosystems Investigation

We completed the Ocean Pulse cruise aboard the NOS Researcher, with Frank Steimle (Chief Scientist), Dave Radosh, Greg Parker, and Tom Wilhelm participating. Other Investigations represented were Ichthyoplankton, Disease and Environmental Stress, Environmental Chemistry, Physiological Effects of Pollutant Stress, and Aquacultural Genetics. Twenty-eight stations between Cape Hatteras and Canada were occupied in the 15 days at sea. Most sampling and shipboard measurements went very smoothly.

We have begun analysis of benthic macrofauna samples from selected Ocean Pulse stations. Indications are that: (1) the macrofauna community structure of "swale" or valley environments in the Baltimore Canyon Trough has been fairly stable since surveys began there in 1974--this strengthens the feasibility of using macrofauna monitoring to detect oil-related impacts; and (2) surf clam spatfall was heavy in those New Jersey coastal waters most severely affected by the 1976 anoxia.

Phytoplankton samples taken from the Researcher have been provided to Biological Oceanography of Stressed Environments Investigation personnel to help determine the extent of blooms in comparison to those observed during the 1976 anoxia.

Tom Wilhelm and Chuck Idelberger collected additional phytoplankton samples on a transect out of Atlantic City, NJ, aboard the Coast Guard vessel Cape Star on 19 and 20 May. The dinoflagellate Ceratium tripos, implicated in the 1976 anoxia, was present in these samples, but not yet in concentrations thought harmful. The Researcher samples had revealed small numbers of Ceratium as well as evidence of a widespread bloom of the diatom Coscinodiscus. To date, temperature, dissolved oxygen, and diver observations have given no indication that this summer will follow the pattern of 1976. There have, however, been reports of a "green slime," perhaps consisting largely of decomposing Coscinodiscus, covering large areas of the bottom between Delaware and Virginia.

Frank Steimle is again coordinating the Sandy Hook Laboratory's studies of possible anoxia problems in the New York Bight this summer.

Jan Caracciolo continued working on an atlas of distributions of benthic fauna in the New York Bight. Tom Wilhelm continued processing benthic samples collected in Block Island Sound and in the Bight's anoxia area. We contributed data on fauna and sediments of Raritan Bay to investigators from Fairleigh Dickinson University who plan to model heavy metal partitioning and migrations in the Bay. Ann Frame spent 3 wk aboard Albatross IV on a resource assessment cruise.

Coastal Monitoring, Assessment, and Prediction Investigation

No report received. Report will be included in next month's report.

Environmental Chemistry Investigation

A good deal of time this month went into preparation for and participation in the Dolphin cruise which was conducted as part of the Aquacultural Genetics Investigation's contractual work with MESA. Our involvement was to collect water and plankton samples for metal and organic analyses. Vincent Zdanowicz and Pat Bowe participated in the cruise which reportedly was quite successful.

In the laboratory, work continued on checking out our rented atomic absorption unit that seems to be in need of repair all too often. It was working long enough to finish up some other contractual work with MESA and to complete some "inhouse" analyses. We will need to find a source of funds, though, to purchase a new atomic absorption unit.

The long-awaited Perkin Elmer gas chromatograph for chlorinated hydrocarbon analyses was installed this month. Preliminary checks were made on the instrument and it seems to be working well. We will try to obtain a fish sample from another laboratory that has already done a PCB analysis on it and compare our results with theirs and thus hopefully determine our capability with this type of analyses.

Unfortunately, we have not had the same success with our Varian gas chromatograph which is a capillary column instrument for petroleum hydrocarbon analyses. We expect to have a repairman here soon, hopefully to resolve our difficulties with the instrument.

Physiological Effects of Pollutant Stress Investigation

Physioecology

Studies continued on the effect of sublethal concentrations of mercury on larval oyster respiration. These preliminary experiments indicate that 3.3 ppb of Hg (LC_5) increases larval respiration when compared to controls.

Several groups of surf clams were induced to spawn, but larvae in control cultures in our heavy metal toxicity tests developed so poorly that the data were not usable.

An experiment to assess the toxicity of 2- and 3-metal mixtures (mercury, copper, and zinc as the chlorides and nitrates) to oyster embryos was performed this month.

Considerable time was spent on the statistical analysis of data obtained from previous metal-exposure experiments and on preparing a manuscript on the effects of copper on embryos and larvae of the American oyster, Crassostrea virginica.

Two proportional diluters were prepared for lobster exposure studies. Lobsters will be exposed to cadmium for 30 days and subsequently placed in low salinity water for 7 days to determine whether this additional stress causes any further physiological or biochemical stress.

Physiological Effects

A majority of this reporting period was occupied with samples from the Researcher Ocean Pulse cruise. Two hundred blood samples from various crustacean, molluscan, and finfish species were analyzed and the data tabulated and compiled with data collected on the ship. In addition, respiratory measurements made on 165 animals of various species while at sea were calculated and analyzed.

A study on the effects of heavy metals on filtration rates of bivalves continues. Data have now been collected on the soft-shell clam (Mya arenaria), blue mussel (Mytilus edulis), and American oyster (Crassostrea virginica) following exposure to silver. Respiratory measurements are also being made so that the present study can be compared to earlier studies on metal-induced changes in bivalve metabolism.

Biochemical Effects

Work has begun on frozen tissues brought back from the Researcher cruise. A Krebs cycle enzyme (MDH) and a pentose shunt enzyme (G6PDH) had been found to have considerable activity in preparations of gill tissue from sea scallops (Placopecten magellanicus) made fresh at sea, then frozen, thawed, and analyzed at sea; but when preparations were made from frozen-stored gill tissue, both of these enzymes were inactive, although other enzyme activities were found. Scallop gills will be sampled at sea hereafter, therefore, by homogenization before freezing for subsequent laboratory analysis.

Some of the backlog of scallop muscle samples from Resource Assessment Division cruises were also analyzed. This information will form the basis of a data bank containing seasonal metabolic profiles for this marine animal.

Two species of flatfishes were taken by otter trawl from the waters off Milford Harbor, the windowpane (Scophthalmus aequosus) and the winter flounder (Pseudopleuronectes americanus). The windowpane was the liveliest of the species taken during the Researcher cruise, and the most similar in tissue texture (observation during dissection) to the winter flounder, which we have been studying in some detail. Because the windowpane may well be an indicator species at Ocean Pulse stations, we sampled gonad tissues to compare with those of the winter flounder. Data are still being analyzed.

Two series of cadmium exposures to lobster (6 ppb for 30 days) were set up: the first to be followed by a 7-day holding period in low salinity seawater (static, aerated, and changed daily), with controls in clean water and experimentals in 6 ppb of Cd water; and the second to be followed by a similar treatment, but in ambient rather than low-salinity water.

Considerable time was spent in manuscript preparation. The data on biochemical patterns in maturing gonads of both male and female winter flounder have been analyzed.

Anaerobic Bacteriology/Metabolism

The activities of this subtask the past 2 mo were primarily directed to preparation for and participation in the second leg of the operational test phase of Ocean Pulse II during 24 April-4 May. Samples from 14 stations were analyzed for clostridial counts (perfringens type) and vibrio groups of bacteria by direct and enrichment plating. An unequal distribution of the organisms was observed to occur between the stations sampled. A preliminary summary of the results is being prepared for the 23 June debriefing of the recent cruise.

Laboratory work is being directed to the identification to the species level of the various isolates obtained to date.

Meetings, Talks, Visitors, Publicity

During 2-29 May, Dr. Pearce was involved in extended foreign travel. He met with scientists in Poland, West Germany, East Germany, Denmark, and Great Britain in regard to ongoing environmental research within these nations. While in Poland, East Germany, and West Germany, he participated in meetings between fishery biologists in regard to continuing cooperative efforts between the US and fishery biologists within the three nations. The meetings were principally concerned with cooperative efforts between scientists as well as the participation of foreign research vessels in ongoing resource assessment and ecosystems research being conducted by the NEFC.

While in East and West Germany and in Poland, Dr. Pearce was able to speak at length with scientists concerned with environmental research programs of interest in fisheries and fisheries habitat management. Dr. Pearce briefed the scientists on the new environmental assessment program, Ocean Pulse, being conducted by the NEFC. Scientists in Denmark are presently involved with developing a program along the lines of Ocean Pulse. The scientists are working at the Charlottenlund Laboratories as well as at the University of Copenhagen's Marine Biological Laboratory in Elsinore, Denmark. The latter laboratory is the site where physiological and other experimental studies are being conducted. The Danish biologists are developing a number of standard experimental sea systems designed to monitor water quality.

While in Great Britain, Dr. Pearce was able to meet with Dr. Alistair McIntyre and the ICES steering committee responsible for developing the forthcoming ICES workshop concerned with biological effects monitoring. Dr. Pearce has arranged for this workshop to be held in late February 1979 at the Duke University Marine Laboratory. The steering committee finalized the lists of participants and the agenda to be followed during the workshop.

Dr. Pearce also participated for 2 days in a special meeting for discussion concerned with the assessment of sublethal effects of pollutants in the sea. This discussion meeting was sponsored by the Royal Society of London and brought together a number of chief scientists working in marine pollution.

Dr. Frederick Thurberg served on the Woods Hole Oceanographic Institution Sea Grant Site Review Team during 2-4 May at Woods Hole, MA.

Al Matte attended the New England Estuarine Research Society meeting at Boothbay, ME, on 5 May. Here he made contact for a new, simpler, approach to data plotting by computer.

Miss Edith Gould participated in the Center Awards Committee meetings at Woods Hole on 11 May.

Dr. John Graikoski attended the Society of American Microbiologists meeting during 14-19 May in Las Vegas, NV.

Dr. Carl Sindermann, Tony Pacheco, Dave Radosh, and others hosted a group of 250 nationwide award-winning high school science students at Sandy Hook Laboratory as part of the Monmouth Junior Science Symposium on 18 May. Dave Radosh outlined activities of the Coastal Ecosystems Investigation to the group.

Dr. John Graikoski, Mrs. Lynne Hanson, and Mr. James Miller participated in career day events at local high schools in the Milford Laboratory area during the month of May.

Bod Reid, Christine Evans, and others from the Sandy Hook Laboratory manned exhibits of NEFC activities at the Atlantic Ocean Alliance Convention on 30 May in Asbury Park, NJ.

Tom Wilhelm gave a laboratory tour to a group of emotionally disturbed children on 30 May. He also gave a talk on careers in marine biology at Thompson Junior High School in Middletown, NJ, on 31 May.

Manuscripts

Knatz, G. 1978. Succession of copepod species in a Middle Atlantic estuary. Estuaries 1(1):68-71. (P)

MacInnes, J. R., and A. Calabrese. 1978. Response of embryos of the American oyster, Crassostrea virginica, to heavy metals at different temperatures. Pages 195-202 in D. S. McLusky and A. J. Berry, eds. Physiology and behaviour of marine organisms. Proc. 12th Eur. Symp. Mar. Biol. Pergamon Press. (P)

Mahoney, J., and F. Steimle. A mass mortality of marine animals associated with a bloom of Ceratium tripos in the New York Bight. 2nd Intern. Conf. Toxic Dinoflagellate Blooms, November 1978. (A)

Olla, B. L., and C. Samet. The effects of elevated temperature on the early embryonic development of the tautog, Tautoga onitis. Trans. Amer. Fish. Soc. (S)

Pearce, J., D. Radosh, F. Steimle, and J. Caracciolo. Benthic fauna. MESA New York Bight Atlas Monog. 14. (S)

AQUACULTURE DIVISION

Spawning and Rearing of Mollusks Investigation

Experiments concerning the growth of surf clams, Spisula solidissima, have begun 1 mo earlier than in previous years. During this 1-mo period, ambient temperatures have climbed from 8.8°C to 12.0°C and chlorophyll-a levels have been greater than 15 mg/m^3. Five-millimeter clams have increased in length by 200%. This growth is significant in terms of reaching our projected market size within one season.

Analysis of the ambient fluorescence levels of seawater indicates that, currently, the net consumption of phytoplankton has not depleted the supply in the most densely stocked tanks. Tanks containing 10 liters of biomass of 30-mm animals held at a flow rate of 50 l/min depleted phytoplankton by only 5%. When the flow rate was reduced to 25 l/min, the net reduction increased by 25%. It is speculated that consumption of phytoplankton will increase as the water temperatures rise and the clams' metabolic activity increases.

Experiments to determine the influence of culture volume on survival and growth of oyster larvae continue. Earlier experiments suggested that the minimum culture volume for optimum well-being of the larvae lies between 1.0 and 7.5 liters. Recent tests have shown that at a culture volume of 2 liters, early signs of stress appear in the form of slightly increased mortality and somewhat reduced growth during the larval development compared with that of larvae in 15-liter cultures. These stress symptoms do not appear in every experiment, however. The assumption is that they appear when the small volume stress is superimposed on a slightly less than optimum overall culture environment.

Reasonable numbers of bay scallop, Argopecten irradians, eggs have been produced in five separate spawnings over the last 2 mo. Only about 10% of these eggs have successfully developed to the larval stage contrasted with an expected successful development rate of 50% or more. Three other facilities in New England have also had similar experiences with bay scallops this spring. Possible explanations for this problem are many, including immature eggs or sperm and poor water quality. Now that this problem has our attention, considerable effort will be made to determine its cause.

Despite difficulties in obtaining bay scallop larvae, the larvae that have been produced are growing rapidly in our culture facilities. Generally, 30-50% of the larvae in a given population reach metamorphosis in 7-9 days. Some bacterial problems have been observed in older larval cultures and we have started using Neomycin as an antibiotic treatment.

A bi-factorial experiment testing the effects of stocking density and available food on the growth of small (3-mm) juvenile bay scallops has been completed. In general, growth was directly related to available food, increasing as the food levels increased. Stocking density was of minor significance in this test over the range tested (350 - 3,500 organisms per square meter.)

Aspects of Nutritional Requirements of Mollusks Investigation

Experimental work is in progress on several investigational tasks. Recent cryopreservation experiments have confirmed our earlier work and demonstrated that it is indeed possible to preserve the sensitive chrysomonad Isochrysis galbana in liquid nitrogen utilizing a particular experimental regime. Unfortunately, our further work in cryopreservation was halted due to equipment breakdown. Work is being delayed until equipment is repaired. Experiments on the culture of six algal species in a dilute growth medium have shown that it is possible to effect a considerable reduction of the concentration of nutrient enrichments in our seawater growth medium. Work is now in progress to explore the possibility of additional reductions by conducting individual experiments on each of the vital medium enrichments -- nitrate, phosphate, and iron.

Our recent work on the effects of three metals, zinc, cadmium, and copper, on the growth of phytoplankton has investigated the potential of adaptation to certain concentrations of metals with prolonged exposure to them in four species of algae. The data that we have describe the growth response of Dunaliella euchlora, Phaeodactylum tricornutum, Isochrysis galbana, and Monochrysis lutheri after six subcultures over a period of 60 days. The concentrations tested were derived from earlier experiments in which they were determined to have inhibitory effects on the growth of the individual species. P. tricornutum appears to be adapting to one concentration of $CuCl_2$. Adaptation in other species is still questionable, but the data suggest that more time may be needed for this to occur.

Zinc appears to be fairly toxic to three of the tested species, but in D. euchlora evidence of adaptation at two concentrations is clear. Results with $CdCl_2$ are most striking since all four species showed evidence of adaptation in at least one of the tested concentrations.

The work of this Investigation was discussed with several visitors this month: Dr. Sheldon Aaronson and his post-doctoral students, Dr. Harry Cheung of Canada, and representatives of the Dynetech Corp.

Algal mass cultures yielded a harvest of 1,678 liters of larval food and 1,393 liters of juvenile food this month, which represents an increase of about 800 liters over the previous 2 mo. The harvested food cells were distributed to other investigations as follows: Aquacultural Genetics, 719 liters; Spawning and Rearing of Mollusks, 965 liters; Physiological Effects of Pollutant Stress, 555 liters; and Control of Larval Disease, 137 liters. Strains of algae in the culture collection have been subcultured according to schedule. Efforts are being renewed to purify the remaining few bacterized cultures in the collection. After considerable work, one diatom strain was purified and is now growing well in axenic culture.

Aquacultural Genetics Investigation

Molluscan Breeding

Breeding continues on the first selected generation of the two-way mass selection experiment on the commercial American oyster (Crassostrea virginica). Further data are accumulating on progeny of matings designed for theoretical (as opposed to realized) estimates of selection response. Foundation crosses of lines to be used in inbreeding experiments are being expanded. Inbred lines (full-sib crosses) are being tested for inbreeding response with successful ones reared for other generations of study. A paper on inbreeding in the commercial oyster is being presented at a Genetics Society of Canada meeting (S. Stiles). The recent installation of an ozonizing unit for treatment of effluent seawater makes it possible now for exotic and nonlocal oysters to be tested in hybridization studies at the Milford Laboratory on a scale commensurate with the importance and size of such an undertaking.

Cytogenetics and Cytology of Developing Fish Eggs

Methods have been developed for very specific studies of the chromosomes of pre-spawned and developing fish eggs (to be published soon). This is in addition to the cytological and mitotic studies of the fish embryos proper. Such methodology is equally applicable to field and laboratory study.

Members of the genetics group have participated in the trial Ocean Pulse cruises with concurrent plankton sampling for appropriate studies of planktonic fish eggs. Two most recent cruises to the toxic chemical disposal site (DWD 106) have failed to yield any fish eggs. Though sparse, eggs collected on the first cruise (summer of 1977) appeared to show increased mortality and cytological abnormality in the in-plume, as opposed to out-of-plume tows (DWD 106 contract). Because of the inherent difficulty in accumulating large enough numbers of planktonic fish eggs at DWD 106, laboratory bioassays on Fundulus eggs are being set up to test the genetic-impacts and related toxicology of one type of waste regularly dumped at DWD 106. This will also provide an opportunity for sharpening methodology hitherto worked out using plankton samples only.

Eggs sampled at the site of the recent gasoline spill in Rhode Island are under study. The chorion of fourbeard rockling eggs taken in the spill area was hardly recognizable as such on examination with the scanning electron microscope. It is believed this may be attributable to the action of the gasoline on the outer egg membrane. Eggs from follow-up cruises must yet be studied.

A 10-day cruise this past May into the New York Bight for the purpose of collecting Atlantic mackerel eggs for cytological-cytogenetic study and associated chemistry samples was successful (MESA-sponsored). Microlayer and subsurface water and plankton were collected for heavy metal and hydrocarbon analyses. By utilizing night hours it was possible to conduct a second field experiment planned to elucidate any deleterious effects of salinity on aspects of mackerel eggs being studied cytologically and cytogenetically. Also, plankton samples were especially fixed for scanning electron microscopy of egg membranes. Prefixation treatments of eggs were tested to further improve the ease of chromosome karyotyping of field samples.

Both the biological and independent chemical analyses of the mackerel eggs and associated chemical samples taken in May 1977 in the New York Bight are now completed (MESA-supported study). Data are being processed for statistical study. Roughly 8,000 mackerel eggs were used in the biological study. Processing of about 5,000 of these eggs involved the dissection of their embryos off their eggs. There are roughly 15,000 data entries on the eggs. Observations fall into four categories: (1) projected viability on the basis of cytological parameters clearly defined for three different development stages; (2) cytogenetic observations on membrane chromosomes; (3) cell-level differentiation difficulties at two developmental stages; and (4) teratogenic effects at the gross level for three developmental stages. Clearly, three stations, showing exceedingly higher metal and/or toxic hydrocarbon levels than the other 12 were also ones outstandingly poor in mackerel egg development by the combination of parameters used. This association involved one clear definition of differences between surface and subsurface eggs.

The investigation also provided young scallops to the Wampanoag Fisheries Project on Martha's Vineyard, MA, and to the Little Harbor Laboratory in Guilford,

Meetings, Talks, Visitors, Publicity

E. Rhodes attended the spring meeting of the New England Estuarine Research Society in Boothbay, ME.

Manuscripts

Babinchak, J., and R. Ukeles. Epifluorescence microscopy, a technique for the study of feeding in Crassostrea virginica veliger larvae. Mar. Biol. (S)

PATHOBIOLOGY DIVISION

Comparative Pathobiology Investigation

Diagnostic services were provided for the States of Connecticut, Delaware, and Massachusetts, and the Government of Chile. Chlamydia-like organisms were seen in mussels, Choromytilus choro, from Chile. This observation extends the host and geographic range of this group of parasitic organisms.

Much time was spent collating data and revising a paper on the phylogeny of the viruses. All available information for all viruses presently described has been assembled. The proposed phylogenetic scheme has been completed and descriptive schemes have been prepared for the viruses of prokaryotic organisms and the RNA viruses of eukaryotic organisms. Schemes yet must be prepared for the DNA viruses of eukaryotic organisms.

Duck clams, Macoma balthica, were obtained from several areas in the Tred Avon River, MD, for use in experimental studies on neoplasia. Clams were fixed for histopathology, frozen for Ames testing, and placed in laboratory aquaria for studies on experimental carcinogenesis.

Preparation of photographs and their corresponding legends for the monograph on the normal histology of the blue crab, Callinectes sapidus, is continuing. Although there presently are 238 figures, photomicrographs of the reproductive systems and several miscellaneous structures yet must be prepared.

Prawns, Macrobrachium sp., from a General Mills aquaculture facility in Florida were examined to determine the cause of extensive mortalities which occurred after the fifth juvenile molt. The major difference between normal and diseased prawns seemed to be a decrease in the amount of tissue, especially muscle, present in the body. Diseased larvae from female prawns in ponds containing elevated amounts of copper contained 50-60 ppm copper. Special stains for demonstration of copper will be attempted on the diseased larvae submitted.

Investigations of the cause of a disease which interferes with spawning of female striped bass, Morone saxatilis, are continuing. It now is clear that the problem is caused by scar tissue occluding the oviduct of some fishes. To date the disease only has been seen in large, spawning females from the Choptank River system. Attempts are being made to determine if this condition is related to peritonitis observed in several fishes from the same area. This study is proceeding in collaboration with the University of Maryland Center for Environmental and Estuarine Studies and the Maryland Department of Natural Resources Fisheries Administration.

A large mortality of menhaden, Brevoortia tyrannus, which is currently occurring in the upper Chesapeake Bay is being studied. Dying fish are exhibiting the characteristic spinning behavior which has been reported so frequently. Observations made during the course of the mortality reveal that: (1) only a small percentage of the menhaden in the area are dying, even though hundreds or even thousands of dead fish may be seen at any given place and time; and (2) the appearance of the sick fish is unremarkable when they first begin to exhibit disorientation, lesions such as hemorrhage and exophthalmia occur later. Serum samples were obtained from several dozen spinning fish, and over two dozen fish were frozen for pesticide analysis. Several smaller specimens were fixed for histopathological study of the central nervous system.

During the month the histology laboratory sectioned 979 blocks and stained 1,265 slides from a large variety of marine fishes, crustaceans, and mollusks.

Disease and Environmental Stress Investigation

Seven cruises were made in the New York Bight to monitor the prevalence of fin rot disease in winter flounder, Pseudopleuronectes americanus. Of 582 fish examined from the sewage sludge area of the Bight (3, 19, and 23 May), only 12 (2.0%) had fin rot. No epidermal papillomas were noted in 358 young-of-the-year (YOY) winter flounder. Lymphocystis disease was noted in six (1.0%) fish.

Of 537 winter flounder examined from Sandy Hook/Raritan Bays (8, 25, and 31 May), 3 (0.5%) had fin rot disease. None of 136 YOY fish had epidermal papillomas and only 1 fish had lymphocystis. Of 118 winter flounder examined from Great Bay (16 May), none had fin rot disease. No epidermal tumors were observed on 65 YOY fish.

An experiment on the exposure of larval striped bass to 50 ppb of Cu^{++} was attempted this month at the Edenton National Fish Hatchery in Edenton, NC. The work was unsuccessful because control animals experienced 50% mortality despite attempts to conduct the experiments in several different ways (i.e., continuous flow, static with frequent toxicant exchange). It was enlightening to be made aware of the high degree of mortality typically found (20-100%) in hatchery operations involving the maintenance and rearing of embryonic and larval fishes of this kind. Handpicked, viable animals of different ages were selected from the holding aquaria and fixed for electron microscopic examination. Changes occurring in the sensory and digestive systems during the critical time period (yolk-sac resorption) will be studied. In the oldest larvae sampled careful attention will be given to differences noted between feeding and nonfeeding animals.

Cooperative research on larval nematodes in surf clams and calico scallops has shown that the adult nematodes are parasitic in loggerhead turtles. Additional nematode specimens were observed in vials of preserved, banded tulip shells provided by Mr. George Miller of the Miami Laboratory of the Southeast Fisheries Center. Preliminary identifications indicate that the tulip shell specimens are identical to those from scallops, clams, moon snails, and whelks. It seems likely that a wide variety of mollusk species may serve as intermediate hosts for the turtle anasakid Sulcascaris sulcatus.

Aquaculture: Control of Larval Disease Investigation

The study of the effects of the red pseudomonad's pigment on larval shellfis is continuing. Rotary evaporation using petroleum ether is a more rapid method of concentrating pigment than the original procedure employed, and therefore, lessens the likelihood of the pigment's deterioration. Thin-layer chromatography of bacterial pigment from a yellow mutant following this rapid evaporation procedu reveals an additional colored band. Two bands now have been seen for this yellow pigment and they appear to correspond to two of the segmented bands of the red parental strain.

Total plate counts of seawater containing larvae and algal food which were ozone and UV treated indicate that the 300-gal experimental quarantine system is effectively disinfecting the seawater. Some minor adjustments to ozone dose and time are required to achieve complete sterilization of conical tank effluent. Seeding experiments with shellfish pathogens and subsequent quarantine treatment are planned.

In the process of looking for functional differences between larval and adult phagocytes of oysters, adult cells were found that can be divided into two types based upon their ability to fluoresce under UV light. Cells examined with a Leit fluorescence microscope equipped with a 2-mm, UG-1 transmission filter and K430 suppression filter exhibited either a blue fluorescence or a yellow-green fluorescence at a corresponding cell ratio of about 4:1. What this means in terms of biochemical activity is unknown at present; however, additional information may be available after completion of a series of cytochemical stains on larval and adult cells.

Meetings, Talks, Visitors, Publicity

Dr. Rosenfield and Mr. Kern met on 2 May with representatives of the University of Maine, Maine Division of Marine Resources, and shellfish industry personnel to discuss problems related to the transplantation of diseased shellfish. On 3 May, Dr. Rosenfield, Mr. Kern, and Mr. Farley met with FDA officials in Washington, DC, concerning contract studies of proliferative cell conditions in selected species of mollusks from Chesapeake Bay. Dr. Rosenfield and Mr. Kern met in Washington, DC, on 16 May with NMFS, FDA officials, and Mr. Rolf Juhl, Fisheries Attache to Mexico, concerning the pre-importation examination of Mexican shellfish. Dr. Rosenfield traveled to Crisfield, MD, on 31 May to discuss food science and marine resource research with State/Federal/local officials.

Dr. Murchelano, Dr. Sawyer, Mr. Kern, Mrs. Swann, and Dr. Robohm attended the 3rd Annual Eastern Fish Health Workshop in Auburn, AL, during 23-24 May. Mrs. Swann presented a paper on the "Registry of Marine Pathology;" Dr. Sawyer presented a paper titled "Amoebic Infections in Hatchery-Reared Fish - Past, Present, and Future;" and Dr. Robohm presented a paper titled "Minitek and API Differentiation Systems for Bacterial Identification in Marine Fish and Shellfish." Dr. Murchelano and Mr. Newman presented lectures and conducted a laboratory on "Diseases of Marine Fishes" at the Aquavet course at MBL on 31 May.

Dr. Johnson spent the week of 15-19 May with Dr. A. K. Sparks of NMFS, Seattle, WA, aiding him with normal histology of the Dungeness crab, Cancer magister. Dr. Johnson presented a seminar entitled "Some Pathological Conditions in the Blue Crab" at the College of Fisheries, University of Washington, on 17 May.

Dr. Bodammer traveled to Edenton, NC, during 22-26 May to conduct experiments at the National Fish Hatchery.

Mrs. Wheatley attended a meeting of the Awards Committee at Woods Hole, MA, on 11 May.

Mrs. Ortt attended a meeting of the President's Committee for the Handicapped in Washington, DC, on 4 and 5 May.

Mr. O'Connell traveled to Woods Hole, MA, during 23-26 May to attend a regional Administrative Officers meeting.

Dr. Blogoslawski presented a luncheon talk to the Stratford Rotary entitled "Aquaculture at the Milford Laboratory." Dr. Blogoslawski attended a successful M.S. thesis defense for a former student, Donna Peretti, at Long Island University. Her thesis was entitled "Physiologic Effects of the Neurotoxin from Gonyaulax tamarensis on the American Eel, Anguilla rostrata."

Mr. Russo attended the New England Estuarine Research Society meeting in Boothbay Harbor, ME, on 5 and 6 May.

Ms. Brown attended the International Ozone Institute Symposium and Exposition in Los Angeles, CA, during 23-25 May, where she presented a paper entitled "Ultraviolet Light: an Effective Disinfectant for Shellfish Hatcheries?"

Mrs. Susie Hines and Mr. Mark Galasso joined the Oxford Laboratory staff on 22 May for a temporary assignment. Mrs. Hines has been assigned to assist our librarian, Mrs. Lang. Mr. Galasso has been assigned to work with Dr. Sawyer to complete data entries for key-punching and eventual ADP output. The data are from studies of black gill disease of New York Bight crustaceans.

Visitors to the Oxford Laboratory were Dr. George Ridgway, NEFC, Woods Hole; Carl and Claire Melone, Bromall, PA; Harold Mears, NMFS, Gloucester, MA; Howard King, Rudy Lukacovic, and Michael Burch, Department of Natural Resources, Annapolis, MD; Mr. and Mrs. Richard Rodes, Columbia, MD; Mrs. R. M. Archer-Shee, Easton, MD; David Powrice, Victoria, Australia; E. Berry, Pollack Park Springs, South Africa; J. B. Scanlan, Newhall, CA; and Joyce L. Taslof, HEW, Washington, DC.

RESOURCE UTILIZATION DIVISION

Resources Development and Improvement Investigations

Sampling and Harvesting Gear Development

The beam trawl, designed with the possibility of being a juvenile sampling tool, species selective, and commercially usable as a hard-bottom gear, underwent 4 days of at-sea testing. Early indications are that considerable chain is necessary to stir up the bottom adequately. These findings correlate with those of the Netherlands and other countries.

A number of projects are underway as part of the redesign and refurbishment of the Center's hydraulic dredging system for shellfish assessment.

The constant-tension winch which handles the electrical cable leading to the submersible pump mounted in the nose of the dredge, is being hydraulically redesigned to simplify operation. This will involve a new pump and control valving.

A new dredge design is on the boards updating the current 15-yr-old dredge and incorporating the submersible pump as well as improved features determined necessary during last August's dredge-testing cruise.

A trip to New Jersey is being made to study current commercial dredges and confer with local dredge builders.

A deck layout of the dredging system is being prepared for necessary NOS approval.

The cost and delivery time for a backup submersible pump was determined.

Instrumentation to monitor dredge performance is also under development. The conceptual design on a remote-readout odometer is completed, and system sketches and odometer drawings are being prepared. An associated remote-readout manifold pressure system is also being designed.

We have been cooperating with the New England Fisheries Development Program providing technical advice on gear for their Maine squid-harvesting project and the University of Massachusetts' hydraulic fish-sorting scheme. This has involved several meetings here and in Maine.

Dan Baker's well received IYABA paper on refrigeration is being rewritten for publication. Al Blott has completed the second draft of a paper that he is coauthoring on pair trawling for squid.

In conjunction with the Woods Hole Laboratory's mesh selectivity studies, we ran tests to determine net mesh size shrinkage due to boiling and the subsequent size stability of the netting. The results were reported to the Woods Hole Laboratory.

Cleaning up the Rorqual has progressed steadily on an "as-time-is-available" basis. John Kenney has put a lot of effort in and it shows.

Processing Engineering

Work is continuing on the design and development of automated squid processing equipment.

Components for the minced-fish extruder were ordered to correct a problem of oil leakage.

Problems related to the circuitry of the control components for the silver hake processing machine were discovered. The wiring system is being checked out to determine the source of the problem.

Species Identification

A replacement batch of ampholines proved to be very poor. The banding patterns on the plates incorporating the new ampholines did not replicate the previous patterns. The defective ampholines cannot be used in a collaborative study and/or an official method. A new manufacturer of ampholines is being sought.

The patterns obtained from the protein extract of canned, pasteurized crab meat and frozen, cooked crab meat are somewhat similar; the only difference being one or two additional bands present in the frozen sample that are not present in the canned sample.

The pattern resolution continues to be excellent, and a paper on crab species identification has been started.

Storage Study of Blue Mussels

Initial experiments with the micro Kjeldahl technique were promising. The drawback of the technique is the small sample size.

As happened last spring, the May mussels appeared to be highly acceptable to the taste panelists. Also, March, April, and May's samples have higher protein contents than the fall-winter samples.

Blue Crab

A storage study on the drip formation and quality of roller-extracted, pasteurized, blue crab meat was completed. The meats were cooked at 1, 1.5, and 2 min before pasteurization. The first of three storage studies on roller-extracted, pasteurized, blue crab meat was completed. Reports on these experiments are being prepared.

Squid

Forty pounds of frozen squid were sent to the Northwest and Alaska Fisheries Center in Seattle. These squid will be tested on a Trio fish fillet skinner to determine its squid-skinning efficiency.

Shell Content in Crab Meat

Samples of pasteurized blue crab meat packed in Louisiana were analyzed for shell content.

Triplicate shell determinations were conducted on three, 2-lb samples of thoroughly mixed "special" grade crab meat, using the AOAC NaOH meat-digestion method. Triplicate taste tests were also conducted on the three samples to determine shell detectability and acceptability. The shell content was 0.09, 0.15, and 0.24%. The shell detectability ratings on a 1 to 5 scale (5 = nil, 4 = barely detectable, 3 = slightly detectable, 2 = moderate, and 1 = excessive) were 3.94, 3.50, and 3.17 respectively. These tests agree with previous results from commercial and prepared samples.

Guaranteed Quality Program

Screening studies of laboratory personnel have been continued to determine their ability to relate changing odors with the 32°F storage age of fresh fish fillets. To date, seven panelists have been tentatively chosen because of their low overall deviations. However, because the deviations of these seven vary markedly at times and because several other panelists have not been adequately tested, these screening activities will continue for about another month.

Other tentative results indicate that the usable Grade A, 32°F shelf life of our fish is around 9 days, and the method of packaging has an influence on the odor acceptability of the stored fish.

MPDI

We are currently irradiating samples of powdered coal of varying degrees of purity for Worcester Polytechnic Institute.

Because of reported poor quality, the only freshwater fish dealer in our area has been unable to supply us with the needed quality fish. When available, the fish will be smoked here and irradiated at Natick. In the event that good quality lake whitefish is not available in the near future, we will substitute Atlantic mackerel.

Product Quality, Safety, and Standards Investigations

Product Quality

Two studies were initiated during this period. The first is concerned with the storage characteristics at 0°F of hake blocks made from fillets which had been either treated or not treated with a solution of sodium erythorbate, and which also had or had not been "saberized" to remove most of the fatty layer along the lateral line.

The second study was a continuation of the evaluation of the Torrymeter with haddock as the test species. The fish are being stored on ice and monitored for sensory evaluation, meter reading, and chemical and bacterial tests. In addition, the method of packing the fish, that is, either all with dorsal side up or as a jumbled pack, is carefully being studied. In the previous study with gutted Atlantic cod or jumbled packs of fish, meter readings were erratic.

Ron Lundstrom was recently appointed as an Associate Referee by the FDA for a collaborative study to evaluate species identification of finfish by isoelectric focusing as an official method for AOAC.

A processing plant in Rhode Island was surveyed as a potential site for testing the Arenco filleting machine on silver hake.

Product Safety

Workup of cold-smoked Atlantic salmon samples is nearing completion. GLC analysis of these extracts is being deferred until the Perkin-Elmer Model 910 GL has been serviced. A shipment of hot-smoked lake whitefish was received from Seattle. The fish are being composited, weighed, and frozen until workup can be started. GC-MS work of spiked lake whitefish extract is continuing.

Product Standardization

A USDC Inspector started working with this unit on a study of cook-drip methodology and objective measurement of bone in fillets and fish blocks. The immediate objective of this work is to obtain data from which decisions can be made regarding selection of a methodology for further study.

At a meeting of the Armed Forces Product Evaluation Committee held at the US Army Natick Research and Development Command, the Committee voted to accept both pollock fillets and fish sticks and portions prepared from silver hake blocks for military procurement.

A proposed program for the development of federal specifications for fishery products has been prepared for review and comments. An Interagency Food Quality Assurance Planning Committee has recommended that the responsibility for the preparation of federal specifications for fishery products be transferred to the National Marine Fisheries Service. Most of the fishery products being purchased by the military are being inspected by the USDC Inspection Service. Whenever possible, USDC grade standards will be used for the quality requirements for fishery products.

A manuscript was reviewed, entitled "Comparison of Two Methods for Removal of Breading from Frozen Raw Breaded Shrimp," by Jack Dougherty and Jesse Hicks, of the Seafood Quality and Inspection Division, Southeast Region, NMFS.

Technical Assistance, Visitors, Meetings, Training

Technical Assistance

We responded to inquiries on the following: structure of the fish business; international shipments of live lobsters; skates; conchs; dogfish; Alaska pollock; construction of lobster traps; underutilized species for a new venture firm; position paper on change of name of Pacific hake; dehydrated squid and scallops; labeling of arrowtooth flounder; labeling of Pacific flatfish; packaging films; Anisakis larvae in fish flesh; skate wings; mercury in dogfish and best European markets; New Zealand monkfish; Faroes chief fishery; tullibee; labeling of crab meat from Chile; temperature control for smoking of fish; nutritive value of portion-sized fish servings; smoking of silver hake; fishery recipes; squid processing; research on use of freshwater fish; fish handling and processing equipment; pollution of marine waters; harvesting, shelf life, processing, and economics of fishing and import statistics of squid; fishery development in Alaska; specifications for a heading and gutting machine for silver hake; source of supply for Alosa aestivalis, Clupea harengus, and "Dory" (from Australia or New Zealand); data on volume of use for food-grade phosphates in the seafood industry; sources of supply for minced fish blocks, ocean quahogs, and squid from a manufacturer of spaghetti sauces contemplating new product development; processes and products for minced fish from freshwater species; information concerning appropriate USDC grade standards for federal specifications to judge the quality of air-shipped fishery products; characteristics of Rhinoptera bonasus, the cow-nosed ray (found from Cape Cod to Brazil), for a distributor in Toronto, Canada; inquiry about Canadian requirements for batter-dipped fish sticks and portions; ocean quahogs; fishery research and retailing; record-keeping systems for fishermen; NMFS film contacts.

Technical assistance was given to: (1) the Milford Laboratory, to help them determine cooling capacity for a backup air-conditioning system for their algal culture facility; (2) a 4-H County Extension worker, in obtaining samples and materials for a fishery demonstration for 4-H leaders; and (3) an individual in the Great Lakes area interested in forming a fishermen's cooperative and seafood-processing facility.

Visitors

Visitors to the Gloucester Laboratory were: (1) Chris Davis to discuss laboratory research and fishery management; (2) three Chinese businessmen interested in processing dried squid and other marine products for export; and (3) 14 students from Salem State College for a talk on laboratory activities and a tour of the facility.

Meetings

On 31 May, Burton Tinker and Louis Ronsivalli participated in a program review of the Delmarva Seafood Laboratory, University of Maryland, Crisfield, MD. They collaborated with other participants in evaluating the objectives and current activities of the Laboratory, and made recommendations for its future activities.

On 1 June, Louis Ronsivalli participated in a workshop for about 100 high school teachers sponsored by the Essex Agricultural and Technical Institute, Hawthorne, MA. The subject of Louis' talk was "Basic Curricula for Candidates for the High School Diploma and Associate Degree."

Mike Corbett represented the US in three ICES working group meetings in Bergen, Norway. They were the Working Group on Research on Engineering Aspects of Fishing Gear, Vessels, and Equipment; the Working Group on Reaction of Fish to Fishing Operations; and the Working Group on Data Collection and Processing in Fish Capture Research. These meetings were enormously valuable as they are the forums from which many nations draw for their research plans and fresh ideas. It was obvious there had been long-standing technology transfer among participating countries. This communcation link has resulted in a uniformly high degree of technological development in gear development and fish behavior. These meetings clearly demonstrated the need for improved communication within this country and with other nations.

Perry Lane attended: (1) a meeting of the New England Fisheries Steering Committee; (2) a career day program at North Reading High School and discussed with students careers in the marine field; (3) a meeting at the Woods Hole Laboratory to develop suggestions for increasing the use of the aquarium facility as an educational tool; and (4) the Annual Meeting of the New England Marine Advisory Service (NEMAS) Board of Directors and was elected Secretary/Treasurer of the Board for the coming year.

John Kaylor attended a 1-day workshop conducted by the Food Marketing Institute on retailing of fresh seafoods.

Fred King participated in a meeting at the Gloucester Laboratory on the potential of New England species for making surimi to be exported to Japan.

John Ryan and Fred King participated in a meeting of the Armed Forces Product Evaluation Committee, US Army Natick Research and Development Command, Natick, MA.

Fred King substituted for John Ryan at a meeting of the NEFC's Awards Committee in Woods Hole, MA.

Fred King was a judge at the 16th Annual Junior Sciences and Humanities Symposium, Fort Monmouth, NJ.

Training

Joe Mendelsohn and Kurt Wilhelm attended a 2-day course, "The Retort Pouch," at the Center for Professional Advancement in East Brunswick, NJ. The course compared flexible container packages with conventional food cans and semirigid food containers.

Vincent Ampola attended a "Report Writing Workshop" seminar given by the Civil Service Commission.

Manuscripts

Bakal, A., P. Garber, and J. M. Mendelsohn. 1978. Ocean quahog invades surf clam domain, wins quality objectives. Food Prod. Dev. (P)

NATIONAL SYSTEMATICS LABORATORY

Benthic Fishes

Preparation continued on a paper describing several unnamed species of ophidioid fishes taken by Soviet trawlers off West Africa. Analysis was completed of the geographical variation in two species of the toadfish genus Batrachoides.

Pelagic Fishes

Research continued on the anatomy and systematics of the Spanish mackerels and on the systematics of Indo-Pacific halfbeaks.

Shrimps

Research continued on the penaeoid postlarvae from the eastern Pacific and on Australian Solenocera.

Other Crustaceans

Work continued on the preparation of a guide to the temperate-water decapod crustaceans of the US east coast. A study was commenced comparing the importance of Cape Hatteras and Cape Lookout as barriers to the distribution of decapod crustaceans.

Meetings, Talks, Visitors, Publicity

A visit of several weeks was begun by Dr. N. V. Parin of the P. P. Shirshov Institute of Oceanology in Moscow, who studied epipelagic fishes jointly with Bruce Collette. Visitors studying crustaceans included G. D. Goeke and D. Atkinson of the Dauphin Island Sea Laboratory, D. Nation of Northern Arizona State University, and R. Langton of the Woods Hole Laboratory.

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Task Group

During May the cooperative Ship of Opportunity Program obtained nine XBT transects, three in the Gulf of Maine, three across the southern New England shelf along the 71°W meridian, one across the shelf and slope off New York, one off Norfolk, VA, and one in the Gulf of Mexico. Also, continuous plankton and temperature records at 10 m were obtained along one of the Gulf of Maine routes, the transect of the shelf and slope off New York, and the transect northeastward from Norfolk, VA.

A one-page report updating the location and configuration of warm-core Gulf Stream eddies adjacent to the continental shelf in the Middle Atlantic Bight was submitted for publication in the June Atlantic Notice to Fishermen, and also was released to a mailing list of interested individuals at the same time. This report points out that during mid-May a warm-core eddy was off southern Georges Bank, centered at 38°45'N, 68°20'W. Another eddy was situated to the ENE at 39°20'N, 64°50'W, with its northwestern edge about 100 nautical miles seaward of Georges Bank.

On 26 May the MARMAP Field Group was abolished and five members of its staff were transferred to the Atlantic Environmental Group. The individuals joining AEG are Jack Jossi, Dan Smith, Grayson Wood, Bob Benway, Lianne Armstrong, and Sandy Agronick. Most of the tasks assigned to this group of people remain the same in AEG as they were in the MARMAP Field Group, but the transfer provides an opportunity for closer coordination of similar activities and involvement in a few new tasks.

Data Analysis Product No. 10, 31-yr time series plots of wind stress and Ekman transport in the vicinity of 42°N, 69°W, in the southern Gulf of Maine, was distributed to scientists in the Woods Hole and Narragansett Laboratories. The portrayals were produced by the MARMAP Information System from data computed by the Pacific Environmental Group in Monterey, CA, beginning with mean monthly atmospheric pressure fields held in digital storage by the US Navy Fleet Numerical Weather Central.

A report entitled, "Marine Environmental Variation off the Atlantic and Gulf Coasts of the United States - January 1977 to March 1978," was completed and submitted to NMFS headquarters for distribution to Center, Laboratory, and Regional Directors.

Ocean Dumping Task Group

Processing and portrayal of data from the January 1978 and April 1978 cruises to Deepwater Dumpsite 106 are continuing. The discrepancy in the Winkler dissolved oxygen values from the April cruise has been resolved with only a slight decrease in the precision of the method.

Neuston sampling equipment has been developed for the forthcoming 11-17 June 1978 cruise to DWD 106 aboard the George B. Kelez. The neuston net and frame are all nonmetallic in construction. Prior to use, the neuston nets and sample bottles will be pre-cleaned in 1N-HNO_3 and stored in clean plastic bags. Use of such a net system should facilitate collection of uncontaminated neuston samples which will be analyzed for trace metals. Comparison of metal values from neuston samples collected with the nonmetallic net system should be made with some metal values from the standard neuston net arrangement.

Meetings, Talks, Visitors, Publicity

Mert Ingham and Bob Marak met with Cdr. Swanson and Hal Stanford of the MESA New York Bight Program at the Groton, CT, Airport on 8 May for a conference on phytoplankton bloom sampling.

On 9 May Mert Ingham, Jim Bisagni, and John Whitford traveled to Rockville, MD, to confer with personnel of the National Ocean Survey. Mert Ingham then visited NMFS headquarters on 10 May.

Steve Cook attended an Awards Committee meeting at the Woods Hole Laboratory on 11 May.

Grayson Wood attended the "Electro 78" Conference held in Boston, MA, on 23 May.

On 23 May Mert Ingham attended a meeting of the Steering Committee for the Climate-Fisheries Workshop at the University of Rhode Island.

Steve Cook and Bob Benway traveled to New York to meet with Marine Science Branch, US Coast Guard, Atlantic Area, on Governors Island on 24 May.

Woody Chamberlin went to the Woods Hole Laboratory on 26 May to confer with Mr. Bertil Öström from the Institute of Marine Research, Hydrographic Department, National Board of Fisheries of Sweden.

On 26 May Mert Ingham and Bob Marak went to Milford, CT, to confer with MESA Program representatives concerning use of plankton "indicators" on an upcoming extended water-column chemistry cruise in the New York Bight.

Manuscripts

Chamberlin, J. L. 1978. Passage of a Gulf Stream warm-core eddy recorded by the vertical temperature array on a NOAA buoy. Gulfstream (NOAA) 3(12):6-7. (P)

Cook, S. K. 1978. Expendable bathythermograph observations from the NMFS/MARAD Ship of Opportunity Program for 1975. NOAA Tech. Rep. NMFS-SSRF. (A)

Cook, S. K. 1978. Water column thermal structure across the shelf and slope southeast of Sandy Hook, NJ in 1977. Ann. Biol. (S)

Crist, R. W., and J. L. Chamberlin. 1978. Bottom temperatures on the continental shelf and slope south of New England during 1977. Ann. Biol. (S)

Gunn, J. T. 1978. Variation in the shelf water front position in 1977 from Georges Bank to Cape Romain. Ann. Biol. (S)

Mizenko, D., and J. L. Chamberlin. 1978. Gulf Stream anticyclonic eddies (warm-core rings) off the northeastern United States during 1977. Ann. Biol. (S)