Dr. Gary Kleppel, Associate Professor of Marine Biology, has contributed an update on the goings-on in his laboratory at the Oceanographic Center.

“The general orientation of the laboratory remains trophic dynamic research and studies of how interactions between biological and physical processes in the sea influence marine biotic production,” he said.

“We are in the first year of a renewed, two-year research project supported by the Biological Oceanography Program of NSF [National Science Foundation] to identify the carotenoid pigments of microzooplankton, especially protozoans, and to understand what causes their concentrations in protozoan cells to vary. The project is a collaboration between our lab and that of Dr. Evelyn J. Lessard of the University of Washington, Seattle. Student Carol Burkart, who is completing her M.S. studies on the distributions of microzooplankton of the Irish Sea, is assisting in this project.” (Carol plans to use her newly acquired HPLC-based pigment analysis techniques in her Ph.D. research, which she hopes to launch here at the Center in the fall.)

“We are presently winding up our two-year study of the role of the Gulf Stream front in the survival and recruitment of larval fishes off southeast Florida,” Dr. Kleppel continued. “The project was conducted collaboratively with Dr. Elizabeth Clarke, of the University of Miami, and Dr. Peter Ortner, of NOAA/AOML in Miami. Dr. Denis Frazel, a former Nova Ph.D. student and now a postdoctoral fellow at the University of Miami, also is involved in this project and recently presented a paper at the ASLO meeting in Santa Fe, New Mexico, on the first results. M.S. students Gayle Stone and John Braker are completing their research on frontal biology and the use of a moored acoustic Doppler current profiler for measuring zooplankton distributions, respectively.”

The newest member of the laboratory team, Kevin Carter, is currently preparing a proposal for his M.S. thesis. He will be studying the role of nutrition in zooplankton production.

In addition to the work mentioned above and continued research into the measurement of natural zooplankton diets, Dr. Kleppel has been working with Dr. Scott Quackenbush, of Florida International University, on the dynamics of zooplankton (copepod) egg production. They believe that “by understanding the biological processes that contribute to egg production, the influence of individual environmental variables (e.g., temperature, food availability) on the physiology of production in copepod populations can be ascertained,” Dr. Kleppel said. “To accomplish this, a new immunoassay technique is being developed to monitor the production and spawning of eggs in female copepods.”
**TURTLE TIME AGAIN**

Nesting season for sea turtles will not start officially until May 1, but **Cathy Mattison** and her troops will be on the beach each morning at dawn beginning in mid-April. Thus begins the fourth year of the current sea turtle conservation project, sponsored by the Office of Natural Resource Protection and funded by Broward County. The Center’s **Dr. Curtis Burney** is Principal Investigator.

As co-P.I., Cathy will have five helpers daily throughout the nesting season, which will end in mid-August. The hatching season overlaps, starting in late June and ending in late October. The project responsibilities are manifold and labor-intensive. They include:

1. Relocating eggs from “hazardous locations” that are too close to the high tide line, have high pedestrian traffic, are near roads, are subject to beach renourishment, or are located “where you can see your shadow at night.”

2. Accurately surveying nesting patterns to determine any historical trends.


5. Responding to sea turtle strandings, salvage, and other emergency situations.

6. Setting up a hotline to handle emergencies and inform the public.

Locating an endangered nest is only about a third of the battle. Another part entails digging around the 100 or so eggs in the nest and removing them one by one, digging another hole in a safe hatchery, and placing the eggs in their new home—again, one by one. Then, about 60 days later, most of the eggs will break open and the hatchlings will emerge and scamper to the sea. Of course, all of the eggs and the hatchlings then must be assessed by the investigative team.

The project area extends from the Broward/Palm Beach County line south to the Broward/Dade County line (excluding John U. Lloyd Beach State Park). Hatcheries are located at Pompano Beach, Fort Lauderdale Beach, and North Beach Park in Hollywood, and a “safe” open beach area is used at Hillsboro Beach. Small wonder that Cathy and her helpers need so many all-terrain vehicles to accomplish their work.

Data now have been worked up for the 1991 season. The investigators counted 2,017 sea turtle nests, which is the second highest number since 1981 (there were 2,385 nests in 1990). The total includes 2,002 nests for loggerheads, 11 for greens, and 4 for leatherbacks. Even more impressive is the number of relocated eggs: 199,500 from 1,796 nests. From these eggs, 121,907 hatchlings emerged. The hatching success rate was 64.3 percent. For comparison, 20,556 eggs from 186 nests considered not to be endangered were not relocated; 13,521 hatchlings were released from these nests, and the success rate reached 66.3 percent.

Higher nesting densities (more nests per kilometer) were noted for 1991 than for previous years. According to Cathy, “This could be due to first-time nesting females, to an increase in population size, or perhaps to past conservation projects having a positive effect on recruitment or survival.” It would be encouraging indeed to determine finally that the efforts of sea turtle conservationists over the years really have made a difference.

**PEOPLE ON THE MOVE**

**Dr. Charles Messing** visited the Natural History Museum in Washington, D.C., January 17-21. The purpose of his visit was to compare the crinoids that he collected in Papua New Guinea last summer with the Museum’s collection. He also spent time, he said, “visiting old friends and establishing contacts for future research.”

During the week of January 27-31, several Center scientists traveled to New Orleans to attend the annual Ocean Sciences meeting, sponsored by the American Geophysical Union. Among the attendees was **Dr. Jeffrey Proehl**. Two of Dr. **Julian McCreary’s** Ph.D. students, **Yasushi Fukamachi** and **Zuojun Yu**, presented talks, entitled “Small-scale Instabilities along Oceanic Fronts” and “Asymmetry of Tropical Instability Waves,” respectively. Postdoctoral fellow **Dr. Lu Peng** also presented a talk, entitled “On the Interaction between Tropical and Subtropical Ocean Circulations.”

**Dr. Gary Kleppel** will travel to Ann Arbor, Michigan, March 10-13 to visit the Great Lakes Environmental Research Laboratory for a Coastal Oceans Program meeting. He will present a paper entitled “The Natural Diets and Egg Production of Copepods.”

**Continued on page 8**
The Center's Board of Governors met on January 16. Members present were Betty Berry, Scott Boyd, Bud Brown, Arne Carlson, Patricia Carr, Will Connelly, William Darby, Richard Donato, John Gerbino, Chris Jacoby, Marshall Lytle, Jerry Pascoe, Stan Smoker, and Richard Wilson. Also attending was honorary board and Center faculty member Dr. Guy Harvey, who is a nationally recognized marine artist and ichthyologist. A large number of Center faculty and staff were present, as well as Nova President Abraham S. Fischler; Nova Vice-President for Development Richard Miller; and Nova's development officer for the Oceanographic Center, Dennis Dannacher.

One unique feature of this gathering was the meeting site itself: two yet-to-be-furnished combined laboratories in the Center's newly acquired Dorothy and Alexander Schure Building. Dr. Fischler, who was instrumental in obtaining the 10,000-square-foot building for the Center, welcomed the group and thanked the staff for getting it refurbished and ready for occupancy.

Dr. Richard Dodge distributed a diagram and descriptive plan for use of the facilities. The plans reveal 8 labs, a classroom/conference room, 12 offices, and a vertebrate/invertebrate museum. The amount needed to furnish each lab is $21,000 to $30,000, so the Center has a long way to go before proper use can be made of this excellent research facility. The Board's assistance in this task was solicited.

Dennis Dannacher showed the group a new video on Nova University, which includes a four-minute segment on the Center. The presentation was well-received, and each board member was given a cassette to use for development purposes. Dannacher also reported that a load of rocks has been donated by Shaw Trucking Service and transported to the Center. Board member John Grady has volunteered to put the rocks in place on the breakwater at the basin entrance, where they are badly needed to retard incoming tidal surges from Port Everglades.

Chairman Chris Jacoby opened the meeting to discussion of possible fund-raising projects. He moved to set up formal communication with several local organizations in order to increase public awareness of research activities at the Oceanographic Center. A committee was established to open these lines of communication and to establish a permanent liaison with such groups. It was also decided that a faculty Speakers Bureau would be set up for local speaking engagements.

Other potential fund-raising events were discussed, including a fish fry, a series of workshops, and a silent auction. The staff will report back to the board at the next meeting as to which event will be pursued. Richard Donato announced a forthcoming event to make everyone's mouth water: a pig roast, to be held at the edge of the Everglades on February 16. Air boat rides and a tour of an Indian village have been arranged. The board, Friends of Oceanography, and Center staff and students have been invited.

Mr. Donato, chairman of the Scholarship and Student Relations Committee, announced the addition of 25 new oceanography students, bringing the total of undergraduate students to 40 and graduate students to about 60.

The next meeting was set for February 20. After adjournment, the group toured the facility and were treated to refreshments in the new conference/classroom.

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President Fischler Steps Down

Dr. Abraham S. Fischler, president of Nova University, will step down on July 31, 1992. Dr. Fischler came to the University as dean of graduate studies and director of the Behavioral Sciences Center in 1966 and assumed the presidency in 1970. In the ensuing years, he led Nova to a stable plateau, despite many rough spots encountered in the road along the way.

Nova University has become a nationally recognized educational institution, and the development phase is continuing. As Dr. Fischler said last summer, “When potential candidates visit Nova’s campus, they will see five buildings under construction: the Leo Goodwin, Sr., Law Building; a new student dormitory; a new bookstore; and enlargement of both the Baudhuin Oral School and the Rosenthal Building”—not to mention the newly acquired building at the Oceanographic Center.

In his letter of resignation to the Board of Trustees, Dr. Fischler said, “When I accepted the responsibility as chief executive officer of Nova University in 1969, it was my intention to remain until such time as the University achieved academic and economic stability.” He felt that the most appropriate time had now arrived, and he gave, in brief, the following reasons:

1. Academically, all programs within centers and all centers have achieved quality education acceptability.
2. Financially, we are in the best position in the University's history.
3. The reaffirmation process by SACS will allow the new president two years before the self-study is due.
4. Our strategic planning process is moving forward in a positive direction.
5. The Office of Institutional Research is firmly in place.

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Christmas Party a Hit

The Center’s annual Christmas party was held on December 13 in the Richardson Library and the Coastal Studies area. As usual, the hoagies were a huge hit—two six-footers and a four-footer, to be exact. There were no observable leftovers.

The festivities, which were organized by staffer Kathy Maxson, ran well into the evening. Many guests from Nova’s main campus attended, including the president, Dr. Abraham Fischler. Several members of the Center’s Board of Governors also were in attendance.

Live holiday music was provided once again by Dr. Russell Snyder, Dr. Lu Peng, and Kathy Maxson. And a good time was had by all.

Dr. Gary Kleppel, with wife Pam and son Jarret.

Kathy Maxson sets out more food.

Cathy Mattison, Dr. Andrew Cole, and Dr. Jeffrey Proehl find a table.

Board member Marshall Lytle enjoys festivities.

Dr. Nat Apter and wife Valerie find the spirit.

PRESIDENT FISCHLER STEPS DOWN

Continued from page 3

6. The University’s development effort is moving along positively.

Dr. Fischler’s plans are indefinite at this time. “However, I do expect to remain active and do some writing and traveling during my sabbatical year,” he vowed.

We at the Oceanographic Center will miss Dr. Fischler. He stood by us during some very dire periods, and we are “survivors” only through his perseverance. We wish him the best of all possible worlds.
Spring Term Schedule

M.S. degree specialties are Marine Biology and Coastal Zone Management. Each course carries three credit hours or may be audited. Tuition is $250 per credit hour (50 percent less for audit). Classes meet once a week from 6:30 to 9:30 P.M. at the Center. The spring term extends from April 6 through June 26, 1992. For more information, call Bonnie at (305) 920-1909.

Marine Geology (OCOR-5604): Offered for both degree programs, this required CORE course stresses the origin, form, and resources of ocean basins and continental margins. Topics range from fossil reefs to mid-ocean ridge basalts. Southeast Florida geology will be included. Instructor: Dr. Pat Blackwelder, Center faculty. Begins Monday, April 6.

Methods in Plankton Ecology (OCMB-6310): Focus is on common measurement techniques used in water column biology. Emphasis is on field application for sampling the distributions and evaluating the activities of phytoplankton and zooplankton. Some classes will meet on weekends. Previous work with plankton is helpful. Instructor: Dr. Gary Kleppel, Center Faculty. Begins Tuesday, April 7.

Marine Microbiology (OCMB-6055): The nature, activities, interactions, and ecological roles of marine bacteria and their heterotrophic microbial consumers in coastal and offshore environments will be examined through a survey of recent literature. Instructor: Dr. Curtis Burney, Center faculty. Begins Wednesday, April 8.

Dry Coastal Ecosystems (CZMT-0605): A multidisciplinary study is made of coastal ecosystems, such as tropical hardwood hammocks, pinelands, coastal scrub, sand dunes, and rocky coastlines. Emphasis is on interaction between biological, physical, and chemical components of these systems, and external influences such as climate, fire, changing hydrology, and the effects of human activities. Four Saturday field trips to study local ecosystems are required. Instructor: Dr. Bart Baca, Center adjunct. Begins Thursday, April 16 (one week later).

Summer Term Schedule

11 weeks: July 6 - September 18, 1992

Marine Chemistry (OCOR-5605): CORE course. Instructor: Dr. Curtis Burney, Center faculty.

Coastal Water Resource Impacts (CZMT-0622): Instructor: Mr. Stacy Myers, Center adjunct.

Marine Ichthyology (OCMB-6230): Instructor: Dr. Richard Spieler, Center faculty.

Wetlands Ecology (CZMT-0791): Instructor: Dr. Bart Baca, Center adjunct.

David Gilliam successfully defended his M.S. thesis in Marine Biology on December 6. The thesis title was "The Diet and Feeding Habits of the Southern Stingray Dasyatis americana in Shallow Tropical Habitats." Members of his thesis committee were Drs. Curtis Burney, Charles Messing, and Kathleen Sullivan (University of Miami).

David’s field research took place in the central Bahamas, at the Exuma Cays Land and Sea Park, which is a Bahamian national park. He conducted his field experiments several times a year over the past three years, gathering data on feeding habits primarily by means of aerial surveys and observations. It was his good fortune that one of his committee members, Dr. Sullivan, was his pilot, and the group with which she is associated, the Sea and Sky Foundation, provided the plane. To get to the nitty-gritty of the research, David also brought stingray

Continued on page 6
Kevin Kuta Defends M.S. Thesis

On January 29, Marine Biology student Kevin Kuta presented a defense of his M.S. thesis, entitled "The Effect of Demersal Reef Fish on Two Species of Gorgonian Coral." His major professor is Dr. Richard Dodge.

In his observational study, Kevin looked at reef fish in the Florida Keys. He said that "Traditional thinking was that reef fish had no effect on coral, that they just used the reef for food and shelter. However, in the past 15 years or so that thinking has started to change. It is apparent that a lot of fish feed off the reefs and then come back to them for shelter, and they excrete and defecate there."

Several studies in the mid- to late-1980s have demonstrated that reef fish do, in fact, make a significant contribution of carbon and nitrogen to the reef system. In particular, Judy Meyers and Eric Schultz, of the University of Georgia, looked at the effect that resting fish have on hard corals. It was found that their presence actually causes the corals to grow faster. If this were true, Kevin wondered, what happens to soft corals, such as gorgonians?

Kevin's six-month lab experiment consisted of a system of flow-through sea water aquaria, into which gorgonians were transplanted. Some aquaria also contained reef fish—primarily grunts and snappers. The remaining aquaria contained no fish and were used as controls. "I looked at several different parameters," he explained, "one of which was the concentration of zooxanthellae, which are symbiotic algae that live inside coral. I found that gorgonians kept without fish had higher zooxanthellae levels than those kept with fish." In looking for the causes of this behavior, Kevin speculates that corals without fish relied more on autotrophic production (photosynthesis) for maintenance and growth and therefore produced the higher levels. He suspects that the corals with fish may have been receiving some sort of energy supplement from the fish—from their feces or from the ammonia they release.

Kevin also looked at changes in bulk density of the organisms and at spicule (calcium carbonate) concentration and found that both conditions were higher in the presence of fish. He has considered several explanations, the most probable being that the number of spicules is increasing or that tissue density/volume is changing. "From my experiments there is no way to determine which is happening," he said, "but several studies show that hard corals calcify at higher rates when incubated in high levels of ammonia, which is essentially what happened in this experiment."

Another parameter considered was a change in size of the organisms. "The method I used to look at size change hasn't been used before, to my knowledge," Kevin said. "I calculated the planar area of the organism by photographic technique to determine whether a change had occurred. I didn't find any difference between the fish and no-fish groups."

Kevin is now working toward the Ph.D. degree at Florida International University in Miami, this time looking at black band disease in hard corals. The disease has been documented in the Atlantic, the Caribbean, and portions of the Red Sea, and he wants to know the causes of the disease, how it is transported, and how it kills the coral. A lofty goal, and good luck!

New M.S. Students Begin Winter Term

The following are new students who have enrolled in the master's program in the Institute of Marine and Coastal Studies, beginning with the winter term.

Nicole Adimey, MB: Ohio State Univ.
Melissa Dore, CZM: Wells College
Larry Havill, Sp: University of Florida
Roseline Hernandez, MB: Cornell Univ.
Gary Van Den Berg, CZM: South Dakota State University

Legend: MB = Marine Biology, CZM = Coastal Zone Management, Sp = Special.

DAVID GILLIAM DEFENDS, LOOKS AHEAD
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stomachs back to our laboratory in order to study and identify their contents.

One major finding of this research shows that the southern stingray is opportunistic in its feeding habits. This means that it feeds throughout the day, although it does show some preference for periods of high tide. David also found that the stingray feeds mainly in soft-sediment, algal turf habitats. Another major finding, according to David, is that the southern stingray "is a generalist feeder, meaning that it feeds on many different prey types, such as a wide variety of crustaceans and mollusks, and some bony fishes."

This sort of feeding information on the southern stingray has been suggested previously, but not quantitatively described. David feels that perhaps the two major findings described above will go a long way toward explaining why these creatures are so abundant in the Central Bahamas.

David was a 1988 graduate of the University of Miami, with a major in Marine Science and Biology. He hopes to go on for the Ph.D. degree in Marine Fisheries at Nova. Seems a logical step.
Denice Teeples presents nonthesis option paper

Denice Teeples, an M.S. student in Marine Biology, presented a nonthesis option paper on January 24. Her paper, entitled “Gelatinous Zooplankton: Validity of the Concept and Roles of Component Organisms as Predators, Prey, and Sources of Marine Aggregates,” is essentially a literature review of these organisms.

Denice stated that her research was stimulated by her belief that gelatinous zooplankton frequently were being overlooked and that “accurate data collected by appropriate sampling techniques have in many cases been viewed as unimportant because gelatinous zooplankton have long been considered trophic dead ends.... Recently, however, gelatinous zooplankton have come under closer scrutiny because scientists are recognizing their abundance and the roles they play in marine ecosystems.”

Denice read about 200 articles on the subject while pursuing the literature review, and she now has a good idea of the general characteristics of gelatinous zooplankton and the roles they play as both predators and prey. She also has learned that they are not trophic dead ends. Her paper further discusses the indirect effects of their feeding, including the production and significance of marine aggregates.

As to her plans for the immediate future, her top priority is the imminent birth of her first child. After that event, her plans are not firm, but she considers high school teaching a viable option.

Dean Teeples defends option paper

Dean Teeples, an M.S. student in Marine Biology, defended his nonthesis option paper on February 20. It is entitled “Wetlands Restoration.”

Now considered “an invaluable, endangered natural resource,” as well as one of the most productive ecosystems in the world, sadly, “global wetlands are being destroyed at the rate of approximately 300,000 acres per year,” according to the introduction of Dean’s paper. One solution to this disturbing bit of data is to dampen public misconceptions about the threat that wetlands supposedly pose and to bolster instead the idea that wetlands are valuable assets. But wetlands need to be properly defined before they can be preserved and restored.

“There are at least 50 different definitions in use in the United States,” according to Dean. “These different definitions originate because of the nature and complexity of wetlands.”

We think we know Dean’s immediate priorities. We wish him well in his career as an environmental scientist as well.

Frazel gives seminar on Plankton Abundance

Center graduate Dr. Denis Frazel, of the University of Miami, presented a seminar on January 31 entitled “Variability in Plankton Abundance at the Gulf Stream Front.” He presented the talk again at the American Society of Limnology and Oceanography meeting, held February 10-14 in Santa Fe, New Mexico. Coauthors are Dr. Gary Kleppel, of the Oceanographic Center, Dr. M. Elizabeth Clarke, of the University of Miami, and Dr. Peter B. Ortner, of NOAA/AOML in Miami.

The collaborative project is a study of the Gulf Stream front and its role in the survival and recruitment of larval fish. The “front” generally means the region along the western edge of the Gulf Stream, where pronounced gradients in physical properties, such as temperature, salinity and density, occur.

The study tests the null hypothesis that biological differences among inshore, front, and Gulf Stream waters are not significant. An alternative hypothesis is that biological differences between either the inshore and front waters or the front and Gulf Stream waters are significant. A second alternative is that biological differences between both inshore and front waters, and front and Gulf Stream waters are significant, in which case it could be concluded that the front indeed is a unique biological habitat.

Frazel reported that “Preliminary data show that the optical front appears to be a surface phenomenon. Biologically, inshore and front waters seem to have similar characteristics, while front and Gulf Stream waters have different characteristics. From the chlorophyll and depth-integrated zooplankton data, it would appear that the front is not a unique biological habitat. However, preliminary results from the other biological data sets suggest that there may be certain unique biological properties at the front.” Continued in-depth studies of the data sets will be performed.

Joint seminar presented

On February 28, a joint seminar, was presented in the Richardson Library. The topic was “The Echinoderm Experience: Research at Nova on Crinoids and Sea Urchins”; speakers were M.S. student Serge Beregovoy, visiting scientist Ghislaine Lewellyn, and Dr. Charles Messing.
PEOPLE ON THE MOVE
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From left: Dr. Lu Peng, Zuojun Yu, and Yasushi Fukamachi present a practice seminar for Center staff and students.

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