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THE 57th ANNUAL MEETING

FLORIDA ACADEMY OF SCIENCES

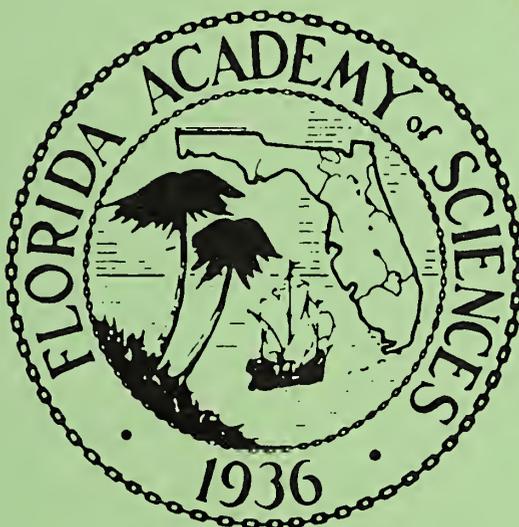
MARCH 26-28, 1993

ECKERD COLLEGE
St. Petersburg, Florida

Florida Scientist



IN TOUCH
WITH PEOPLE. . .



... IN TOUCH
WITH
THE
FUTURE.

Program Issue

Volume 56

Supplement 1

FLORIDA ACADEMY OF SCIENCES

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Urban and Regional Planning	Lisa Dodd

The 57th ANNUAL MEETING

FLORIDA ACADEMY OF SCIENCES

PLENARY SESSION (Panel Discussion):

"Human Impact on the Environment of Tampa Bay"

Panelists:

**Mr. Peter Clark, Tampa Bay Regional Planning Council
-Agency on Bay Management**

**Ms. Holly Greening, Tampa Bay National Estuary
Program**

Mr. David Carpenter, Tampa Port Authority

Mr. John Ramil, Tampa Electric Authority

**Mr. Mike Perry, Southwest Florida Water Management
District**

Moderator:

**R. Del Delumyea, Ph.D., Millar Wilson Laboratory,
Jacksonville University**

BANQUET ADDRESS:

"Nuclear Waste and the Environment"

**Dr. Gregory Choppin
Department of Chemistry
Florida State University**

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1993 Florida Academy of Sciences Annual Meeting

WELCOME

Welcome to the 57th Annual Meeting of the Florida Academy of Sciences. The Academy is a multi-disciplinary association whose goal is facilitating the exchange of scientific ideas in the State of Florida. It is a window to the current state of science in the State. The 1993 scientific program at the Annual Meeting is one of the largest and most diverse in the history of the Academy and promises to stimulate a great deal of discussion both within the scientific community and the public at large. I encourage presenters at the meeting to consider submitting manuscripts for publication in the official outlet for the Academy, the Florida Scientist. Finally, I wish you an enjoyable experience and look forward to your continued active support of the Academy.

Tom Crisman, 1993 President, Florida Academy of Sciences

MEETING INFORMATION

GENERAL INFORMATION ON MEETING

Information about the meeting program and the Florida Academy of Sciences may be obtained from the Executive Secretary, Mrs. Betty Preece, P. O. Box 033012, Indialantic FL 32903-0012 (407) 723-6835.

LOCATION

Overlooking beautiful Boca Ciega Bay in St. Petersburg, Florida, Eckerd College is a private, coeducational college of the liberal arts and sciences related by covenant to the Presbyterian Church. Since its founding in 1958, the college has been a pioneer of responsible innovation—developing programs that have been adopted nationwide and earning the college an international reputation for academic excellence.

To get to campus, take Interstate 75 from either the north or south to southern St. Petersburg. Take Exit 35 (heading west on Highway 682 toward the Pinellas Bayway), continue for approximately 1 mile, and turn left into campus before the first Bayway bridge.

REGISTRATION

All participants are expected to register. A registration desk will be open in the lobby (Science Building) from 7:30 am to 4:00 pm on Friday, March 26 and from 7:45 am to 9:30 am on Saturday, March 27. The registration fee is \$25 for regular members, \$30 for non-members, and \$15 for students. Members receive the program issue by mail, as will others registered by February 14, 1993. Extra programs cost \$4.00.

LODGING

No reservations can be made through the Academy. The following motels are within a 5 minute drive of campus. All are providing discounts to Academy members. Please make reservations well in advance to ensure motel space during tourist season and mention your affiliation with Eckerd College/FAS.

PRIDE MOTOR INN: 3501 54th Ave. S. (813) 867-8461. \$25 sgl, \$30 dbl.

HOLIDAY INN: 4601 34th St. S. (813) 867-3131. \$59 sgl, or dbl.

BAY WAY INN: 4400 34th St. S. (813) 867-2471. \$42.95 sgl, \$48.95 dbl.

TROPICAL INN: 3601 34th St. S. (813) 867-1377. \$52 sgl, \$56 dbl, \$65 effc.

HOWARD JOHNSON'S: 3600 34th St. S. (813) 867-6070. \$40 any room.

ECONOLODGE: 3000 34th St. S. (813)867-1111. \$27 sgl or dbl.

MEALS/BANQUET

The college cafeteria will be available for lunch on Thursday and Friday at a cost of \$4.50 or less. Numerous restaurants are also within a 5 minute drive of campus. The Academy Social, Banquet, and second Plenary Session will be held on Friday evening, March 26, at Fox Hall in the center of campus. The social will begin at 6:30 PM, the Banquet at 7:30 PM and the Plenary Session at 8:30 PM. The social will include punch and appetizers. Dinner will be buffet style and consist of roast beef and a vegetarian pasta, tossed salad, vegetables, dessert, and beverages. Total cost for the social and banquet is \$16. Participants should pre-register for the banquet.

EXECUTIVE COMMITTEE MEETING

The annual meeting of the Executive Committee of the Florida Academy of Sciences will be held on Thursday, March 25 at 1:00 pm.

ANNUAL BUSINESS MEETING

The Academy's annual business meeting will begin at 12:15 pm (following the FJAS Awards Recognition at the Plenary Session) on Friday Afternoon, March 26, 1993. Members of the Executive Committee and Chairs of sections are asked to bring written 1992-1993 reports.

FLORIDA JUNIOR ACADEMY OF SCIENCES MEETING

The annual meeting of the Junior Academy will be held March 24-26, 1993 at Eckerd College. Volunteers are needed to assist in the Judging of Student Papers on March 24. Persons interested in participating should contact the FJAS Coordinator: Mrs. Cathy Gotshall, Melbourne Central Catholic High, 100 E. Florida Ave., Melbourne FL 32901. Telephone Number: (407) 727-0793.

INFORMATION FOR SPEAKERS

All rooms have slide projectors and screens. Speakers wishing to use transparencies (overhead slides) should verify with their session chair that one will be provided for that session. Speakers requiring special equipment must contact the chair of the local arrangements committee. Student speakers should identify themselves to the session chair prior to speaking.

If an author or co-author is scheduled to speak but cannot attend due to unforeseen circumstances, arrangements should be made for a colleague to present the paper. If a reader cannot be found, the paper should be cancelled. The Academy must be notified of a substitute speaker or cancellation by contacting the appropriate section chair.

LOCAL ARRANGEMENTS

Special needs (e.g. transportation for disabled persons) during the meeting at Eckerd college are coordinated by Dr. William Szelistowski, Chair of the Local Arrangements Committee, who may be consulted on all aspects of meeting support, including special services, by calling (813) 864-8439.

PUBLICATION

The 1993 Annual Program Issue, is Supplement Number 1 to Volume 56 of the Florida Scientist and will be distributed to more than 200 domestic and foreign libraries as well as major abstracting services.

LOCAL AREAS OF INTEREST AND FIELD TRIPS

Information about local areas of interest (museums, parks, etc.) will be available at registration. The following field trips are planned and others may also be available.

Shell Island. Beach party and chicken box lunch on a scenic barrier island via a pontoon boat. Saturday 11-3 PM. Transportation to boat provided if necessary. \$15 adults, \$10 children. Advance registration required.

Boyd Hill Nature Park. Nature walk/tour of park, a multi-habitat natural area 10 minute drive from campus. Saturday morning. Sign up at registration desk.

Guided bird watching. Bird watching in local habitat(s). Saturday morning. Sign up at registration desk.

ANNOUNCEMENTS

SPECIAL SYMPOSIUM: The Anthropological Sciences Section of the Academy is sponsoring a symposium titled "HUMAN IMPACTS ON THE CULTURAL RESOURCES OF FLORIDA" on Friday, March 26, 1993, 8:15-9:30 AM in Room SHB-116, Robert Austin, Piper Archeology, Presiding.

Business Meetings of the Computer and Mathematical Sciences, and Engineering Sciences Sections of the Academy will be held on Friday, March 26, 1993, 10:30-11:00 AM in Room SE-101, Ms. Betty Preece, Executive Secretary, Presiding.

Workshop The American Association of Physics Teachers will present a Workshop titled "Electrostatics: A Workshop for High School and Middle School Physics and Physical Science Teachers" on Saturday, March 27, 11:45 AM-4:00 PM, Room SHC-103. Bobbie Himes, Edgewater High School, Orlando, will preside. (Lunch and breaks will be arranged in the workshop).

SPECIAL ANNOUNCEMENT: Amendments to bylaws of the Florida Academy of Sciences, Inc. Pursuant to Council action on January 16, 1993, two amendments to the bylaws of the Florida Academy of Sciences, Inc. will be considered for adoption at the annual business meeting. One amendment changes the grade-level of students eligible for membership in the Junior Academy. The other amendment changes criteria for Emeritus membership. Section 2, Article XI of the Academy's charter provides for the adoption, alteration, amendment or rescision of Bylaws at any annual business meeting of the Corporation if approved by a two-thirds (2/3) vote of members present, provided notice of proposed amendments has been given to members at least thirty (30) days prior to the meeting.

Note: Words in brackets [] are to be deleted and underlined words are additions:

Amendment One: Amends Bylaws, Article I Section 2, Definition of Classes, as follows:

item h. Members who are secondary school students of grades [seven] six to twelve inclusive shall be designated as Junior Members.

Amendment Two: Amends Bylaws, Article I Section 2, Definition of Classes, as follows:

item i. Regular members who have been in good standing for ten (10) years and who are active in the Academy at time of retirement shall be designated Emeritus Members.

EXHIBITS

Exhibits and exhibitors will display information and materials around the registration area during Friday, March 25, 1993.

Save the Manatee Club will staff a booth describing its efforts to encourage research, public awareness, education and lobbying on its behalf.

The Florida Aquarium will display and interpret the hydrological, geological and ecological status and future of Florida's freshwater and marine ecosystems.

PLENARY SESSION: "Human Impact on the Environment of Tampa Bay"

A panel discussion will be the feature of the Plenary Session, which begins at 11:00 am on Friday, March 26. In addition, presentations which relate to the Plenary topic are indicated with an asterisk in the Program Issue. Registrants are encouraged to attend as many of these as practical, both before and after the Plenary Session. Listed below is the schedule for the Plenary Session:

Friday, March 26, 1993, 11:00 AM - 12:15 PM **Dendy Auditorium**

R. Del Delumyea, Millar Wilson Laboratory, Jacksonville University, Moderator

- 11:00 R. Del Delumyea, Ph. D., Millar Wilson Laboratory for Chemical Research, Jacksonville University, will introduce the panel.
- 11:05 Mr. Peter Clark, Principal Environmental Planner, Tampa Bay Regional Planning Council - Agency on Bay Management will present "An Overview of Tampa Bay Historical Problems" and discuss early activities to coordinate bay management efforts.
- 11:20 Ms. Holly Greening, Program Scientist, Tampa Bay National Estuary Program, will give a brief overview of the objectives of the Tampa Bay National Estuary Program, focusing on the technical projects defining the critical living resources in Tampa Bay, how anthropogenic impacts have affected bay habitats and living resources, and the development of specific management actions necessary to ameliorate identified impacts.
- 11:35 Mr. John Ramil, Director of Power Resource Planning for the Tampa Electric Authority, will address "Tampa Bay Area Energy Needs Through the year 2000" and how they will be met through a combined plan of conservation and new supply. Tampa Electric's approach to siting new power generation and power supply environmental impacts will be presented
- 11:50 Mr. Michael J. Perry, Director of the Surface Water Improvement and Management Department of the Southwest Florida Water Management District, will review "Restoration Activities Within the Tampa Bay Watershed" and the effects of cultural eutrophication on habitat and water quality in Tampa Bay.
- 12:05 Mr. David Carpenter, Senior Environmental Scientist with King Engineering, Associates, (and formerly with the Tampa Port Authority), will review "Port Impacts, Past and Future".

PROGRAM SUMMARY

THURSDAY AFTERNOON, MARCH 25, 1993

1:00 FAS Council Meeting SHA-103

THURSDAY EVENING, MARCH 25, 1993

6:30 FJAS Judging SHA-103

FRIDAY MORNING, MARCH 26, 1993

7:30 Registration (to 4:00 pm) SHA LOBBY
 8:00 Biological Sciences, Session A DM-101
 Physics and Space Science, Session A * SE-202
 Science Teaching, Session A SE-218
 Urban and Regional Planning * FO-120
 8:15 Anthropological Science, Symposium SE-106
 Biological Sciences, Session C DM-103
 8:30 Biological Sciences, Session B * DM-102
 Biological Sciences, Session D DM-104
 Env. Chem. and Chem. Sci., Session A * SHC-103
 Rare and Endangered Biota * SHC-102
 8:45 Anthropological Sciences, Session A SE-105
 8:55 Agricultural Science, Session A SE-104
 9:30 Social Sciences * SE-202
 Atmospheric and Oceanographic Sciences * FO-113
 10:00 Agricultural Science, Session B * SE-104
 Anthropological Sciences, Session C SE-105
 11:00 PLENARY SESSION DENDY AUD

FRIDAY AFTERNOON, MARCH 26, 1993

12:15 FJAS Awards DENDY AUD
 12:30 Academy Business Meeting DENDY AUD
 1:00 Lunch
 2:00 Agricultural Science, Session C SE-104
 Biological Sciences, Session E DM-101
 Biological Sciences, Session F DM-102
 Biological Sciences, Session G DM-103
 Env. Chem. and Chem. Sci., Session B SHC-103
 Env. Chem. and Chem. Sci., Session C SHC-102
 Geology and Hydrology * FO-114
 Medical Sciences * DM-104
 Physics and Space Science, Session B SE-202
 Science Teaching, Session B SE-218
 2:15 Anthropological Sciences, Session B SE-105
 Anthropological Sciences, Session D SE-106
 4:00 Poster Session SH LOBBY

FRIDAY EVENING, MARCH 26, 1993

6:30 Academy Social Hour FOX HALL
 7:30 Banquet FOX HALL
 8:30 Plenary Address II FOX HALL

SATURDAY MORNING, MARCH 27, 1993

8:00 AAPT Breakfast CAFETERIA
 8:15 AAPT SECTION MEETING CAFETERIA
 8:45 Break
 9:00 AAPT Session A SHC-102
 10:30 FOURTH ANNUAL LOWELL SEACAT MEMORIAL LECTURE SHC-102
 11:45 AAPT SESSION B Workshop SHC-102

* Section Business Meetings to follow session

AGRICULTURAL SCIENCES

Friday, March 26, 1993, 8:55 am - 9:45 am, Room SE-104

SESSION A

E.C. French, University of Florida, Presiding

8:55 am, WELCOME

Agricultural Science Section Chair

9:00 am, AGR-1A **A Morphometric Measurement Formula for Determining the Weight of Neonatal Foals.** R.L. ASQUITH (1), J. KOVIPELTO (2), E.A. OTT (3), E.L. JOHNSON (4), Animal Science, University of Florida, Gainesville, FL 32611. The accurate determination of a foal's weight is essential to insure appropriate medical treatment in a field situation in the absence of a scale. Eighteen clinically normal Thoroughbred and Quarter Horse foals from the 1991 foal crop at the Horse Research Center were used in this study. Using a simple formula and very basic arithmetic skills, based on the single measurement of the foal's heart girth will provide a rapid, practical, and easy method to determine the weight of the foal with reasonable accuracy.

9:15 am, AGR-2A **Identification of Random Amplified Polymorphic DNA Markers in Sweetpotato.** ZHIQIANG ZHU, Agricultural Research Program, Florida A&M University, Tallahassee, FL 32310. A total of 32 random primers were used to detect RAPD markers in 7 sweetpotato (*Ipomoea batatas*) cultivars which resulted in identification of more than 50 polymorphic DNA fragments. Since isozymic polymorphism in sweetpotato is extremely low and only a few RFLP markers in sweetpotato have been reported, the RAPD technique may be used as an alternative tool to generate sufficient polymorphism and permit developing a genetic map of *I. batatas*.

9:30 am, AGR-3A **Low Input Cropping Systems on North Florida Small Farms.** C.S. GARDNER AND C.H. MCGOWAN, Division of Agricultural Science, Florida A&M University, Tallahassee, FL 32307. Wheat (*Triticum aestivum* L.), oat (*Avena sativa* L.), crimson clover (*Trifolium incarnatum* L.) and hairy vetch (*Vicia villosa* Roth.), were evaluated in two counties, as green manure crops (GMCs) for subsequent corn. GMCs were planted in fall 1990 and received 336 kg/ha of a 0-14-14 fertilizer mixture at planting. Wheat and oat received an additional 67 kg/ha of N in split application. GMCs were sample harvested, plowed down and the area planted to tropical corn in spring 1991. Aerial dry matter yields of GMCs ranged from 5000 to 8500 kg/ha and content of up to 278 kg/ha. Corn forage and grain yields were up to 6720 and 2000 kg/ha, respectively and were comparably higher than yields from corn grown without GMCs. It was concluded that temperate GMCs may be used as a supplementary nutrient source on small farms.

9:45 am, BREAK

Friday, March 26, 1993, 10:00 am - 11:00 am, Room SE-104

SESSION B

C.S. Gardner, Florida A&M University, Presiding

10:00 am, AGR-4B Growth Regulator Effects on the Tuberization of *Dioscorea rotundata* Minisetts. O.U. ONOKPISE (1), J.T. TAMBONG (2), AND L. NYOCHEMBENG (2), (1) Florida A&M University, Tallahassee, FL 32307, (2) Institute of Agronomic Research, Ekona, P.M.B. 25, Buea, Cameroon, West Africa. Yams (*Dioscorea rotundata*) which are staple food crops for over 500 million people in the tropical regions of the world, suffer continuous decline in production due to the inadequate supply of planting materials. The minisett technique which should enhance productivity has also received very limited attention. Three growth regulators (NAA, IAA, and BAP), were evaluated to determine their effects on minisett tuberization. Minisetts from the middle portions of yams had significantly higher growth and tuber formation. There was no significant difference among the growth regulators in producing minitubers from the yams. The relevance of these studies to the productivity of yams will be discussed.

10:15 am, AGR-5B Phytoalexin Induction and Characterization in Peanut Leaves. S.M. BASHA, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307. Phytoalexins are antibiotic secondary metabolites produced by plants in response to injury and invasion by certain pathogens, and they appear to be involved in disease resistance. Peanut leafspot, a disease caused by Cercospora arachidicola Hori and Cercosporidium personatum (Berk. and Curt.) Deighton, is one of the most important diseases of peanuts. Phytoalexins were induced in peanut leaves of different maturities following wounding by injury and subsequent challenge with native microflora. The results showed that immature peanut leaves produced one major and three to four minor phytoalexin components, while the mature leaves produced one major phytoalexin component. In addition, the mature leaves produced significantly higher amount of phytoalexin than the immature leaves. The leaves from the flowering plants produced relatively higher amount of phytoalexins than the leaves from flowerless plants. In addition, evaluation of leaves from selected peanut genotypes showed wide genetic variation in phytoalexin content and composition.

10:30 am, AGR-6B Identifying Nutrients that Limit Rhizoma Peanut Production on Florida Sandy Soils Using a Missing Element Experiment. R.W. RICE, E.C. FRENCH, G.M. PRINE, P.E. HILDEBRAND, AND W.G. BLUE. University of Florida, Gainesville, FL 32611. Little definitive data exists regarding rhizome peanut (RP) soil fertility requirements and forage yield response to fertilizer amendments. This experiment investigated 'Florigraze' RP yield response to both macro (P, K, S, Mg) and micronutrients (Fe, Cu, Mn, Mo, B, Zn) over a 4 year period. Nutrients were added annually in a missing element design. Treatments included the 'CONTROL': received nothing, 'ALL': received a full complement of all elements, and 10 more 'MINUS' treatment where each element was omitted singly from the full ALL complement. From 1989 to 1992, forage yield increased in the CONTROL in response to weed control management. By 1992, ALL yield exceeded

CONTROL by 72%. Exclusion of Mg or any single micronutrient had no effect on yield relative to ALL. Forage yield progressively declined when treatments lacked P ($p < 0.072$), S ($p < 0.010$) or K ($p < 0.001$). Forage tissue analysis was not a reliable indicator of yield potential. To develop fertilizer recommendations, yield response data must be collected from many different sites across a wide range of P, S, and K soil test values. This study required 4 years before accrued benefits of amendments were realized, suggesting that future research on RP fertilizer requirements should be long term.

10:45 am

SECTION MEETING

G.N. Prine, University of Florida, Presiding

Friday, March 26, 1993, 2:00 pm - 3:15 pm, Room SE-104

SESSION C

G.N. Prine, University of Florida, Presiding

2:00 pm, AGR-7C Defoliation Effects on Seed Yield Components and Ease of Harvesting in Pearl Millet x Elephantgrass Hybrids. D.A. DIZ, S.C. SCHANK, AND D.S. WOFFORD, University of Florida, IFAS, Department of Agronomy, Gainesville, FL 32611. A seeded high-quality elephantgrass hybrid has been obtained through hybridization with pearl millet and further breeding. A problem which remains to be solved prior to widespread use of the hybrids is mechanical seed harvesting. The extreme height of the panicles and the high biomass of the crop complicate this procedure. This problem may be solved through defoliation management. The objective of this study was to evaluate the effect of three defoliation treatments on the seed yield components and ease of harvesting in four pearl millet x elephantgrass hybrid genotypes. The height of panicles and the biomass of plants were drastically reduced with 2 and 3 cuts per year. Two cuts per year (mid-June and beginning of August) did not decrease seed yield and seed quality parameters significantly. Three cuts per year (last cut in mid-September) would not be a viable alternative for seed production due to its high detrimental effect on seed yield. Genotype x treatment and treatment x year interactions were significant.

2:15 pm, AGR-8C Herbaceous Grasses and Shrubs Are Potential Energy Crops for Florida. G.M. PRINE AND K.R. WOODARD, University of Florida, Agronomy Department, Gainesville, FL 32611. Perennial tall grasses such as elephantgrass (Pennisetum purpureum), sugarcane (Saccharum sp.) and energy cane (Saccharum sp.) and the leguminous shrub leucaena (Leucaena leucocephala) are capable of making high dry matter yields (over 30 Mg ha⁻¹ yr⁻¹) over the entire State of Florida. The highest yields are usually made in southern portion of state where the growing season is longer. Especially high yields (over 50 Mg⁻¹ ha⁻¹ yr⁻¹) are possible on phosphatic settling pond clays and from the grasses on muck soils. Biomass yields in North Florida are still good though some dry matter yields may drop into the 20 to 30 Mg⁻¹ ha⁻¹ yr⁻¹ range. These energy crops may be burned directly or manufactured into alcohol, methane and other energy products. A dryweight Mg of tall grasses and leucaena has energy equivalent to about 112 and 123 gallons of number 2 oil,

respectively. Sewage effluent and sludge can be used to irrigate and fertilize the energy crops. Growing of these herbaceous crops to satisfy some of our energy needs would help to reduce CO₂ released from fossil fuel use and develop valuable new industry and jobs.

2:30 pm, AGR-9C The Interaction of *Fusarium oxysporum* and *Meloidogyne incognita* Race 1 on Sage, Rosemary, and Lavender. J.R. ESPAILLAT (1), E.C. FRENCH (1), D.J. MITCHELL (2), AND R.T. McSORLEY (3), (1) Agronomy, (2) Plant Pathology, and (3) Entomology/Nematology Department, IFAS, University of Florida, Gainesville, FL 32611. Disease complexes involving *Fusarium* spp. and root-knot nematodes have been studied on several crops. Production of herbs and spices in Florida are limited by *Meloidogyne incognita* race 1. The objectives of this research are: 1) to identify if and which fungi is involved, and 2) to determine the interaction between root-knot nematodes and two *Fusarium* isolates. Koch's postulate had been followed for identification and diagnostic. Field and greenhouse studies have shown two isolates of *Fusarium oxysporum* to be the predominant pathogens in diseased plants. In pathogenicity tests, rooted cuttings of sage (*Salvia officinalis*), rosemary (*Rosmarinus officinalis*), and lavender (*Lavandula angustifolia*) were inoculated with different root-knot and fusarium combination levels in RCB designs with 10 replications. Data collection includes growth rate, yellowing, and wilting. Final results will be discussed.

2:45 pm, AGR-10C Effects of Inappropriate Herbicides on Field-grown Tobacco: A Review. MERRILL WILCOX, E.B. WHITTY, Y.Y. LI, AND J.P. WEIDNGER, Agronomy Dept., IFAS, University of Florida, Gainesville, FL 32611. The literature describing the deleterious effects of halopyridin(oxy)alkanoic acid herbicides is reviewed. Profound effects were observed at rather low application rates. These effects had usually disappeared by the end of the second crop year after the application. Comparisons are made with some other field crops.

3:00 pm, DISCUSSION

3:15 pm, ADJOURN

ANTHROPOLOGICAL SCIENCES

Friday, March 26, 1993, 8:45 am - 10:45 am, Room SE-105
SESSION A Applied Anthropology: Examples From The Field
Linda Whiteford, Ph.D., University of South Florida, Presiding

8:45 am, ANS-1A Impacting the Social Environment: A Cultural Sensitivity Training Program. ANDREA C. HUMMEL, Diversity Training and Consulting, 4305 W. Santiago, Tampa, FL 33629. The ethnic and racial makeup of the U.S. is changing rapidly, and minorities are expected to outnumber the traditional majority by the year 2000. To

address subsequent tensions in work and school settings, the author has developed a cultural sensitivity program centered around self-awareness of attitudes, knowledge of cultural concepts and differences, and skill-building. Its innovativeness lies in the adherence to the anthropological concept of sensitivity rather than only knowledge of ethnic group behaviors. Exercises include experiential situations, focus group discussions, and problem-solving. Preliminary results of the implementation of this program in schools indicate a heightened interest in individuals different from oneself and a lower frequency of stereotypical attitudes.

9:00 am, ANS-2A **A Study of the Political Economy of African American Ethnicity in St. Petersburg, Florida: An Ethnohistorical Approach.** EVELYN NEWMAN PHILLIPS, University of South Florida, Department of Anthropology, Tampa, FL 33620. African Americans in St. Petersburg, like most urban communities, confront a plethora of social problems. Too many of their youths have become alienated from the cultural values which sustain their parents. Thus, a major challenge for African Americans in St. Petersburg is to socialize their youths against detrimental social changes and inculcate in them the values of their ancestors. A-historical and racial approaches are often applied to this problem. This research investigates the political economy and historical social changes in St. Petersburg which shape the African American worldview and the behavior of their youths.

9:15 am, ANS-3A **Providing Meaningful Multicultural Training to Mental Health Professionals and Workers.** PHILLIP E. GRACE, Florida Mental Health Institute, 13301 Bruce B. Downs Blvd., Tampa, FL 33612. This paper examines a workshop designed to help Florida's mental health professionals and workers provide effective mental health services to the state's increasingly multicultural population. After first outlining the workshop's development, its structure and content is presented. The workshop concentrates on three primary attributes of a "multiculturally competent" counselor: an awareness of one's own cultural assumptions and biases, a knowledge of the cultural dimensions of mental health, and the skills to incorporate this awareness and knowledge into a culturally appropriate treatment format. Importantly, this workshop's approach to the development of multicultural competence, unlike many other multicultural training programs, derives from the anthropological perspective. It is asserted that this type of training program can be more meaningful to service providers since its focus is on how to work more effectively with people from any cultural orientation rather than on generalized "facts" about specific populations.

9:30 am, ANS-4A **Pride and Prejudice: Introduction of a Social Innovation in Tampa Bay.** WILLIAM M. MICHAELS, Ph.D., Children's Board of Hillsborough County, 1901 North 13th Street, Ybor Square, Suite 100, Tampa, FL 33605. Using H.G. Barnett's theory of innovation, this paper seeks to examine the introduction of a social innovation in Tampa Bay. The innovation is the establishment of a new government agency in Hillsborough County, using a model borrowed from Pinellas County. The paper examines the extent to which Barnett's theory of innovation fits this case, and examines the extent to which the introduction of a social innovation, in this instance a new governmental agency, follows a pattern similar to the introduction of a new product or artifact. The author is the Executive Director of the government agency which is the focus of this paper.

9:45 am, BREAK

10:00 am, ANS-5A Anthropological Perspectives on Teaching Conflict Resolution. D.P. FRY (1) AND JAMES WELCH (2), (1) Anthropology, Eckerd College, St. Petersburg, FL 33733 and (2) Institute for Social Ecology, Goddard College, St. Petersburg, FL 33750. Do beliefs about human nature (e.g., instinctive aggression) correlate with conflict resolving strategies in daily life? Do views of human nature affect the likelihood of engaging in peace activism? How modifiable are views that humans are aggressive by nature? A pretest and post-test survey, designed to investigate these topics and to assess whether taking a course in "Conflict Studies" would affect student attitudes and beliefs, was administered to 91 students in 4 classes, including a "Conflict Studies" class, at Eckerd College in St. Petersburg, Florida. Results indicate that students developed a more positive view of human nature and of potential for peacemaking after being exposed to the "Conflict Studies" curriculum. Student self-reports of activities and beliefs are analyzed across the subsamples, and implications for peace education and conflict resolution programs are considered.

10:15 am, ANS-6A Tourism and the Natural Resource Community. M.E. JEPSON, Department of Anthropology, University of Florida, P.O. Box 944, Cortez, FL 34215. The fast paced growth of recreational tourism has forced traditional inhabitants of rural coastal communities to adapt to changes in use patterns for Florida's marine environment. These formerly isolated communities face increasing pressure to redevelop their waterfront property for a "higher and best" use which eventually forces established residents, like commercial fishers, from their traditional home. In addition, increased competition for marine resources from recreational fishers now challenges commercial fisher's traditional place on the water. This process of "gentrification" has evolved into a resource war which threatens commercial fishers' ability to endure. This paper describes recent events in a commercial fishing village just south of Tampa Bay in order to understand the impacts of the rapid growth and development of tourism within the state. The concepts "Natural Resource Community," "local knowledge," and "place" are used to examine the unique sense of community created by these commercial fishers over several generations now threatened by this growth and development.

10:30 am, ANS-7A Applied Anthropology in an Urban Planning Context - An Overview. MICHAEL M. ENGLISH, President, The English Company, Inc., P.O. Box 3012, Tampa, FL 33601. A discussion of practical applications of cultural anthropological principles and research techniques in the private practice of urban planning consulting. The focus is based in the Tampa Bay area, and includes a consideration of public policy formulation and consulting to private sector interests. Generalized research techniques and concepts include key informant interviewing, ethnography, ethnology and holistic perspective. Presentation format will include brief chronological development of practice, and conclude with discussion of current activity.

Friday, March 26, 1993, 2:15 pm - 3:30 pm, Room SE-105

SESSION B

Linda Whiteford, Ph.D., University of South Florida, Presiding

2:15 pm, ANS-8B **Practicing Anthropologists in North Florida: Advocates, Consultants, Evaluators and Community Developers.** R. CLAUDE HENDON, Office of the Auditor General, State of Florida, 3106 Avon Cr., Tallahassee, FL 32312. Several roles for applied anthropologists are highlighted by presenting the work of members of the North Florida Network of Practicing Anthropologists. Members use anthropological methods and theory to advocate for the elderly and for disadvantaged children. Another member works as a consultant to private interests who create economic and social impacts on local communities. Several members use anthropological methods and theory to evaluate state government programs. Another member uses community development techniques to foster economic development in a local coastal community. A common theme in all these roles is the ability to understand unique cultural differences among subgroups and relate these differences to public and private decision makers.

2:30 pm, ANS-9B **An Anthropologist in Television Research.** M. PARDEE, Nielsen Media Research, During ten years of designing, managing and marketing television research for "The Nielsen Ratings," the author has frequently drawn on skills, techniques, information and perspectives from his anthropological training. He describes how, in spite of the company's focus on quantitative audience measurement, he has been able to successfully apply anthropological concepts, knowledge and techniques in the various positions he has held at Nielsen. He discusses several projects he has worked on and gives examples of the use of anthropology in each. These include recognition of the importance of daily and seasonal cycles in the analysis of TV usage, the need to understand cultural patterns of technological change when forecasting adoption of new media, consideration of the ecological and systems aspects of media usage when evaluating competing media, and the use of techniques such as Delphi in the design and marketing of new research products and reports.

2:45 pm, ANS-10B **Peasants, Multinationals, and Anthropologists.** HENDRICK SERRIE, Eckerd College, St. Petersburg, FL 33733. With some exceptions, multinational enterprises sell products around the world without realizing that many millions of their customers are peasants. When multinational enterprises operate production facilities in less developed regions of the Third World or even less developed regions of some industrialized countries, in most cases there has been little planning for the reality that many of their production workers have been recruited from peasant villages. Given the relative ignorance of multinational firms about their peasant workers and customers, anthropologists can offer valuable assistance with peasant cultures as consultants to or permanent employees of multinational firms. Anthropologists can assist in the management of multinational employees recruited from peasant culture. Anthropologists can contribute to the development of marketing by multinational firms of goods and services to peasant communities that are useful, appropriate, affordable, and part of the peasant's rising standard of living.

3:00 pm, ANS-11B **Education in Remote Regions: Lessons from Jungle Schools of Sri Lanka.** VICTORIA J. BAKER, Eckerd College, St. Petersburg, FL 33733. A comparative field study of 30 village schools in a remote Sri Lankan district focuses on the problems of rural education in underdeveloped areas. The question of realistic expectations and feasibility is considered. The effectiveness of the schools is examined through 16 variables (e.g. drop-out rates, attendance, community integration, examination performance) based on observation and statistical data. An analysis using 6 variables with discrete indicators leads to a typology of the school principals: "failing," "neutral," "dedicated." A composite sketch of the "dedicated" principals associated with the "promising" schools sheds light on the school principal as key factor in effective school functioning. Suggestions based on research findings are offered to the Sri Lankan Ministry of Education.

3:15 pm, BREAK

3:30 pm, ANS-12B **The Anthropological Perspective in the Study of the Children's Mental Health Service System: An Assessment.** J.M. HANJIAN, Florida Mental Health Institute, USF, Tampa, FL 33612. This paper is based on case studies conducted for the author's dissertation research. The contribution of a general anthropological approach, including a cultural perspective and qualitative methodology, is explored in the study of the children's mental health service system. Experiences of two families dealing with the service system providers are emphasized. The anthropological approach has important implications in the study of family involvement within the treatment of children with mental health problems and the services they receive as the treatment modality shifts from a narrow child-focused system to a partnership between the family and service providers.

3:45 pm, ANS-13B **Recognition and Management of "Teething Diarrhea" Among Florida Pediatricians.** J. COREIL, University of South Florida, Tampa, FL 33612. A survey of 215 Florida pediatricians investigated explanation and management of the illness popularly known as "teething diarrhea." Divergent views on the nature of this condition were associated with respondents' age, sex, specialty, place of practice and clientele. About one-third of pediatricians recognized the existence of this disorder, but there was no consensus on the mechanism to explain its etiology. The findings are discussed in terms of the interpretation of unexplained phenomena within the culture of biomedicine.

4:00 pm, ANS-14B **Highlands County: Impact of the Environment on Isolated Rural Elderly Humans.** J.F. BEZON, University of South Florida College of Nursing, Tampa, FL 33612. Highlands County, Florida has the highest percentage of rural elderly people in the state of Florida (44%). Processual ecological anthropology examined what it is like to be elderly and to be living in a rural area and how rural elderly respond and adapt to their environment. These isolated rural elderly are marked by an overarching ethos of conservation of their food, energy, and reliance on others, resulting in an adaptation to their environment that results in poorer health.

4:15 pm,

SECTION MEETING AND AWARDS PRESENTATION

Marcela Guterrez-Mayka, Children's Board of Hillsboro County, Presiding

Friday, March 26, 1993, 10:00 am - 11:00 am, Room SE-105

SESSION C Archeology and Physical Anthropology

Robert Austin, Piper Archeology, Presiding

10:00 am, ANS-15C Marine and Terrestrial Faunal Analysis of the Jupiter Inlet I Site (8PB34). N SINKS, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The faunal analysis of marine and terrestrial remains recovered at archaeological sites offers valuable information concerning subsistence and land-use strategies. The recovery techniques utilized are critical for gaining species-specific information. This paper discusses the faunal materials recovered from the Jupiter Inlet I site (8PB34) in relation to its unique environment. Preliminary results show that the aboriginal inhabitants of this site were exploiting terrestrial, saltwater, and freshwater resources. The remains of sea turtles (*Cheloniidae* sp.), white-tailed deer (*Odocoileus virginianus*), and gar (*Lepisosteus* sp.) were found using fine mesh screening and floatation techniques. Faunal indicators and the influence of recovery methods on a site are discussed, as well as the relationship between the materials found at the Jupiter Inlet I site and prehistoric resource utilization.

10:15 am, ANS-16C Molluscan Shell Materials Recovered from the Jupiter Inlet I Site (8PB34). L. JESTER, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The Jupiter Inlet I site (Palm Beach County, Florida), excavated in the summer of 1992, offers an excellent opportunity for the further analysis of aboriginal lifeways in south Florida. The purpose of this study is to determine the seasonality of occupation based on molluscan shell materials. This site is tentatively dated between 1200-1700 A.D. based on associated cultural material. The American oyster (*Crassostrea virginica*) and the modern hard clam (*Mercenaria mercenaria*) were found in sufficient quantities from each occupation layer to estimate seasonal utilization. Based on the presence and amounts of these and other shell materials, temporal variations in usage are discussed. Limitations and applications of this methodology are considered with respect to this and other regional sites.

10:30 am, ANS-17C Shell Tool Morphology and Use from the Jupiter Inlet I Site (8PB34), Palm Beach County, Florida. A.L. PRESTRIDGE, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The Jupiter Inlet site, excavated in the summer of 1992, provides valuable data in the further study of shell artifacts and tool use in the aboriginal groups in South Florida. The preliminary dates of the site are 1200 A.D. to 1700 A.D., based on associated artifacts. This study examines the Black drink cups, Busycon picks, shell beads, and other shell artifacts found at this site. The materials found at Jupiter Inlet were in excellent condition and provide an opportunity for further study.

10:45 am, ANS-18C Baked Clay Objects from the Jupiter Inlet Midden Site (8PB34): A Survey of Distribution and Use Theory. D.C. WERNECKE, Florida Atlantic University, Boca Raton, FL 33431. Baked clay objects have been found in many parts of the United States but never before in South Florida. Two baked clay objects recovered during excavations at the Jupiter Inlet Midden Site (8PB34) will be examined in terms of the

literature regarding distribution and theories regarding the use of these unique artifacts. Further lines of study are suggested which would expand our knowledge of prehistoric South Florida trade and technology.

Friday, March 26, 1993, 2:15 pm - 4:30 pm, Room SE-106

SESSION D

Robert Austin, Piper Archeology, Presiding

2:15 pm, ANS-19D **Representational Bone Artifacts from Southern Florida.** RYAN J. WHEELER, Department of Anthropology, University of Florida, Gainesville, FL 32611. Examination of decorated bone artifacts from Florida archaeological sites reveals two distinctive style areas, a geometric tradition centered in the St. Johns River basin, and a representational tradition centered in southern Florida. Animal motifs are carved and incised onto bone objects that were probably elements of personal dress and ornamentation. Representations include deer, opossum, rattlesnake, aquatic beings, and a variety of birds. Stylistically, these artifacts are related to the well-known wood carvings from Key Marco and Ft. Center, but also incorporate elements of Weeden Island and Mississippian cultures. Analysis of the motifs and their archaeological contexts provides a deeper understanding of Pre-Columbian belief systems.

2:30 pm, ANS-20D **An Investigation of Spanish Olive Jar Production (16-18th century) through Petrographic Analysis.** GEORGE AVERY, 444 NW 31st Lane, Gainesville, FL 32609. The Spanish olive jar, descendent of Greek and Roman amphorae, was used for shipping (primarily) wine and olives from Spain to America during the colonial period (16-18th century). Little is known about the organization of olive jar production--the exact production levels are unknown and no olive jar kiln sites have been located in Spain. Petrographic analysis of olive jar fragments provides mineralogical signatures, which in turn, provide information about production locality. The following hypothesis is tested: Olive jar production shifts from a large number of widely-dispersed, small-scale producers to a smaller number of centralized, large-scale producers.

2:45 pm, ANS-21D **Reconstruction of Prehistoric Cosmology and Social Organization: An Example from the Southeastern Ceremonial Complex.** J.P. PEPE, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The reconstruction of past lifeways is one of the main goals of modern archaeology. However, this goal can be difficult to obtain by using archaeological material alone. This study demonstrates how an individual artifact from the Southeastern Ceremonial Complex can be interpreted and related to the cosmology and social organization of the prehistoric culture of which it was a part, through comparison with other artifacts and ethnographic and historical material from the Southeastern Culture Area. The artifact in question is a scalloped stone disc with engraved depictions of a hand-and-eye encircled by two horned and intertwined serpents. The interpretation of this artifact and the general methodology used in reconstructing past social phenomena is discussed in relation to aboriginal groups in the southeastern U.S.

3:00 pm, ANS-22D **Death Comes to Miraflores Quebrada in Southern Peru.** DENNIS SATTERLEE, Department of Anthropology, University of Florida, Gainesville, FL 32611. Around 1350 AD, the largest flood ever to impact all of Southern Peru totally inundated one of the most important coastal sites of the Chiribaya Culture (ca. 1000-1400 AD) located near the modern fishing port of Ilo, Peru. Results from dissertation research will be presented concerning the fate of this once burgeoning settlement and its inhabitants.

3:15 pm, BREAK

3:30 pm, ANS-23D **Craniometry and Biological Distance in Three Florida Aboriginal Populations.** N.W. CASSEL, K.J. WINLAND, M. CHECK-PENNELL, AND M.Y. ISCAN, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. Cranial morphology coupled with multivariate statistical analysis has been shown to be a reliable indicator of population relationships. In this study 200 crania from three Florida aboriginal sites, Highland Beach (8PB11), Fort Center (8GL13), and Margate-Blount (8DB41), are analyzed and compared craniometrically. The sites are then compared for determination of biological distance by use of multivariate analysis. This paper discusses the biological relationship between these populations, as well as the limitations and accuracy of this type of study.

3:45 pm, ANS-24D **Resource Utilization by Vervet Monkeys (Cercopithecus aethiops) in the Mangrove Communities of South Florida.** W.R. HYLER, Department of Anthropology, University of Florida, Gainesville, FL 32611. Although a great deal of research has been conducted on the behavior and ecology of the vervet monkey (Cercopithecus aethiops), little has been done concerning their existence in mangrove communities. This study reports observations on free-ranging, non-indigenous populations in the mangrove communities of Southeastern Florida. Preliminary results for two troops are given, illustrating their time budgets and food sources. The vervets' foraging activities were directed mainly at flowers (21.8%), fruit (20.3%), and seeds (23.2%). Special attention is given to the primate's extensive use of the three species of mangroves in the study area: the black mangrove (Avicennia germinans), red mangrove (Rhizophora mangle), and white mangrove (Laguncularia racemosa).

4:00 pm, ANS-25D **Non-metric Analysis of the Highland Beach (8PM11) Population.** M. CHECK-PENNELL, K.J. WINLAND, N.W. CASSEL, AND M.Y. ISCAN, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The Highland Beach population offers an excellent opportunity for the study of non-metric variation within an aboriginal population. This site dates from 600 - 1200 AD, and represents one of the largest skeletal samples in the state of Florida. This presentation discusses the use and value of non-metric train analysis in fragmentary bone remains. Over 120 individuals were analyzed using 20 cranial and 20 post-cranial epigenetic traits. Preliminary results indicate that discrete traits found in this population are a reliable indicator of biological distance as well as stress and function.

4:15 pm, ANS-26D Paleopathology and Paleodemography of the Highland Beach (8PB11) Population. K.J. WINLAND, N.W. CASSEL, M. CHECK-PENNELL, AND M.Y. ISCAN, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431. The Highland Beach (8PB11) collection, excavated as a salvage operation in 1980, represents one of the largest skeletal collections in Florida. The site dates roughly between 600 - 1200 AD, based on associated artifacts. The purpose of this study is to present an analysis of the pathological conditions present in the hard tissue remains, as well as the demographic modeling of this population. The preliminary paleodemographic data derived from this population (over 120 individuals) is indicative of a foraging group. Paleopathological analysis of the bones has yielded evidence of several infectious conditions (treponemal infections, osteomyelitis, periostitis), as well as degenerative and metabolic conditions. This population is compared to several other aboriginal groups in South Florida to illustrate the variables of environment and disease in the past.

ANTHROPOLOGICAL SCIENCES SYMPOSIUM

Symposium: Human Impacts on the Cultural Resources of Florida

Friday, March 26, 1993, 8:15 am - 9:30 am, Room SE-106

Robert Austin, Piper Archeology, Presiding

8:15 am, ANS-1S The impact of Development on Coastal Cultural Resources. HEATHER CLAGETT AND J. RAYMOND WILLIAMS, Department of Anthropology, University of South Florida, Tampa, FL 33620. Recent county-wide and coastal cultural resources survey have evaluated the impact of commercial and agricultural development, looting, and natural disturbance on prehistoric and historic sites along the coastal zone of west Florida. These surveys were funded through a variety of federal, state and county governmental agencies and document the degree of destruction and make recommendations to protect the area's remaining cultural heritage.

8:30 am, ANS-2S Historic Preservation in Sarasota County: Past and Present Human Impact on the Cultural Environment. APRIL L. FEHR, Sarasota County Department of Historical Resources, 701 Plaza de Santo Domingo, Sarasota, FL 34236. Sarasota County's built and archaeological resources are being destroyed by natural and human forces. The County is attempting to protect important resources by reviewing some types of development applications for their impact on historic properties. This requires that built resources and archaeological sites be identified and evaluated. The County also has identified areas with high potential to contain archaeological sites by using environmental variables known to predict site locations. Environmental change, including historic drainage of agricultural lands, has affected our ability to predict archaeological site occurrences. Information about historic resources is being recorded in a computerized database and ultimately will be available on a Geographic Information System.

8:45 am, ANS-3S Highway Construction and Cultural Resource Management in Florida: An Overview. GEORGE R. BALLO, Florida Department of Transportation, Mail Station 37, 605 Suwannee Street, Tallahassee, FL 32399. The Florida Department of Transportation conducts highway improvement projects throughout the State. These projects include the construction of new roadways, the widening of existing facilities, bridge replacements, and other actions which result in varying degrees of alteration to both the physical and cultural aspects of the project locality. Prior to initiating work, the Department conducts archaeological and historical surveys in order to identify and evaluate any significant historic properties potentially impacted by these projects. The Department's approach to managing historic properties and avoiding or mitigating impacts to them is discussed. Typical impacts and appropriate mitigation measures are presented. Economic considerations involved in pursuing the Department's preservation program are also discussed.

9:00 am, ANS-4S Tampa Interstate Study, Hillsborough County: Impacts on Historic Resources. L.M. WEANT, Janus Research/Piper Archaeology, P.O. Box 919, St. Petersburg, FL 33731. The proposed interstate expansion will affect a number of historic structures, including those in two National Register Historic Districts. The background of the interstate study and the affected neighborhoods are described. As the project uses partial Federal funding, historic resources which may be impacted directly or indirectly by the project must be identified and protected through the Section 106 process, which involves concerned parties at the local, State, and Federal levels. Direct and indirect impacts and an overview of the Section 106 process are discussed in the context of the Tampa project as well as mitigative solutions.

9:15 am, ANS-5S Cultural Resource Management in Florida: An Appraisal of Where We've Been and Where We're Going. ROBERT J. AUSTIN, Janus Research/Piper Archaeology, P.O. Box 919, St. Petersburg, FL 33731. Florida has one of the most progressive cultural resource management (CRM) programs in the nation. Millions of dollars are spent annually to record, protect, and mitigate impact to archaeological sites and historic structures. Information about the state's past is being collected at an unprecedented rate, more resources are being preserved than ever before, and the public's awareness has been raised. Yet, many problems still confront us: continued destruction of sites, vandalism, insufficient curation facilities, outmoded concepts of significance. This paper takes stock of the current state of affairs in CRM and offers some observations regarding directions the field may take in the years to come.

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES

Friday, March 26, 1993, 9:30 am - 11:00 am, Room FO-103

Gary Zarillo, Florida Institute of Technology, Presiding

9:30 am, AOS-1 Marine Data Collection at Florida Keys Community College. **WILLIAM TRANTHAM**, Florida Keys Community College, Key West, FL 33040. This paper will include a lecture slide presentation of biological, physical and chemical data collected from selected sites while conducting surveys of reef, turtle grass and mangrove ecosystems during a cooperative project between Florida Keys Community College and the Naval Air Warfare Center, Key West Detachment. The data was obtained by students while taking the courses in the Marine Biology Technology Program during the past two years.

9:45 am, AOS-2 Collection, Classification and Preservation of Marine Echinoderms of the Florida Keys for a Teaching Museum. **KENNETH HAYES**, Florida Keys Community College, Key West, FL 33040. This paper will include a lecture slide presentation of the collection, classification and preservation of marine echinoderms obtained during biological surveys of selected reef, turtle grass and mangrove ecosystems during a cooperative project between Florida Keys Community College and the Naval Air Warfare Center, Key West Detachment. The collection was obtained while taking courses in the Marine Biology Technology Program during September and October 1992.

* **10:00 am, AOS-3** Review of Historical Tampa Bay Water Quality Data. **E.H. RUTHERFORD, B. BENDIS AND DR. K.A. FANNING**, Department of Marine Science, University of South Florida, St. Petersburg, FL 33701. A summary of general trends over the past 17 years of selected nutrient parameters from the data used for the Review and Synthesis of Historical Tampa Bay Water Quality Data, Technical Publication #07-92 of the Tampa Bay National Estuary Program, will be presented. Both seasonal and annual trends between river flow and nutrient levels will be discussed. Specifically, total phosphorus has dramatically decreased over the last decade, but with little if no relation to river flow. A positive relationship between an increase in river flow and an increase in total nitrogen was observed for most, but not all, of Tampa Bay.

10:15 am, AOS-4 The Distribution of Polycyclic Aromatic Hydrocarbons in Crane Creek Sediments. **J.M. SURMA (1) AND J.G. WINDSOR, JR. (2)**, (1) Brevard Labs, 250 Grassland Road, Palm Bay, FL 32909 and (2) Florida Institute of Technology, Melbourne, FL 32901. Sediment samples along Crane Creek were analyzed for alkylated and unsubstituted polycyclic aromatic hydrocarbons (PAH). Total PAH (tPAH) levels ranged from 22 $\mu\text{g}/\text{kg}$ to 12,000 $\mu\text{g}/\text{kg}$ along Crane Creek. The variability in the level of PAH was associated with the variability of silt, clay and organic carbon in association with the moisture content. Study showed that the relative abundance of the unsubstituted PAH were dominated by high molecular weight species suggesting they were combustion generated. A comparison with the data from the National Status and Trends (NS&T) program showed the levels of tPAH and individual species were not present at a concentration for which adverse biological effects may occur. However, mutagenic and chronic effects may still occur at concentrations below the lowest concentrations determined for biological effects.

10:30 am

SECTION MEETING

Gary Zarillo, Florida Institute of Technology, Presiding

BIOLOGICAL SCIENCES

Friday, March 26, 1993, 8:00 am - 10:45 am, Room DM-101

SESSION A: Marine Plants and Water Quality

Dr. Ernest Estevez, Mote Marine Laboratory, Presiding

8:00 am, BIO-1A Review of Historical Tampa Bay Water Quality Data. B. BENDIS AND E.H. RUTHERFORD, Department of Marine Science, University of South Florida, St. Petersburg, FL 33701. A summarization of the data used for the Review and Synthesis of Historical Tampa Bay Water Quality Data, Technical Publication #07-92 of the Tampa Bay National Estuary Program, will be presented. The data set spanned 17 years and includes monthly collections of 27 parameters. Specifically, relationships among chlorophyll, salinity, and flow regimes will be addressed. Salinity and chlorophyll are negatively related in Middle Tampa Bay and Old Tampa Bay. Freshwater flow was not related to chlorophyll except in Old Tampa Bay, yet positively correlated to salinity throughout Tampa Bay. Furthermore, salinity has risen throughout Tampa Bay over the last several years accompanied by a decline in chlorophyll.

8:15 am, BIO-2A Review and Synthesis of Historical Tampa Bay Water Quality Data. A.P. SQUIRES (1), G.V. VARGO (2), R.H. WEISBERG (2), K.A. FANNING (2), AND B. GALPERIN (2), (1) Coastal Environmental, Inc., 9500 Koger Blvd., St. Petersburg, FL 33702, and (2) University of South Florida, Department of Marine Science, St. Petersburg, FL 33701. The historical data review, funded by the Tampa Bay National Estuary program, defined the spatial and temporal trends in water quality parameters from 1974 through 1990. The Environmental Protection Commission of Hillsborough County provided the primary source of long-term water quality data, which was translated to a microcomputer based format for subsequent analyses of trends, annual averages, and climatological means. Parameters examined included temperature, salinity, rainfall, wind, total phosphorus, total nitrogen, dissolved oxygen, chlorophyll-a, Secchi depth, color and turbidity. Baywide patterns of variability for parameters will be discussed as well as recommendations for modifications to ongoing monitoring programs.

8:30 am, BIO-3A Resource-based Water Quality Requirements in Tampa Bay. H.S. GREENING AND R.M. ECKENROD, Tampa Bay National Estuary Program, 111 7th Ave. South, St. Petersburg, FL 33701. While water quality measurements traditionally have served as the surrogate of a water body's viability, ongoing work for the Tampa Bay National Estuary Program emphasizes a critical "next step" by linking water quality directly to the environmental requirements of Tampa Bay's most important habitats and to the faunal communities these habitats support. Under this strategy, resource-based water quality requirements for seagrass, mangrove, emergent marsh, and benthic communities will be developed and incorporated into mandated federal and state programs for point and non-point source pollution control.

- * **8:45 am, BIO-4A** **Modeling Light Available to Seagrasses in Tampa Bay, Florida.** R.L. MILLER AND B.F. McPHERSON, U.S. Geological Survey, 4710 Eisenhower Blvd, B-5, Tampa, FL 33634. A model was developed that uses land-based measurements of photosynthetically active radiation (PAR) to compute instantaneous and annual average estimates of PAR in water of Tampa Bay. Model input was 255 days of 15- or 5-minute averages of incident irradiance measured at sites near Tampa Bay. Annually, 49% ($380 \mu\text{mol m}^{-2} \text{s}^{-1}$) of the incident irradiance measured with a spherical (4π steradians) sensor is estimated to enter the water of Tampa Bay. The model can be used to predict the average depth and, with bathymetry, the areas of bay bottom that have adequate light available to support seagrass. For example, if Thalassia testudium requires a long-term average of 20% of incident PAR for survival, the model predicted that depths of potential seagrass habitat for Thalassia testudium are 0.7, 1.5, 2.5, and 7.5 m for water clarities corresponding to the attenuation coefficients of 1.0, 0.5, 0.3, and 0.1 m^{-1} , respectively.
- * **9:00 am, BIO-5A** **Recovery of Water Quality and Submerged Seagrass in Hillsborough Bay, Florida: Carbon Budget Considerations.** J.O. R. JOHANSSON, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa, FL 33605. Hillsborough Bay has been impacted extensively by human activities. Shoreline modifications, ship channel dredging and high nutrient discharges contributed to historically poor water quality and the elimination of submerged seagrass by the early 1980's. However, signs of water quality and seagrass recovery appeared in the mid 1980's following management actions aimed at reducing eutrophication. Water quality and seagrass recolonization trends suggest that important bay ecosystem processes are not in transition. The current rate of phytoplankton carbon production is near half of the rates measured during the early and mid 1980's. Further, the gain in carbon production from the recolonizing seagrass is still minor relative to the loss of phytoplankton production. A comparison with other marine systems suggests that a substantial reduction in fisheries yield may have resulted from the recent decrease in Hillsborough Bay primary production.
- 9:15 am, BREAK**
- * **9:30 am, BIO-6A** **Comparison of Phytoplankton Populations in the Lower Hillsborough River and Tampa Bypass Canal Systems, Tampa, Florida.** M.K. HEIN, Water and Air Research, Inc., 6821 S.W. Archer Road, Gainesville, FL 32608. Phytoplankton populations were investigated in the Hillsborough River, Tampa Bypass Canal, Palm River, and McKay Bay as part of a three-year study for the West Coast Regional Water Supply Authority. Monthly samples were collected just below the surface, and replicate samples were preserved with formalin and Lugol's solution. Results of sample analyses indicate that certain organisms preserved better with one preservative versus the other. Cell densities in the Hillsborough River were significantly lower than in the Palm River or McKay Bay. Cell densities in the Hillsborough Reservoir were consistently lower than in the Tampa Bay Bypass Canal.

* **9:45 am, BIO-7A** Long-term Trends of Macro-Algae in Hillsborough Bay. B. KELLY, City of Tampa, Bay Study Group, 2700 Maritime Blvd., Tampa, FL 33605. Since late 1985 the City of Tampa's Bay Study Group has been conducting a monthly sampling program of macro-algae in Hillsborough Bay. Five transects are trawled and the total wet weight of the trawls is determined. Subsamples are taken and dry weight is determined in the laboratory. Species composition is also determined. Recently the program has been expanded to include physical data (temperature, salinity, D.O. and pH) and light attenuation. This study is designed in order to see what effects, if any, changing water quality in Hillsborough Bay has on the macro-algae species and abundance in the Bay.

* **10:00 am, BIO-8A** Evaluation and Management of Propeller Damage to Seagrass Beds in Tampa Bay, Florida. P.A. CLARK, Principal Environmental Planner, Tampa Bay Regional Planning Council - Agency on Bay Management, St. Petersburg, FL 33702. Seagrass communities provide critical habitat and water quality benefits to fish and wildlife resources. Recent improvements in water quality have resulted in natural recolonization of seagrass in selected locations within the bay. However, propeller damage from increased boating activity may negate gains in natural seagrass expansion. A survey of shallow, subtidal seagrass meadows has determined the baywide extent of propeller damage and ranked degree of damage. Characterization of scars in seagrass communities have identified the type of activity which generated the scar feature. Management criteria was also developed based upon scar location, activity that generated the scar and degree of damage. Results of the survey were used to develop a geographically referenced map of seagrass beds with site specific management strategies.

* **10:15 am, BIO-9A** The Effects of Docks on Seagrass Beds in the Charlotte Harbor Estuary. R.K. LOFLIN, City of Sanibel, 800 Dunlop Road, Sanibel, FL 33957. Impacts associated with existing boat docks on submerged seagrass beds are analyzed for Pine Island Sound and San Carlos Bay in southwest Florida. Field collected data including shoot density, percent cover, species composition, seagrass "shadow" dimensions, prop dredging area and periphyton loading are related to dock length, wide, orientation, height above mean high water, and docking facilities such as boat lifts. Ramifications of results for government permitting programs are discussed in regard to marina sighting, dock specifications and docking densities. The relative importance of dock effects in comparison with other factors causing seagrass decline is evaluated.

* **10:30 am, BIO-10A** Analyses of Decay and Parrot Fish Bites along Attached Blades of Turtle Grass (*Thalassia testudinum*) from Two Sites in Biscayne Bay (1990-1992). J.C. CARBALLO, L.M. VALDEZ, M. CHACKEN, AND J.R. MONTAGUE, School of Natural and Health Sciences, Barry University, Miami Shores, FL 33161. We sampled nearly a thousand attached blades (above-sediment tissues only) to *T. testudinum* from two sites near Key Biscayne (Crandon Marina and the Bear Cut Channel) over three years (April-July 1990, March-July 1991, and October-December 1992). The 1992 samplings were made after Hurricane Andrew. Blades from both sites showed the same patterns and proportions of fresh and decayed tissues: decay and epiphytic/epizootic organisms tended to increase along

the distal portions of blades. Parrot fish tended to graze selectively on completely decayed portions near the tips of the blades. Earlier data from 1988-1989 suggest parrot fish grazing in Bear Cut has decreased over the last four years (90% of the sampled blades from Bear Cut had bites in 1988, while only 30-35% of the 1990-1992 Bear Cut blades had bites). The establishment of an artificial reef near Bear Cut in 1988 may have had an influence on abundance of parrot fish. (Funded partially by NIGMS-MARC Grant, Barry University).

Friday, March 26, 1993, 8:30 am - 10:30 am, Room DM-102

SESSION B: Freshwater Ecology and Botany

Dr. Ronnie Best, Center for Wetlands, University of Florida, Presiding

8:30 am, BIO-11B Mature *Pinus serotina* Michx. and *Pinus elliottii* Englm. Trees with Shallow Leaf-Scarred Bark. R.F. MENTE, Pine Research Consultant, 939 45th St. No., St. Petersburg, FL 33713. A recessive, archaic gene that apparently produces a thin, leaf-scarred bark is reported from two separate adult pines in central Florida. Approximately a 20-year old *P. serotina* Michx. at Boyd Hill Nature Park in St. Petersburg, FL and a 35-year old *P. elliottii* Englm. at EPCOT Center, Orlando, FL both exhibit a thin bark with leaf-scars on the trunk, rather than the normal thick, fissured rhytidome. The first periderm, which may be retained for life or many years, has been previously reported in other genera e.g. *Abies*, *Carpinus*, *Fagus* and *Quercus*, and is now reported for the first time in *Pinus*.

8:45 am, BIO-12B A Report of Dimorphic Cone Types, As Well As Two Statistically Different Types of Ovuliferous Cones Occurring on the Some *Pinus* Hybrids. R.F. MENTE, Pine Research Consultant, 939 45th St. No., St. Petersburg, FL 33713. Phylogeny is revealed in seed cones of *Pinus* sp. and their hybrids. Physical characteristics together with the statistical analysis of their growth curve help reveal the apparent primary and secondary phylogeny. Hybrids of *P. taeda* L. and *P. elliottii* Englm. produce dimorphic seed cones, while hybrids of *P. palustris* Miller and *P. dolichophyllus* Mente exhibit both parental-type seed cones on the same tree. Hybrids of *P. palustris* Miller and *P. densa* (L.&L.) DeL. & Silba apparently produce only one type of seed cone.

9:00 am, BIO-13B Lake Hollingsworth, Florida: Twenty-four hours profile of some physico-chemical parameters. C.A. FERNANDES (1), A.J.A. ROCHA (1), T.L. CRISMAN (1), AND E. MEDLEY (2), (1) University of Florida, Gainesville, FL 32611, and (2) City of Lakeland, Lakeland, FL 33801. Hollingsworth is a 144 ha lake with mean depth of 1.5 m, located in Polk County, Florida (Brooks, 1981). It is a hypereutrophic lake, according to the study of Canfield and Hoyer (1992). Hollingsworth has a low abundance of aquatic macrophytes, with *Typha* spp. and *Nelumbo lutea* being the major aquatic plant in the lake (Polk County Water Resources Division, 1990). A twenty-four hours survey was conducted during July 1992, measuring hourly some major physico chemical parameters such as: Dissolved Oxygen, Temperature, Conductivity and pH, both in the littoral zone and the middle of the lake. Aspects involved in the diurnal variations of these parameters are discussed as well as possible correlations with the lake yearly changes.

9:15 am, BIO-14B **Abundance and Distribution of Macrophytes in the Rainbow River, Florida.** RANDY G. MARTIN, Central Florida Community College, LeCanto, FL 34461. As part of a larger Surface Water Improvement and Management (S.W.I.M.) Program project on the Rainbow River (Marion County, Florida), conducted for the Southwest Florida Water Management District, a complete map of aquatic macrophytes (and certain non-macrophytes, e.g., *Lyngbya* sp.) associated with the river was produced. All species of submergent, floating and emergent macrophytes from the springhead to the confluence of the river, were identified and mapped. A computer-generated, color-coded map of the entire river was produced that illustrates the distribution of all dominant macrophytes. In addition to native plants, results clearly delineate the extent of nuisance species, e.g., *Hydrilla verticillata* and *Lyngbya* sp. Also, data on biomass were obtained for those species occurring at 1-mile intervals, where vegetation transects were conducted.

9:30 am, BREAK

9:45 am, BIO-15B **Analysis of the Ground Layer Vegetation of Riparian Wetlands in the Wekiva River Basin.** T.H. WARD AND I.J. STOUT, Department of Biology, University of Central Florida, Orlando, FL 32816. A survey of ground layer vegetation was conducted at 8 locations (433 1 x 1 m plots) within the Wekiva River Basin. Environmental variables measured in each plot were: light (PAR), hydrology, soil pH and soil organic content. TWINSPAN (two-way indicator species analysis), a classification technique and DCA (detrended correspondence analysis) an ordination technique were used to examine the relationship between vegetation and environmental variables. All 4 environmental variables showed significant ($p < .05$) differences between at least 2 clusters created by TWINSPAN. Three of the environmental variables (light, hydrology and soil pH) showed a significant ($p < .01$) relationship to the first axis of the ordination. The impacts of urbanization and exotic vegetation are also discussed.

10:00 am, BIO-16B **Hydrobiological Monitoring of Cypress Domes in the Green Swamp Area of Lake and Sumter Counties, Florida--1979-1992.** T.F. ROCHOW AND M. LOPEZ, Southwest Florida Water Management District, 2379 Broad St., Brooksville, FL 34609. Surface water levels and vegetation have been monitored for more than ten years in six Green Swamp cypress domes. The purpose of the hydrobiological monitoring program has been to serve as a control for study wetlands in urbanized and ground-water withdrawal areas elsewhere in southwest Florida. The hydrology and vegetational conditions of the Green Swamp domes are discussed and contrasted with cypress wetlands that are influenced by man's activities. In contrast to many cypress wetlands influenced by man, hydrographs of Green Swamp domes show comparatively lengthy hydroperiods without apparent water level trends. The wetland vegetational character of control domes has been maintained.

10:15 am, BIO-17B **Bioaccumulation of Heavy Metals in Fish Living in Stormwater Treatment Ponds.** KYM ROUSE DEMORA, Department of Biology, University of Central Florida, Orlando, FL 32816 and St. Johns River Water Management District, 618 E. South Street, Orlando, FL 32801. This study determined that fish living in stormwater treatment

ponds bioaccumulate significant concentrations of six of the eight heavy metals tested. This is important not only to fish populations, but because fish that inhabit stormwater ponds serve as a food source to wildlife, especially wading birds. Largemouth bass (*Micropterus salmoides*), redear sunfish (*Lepomis microlophus*), and bluegill sunfish (*Lepomis macrochirus*) were analyzed. The three species contained different concentrations of heavy metals, likely because of the differences in foraging strategies. No correlation between the length and the weight of the fish and the heavy metal concentrations was observed. This study was funded by the St. Johns River Water Management District.

Friday, March 26, 1993, 8:15 am - 11:00 am, Room DM-103

SESSION C: Marine Ecology I

Mr. Jay Leverone, Mote Marine Laboratory, Presiding

- * 8:15 am, BIO-18C Vegetation Changes at a Sarasota Bay Tidal Creek Restoration Project. G.A. BLANCHARD (1) AND R. WILLIAMSON (2), (1) Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236 and (2) Lemon Bay Park, 570 Bay Blvd., Englewood, FL 34233. Local governments constructed a model tidal creek community by restoring heavily impacted waterfront property on a Sarasota Bay fill island. The restoration created salt marshes, ponds, upland areas, and beaches upon which extensive plantings of native plants completed the desired community. Quantitative quarterly monitoring of vegetation changes in three compartments (herbaceous vegetation, shrubs, and trees) along permanent transects is being used to evaluate the success of the restoration project. Results from the first year of monitoring will be examined and emerging distributional trends in the herbaceous compartment discussed.

8:30 am, BIO-19C Predation on Supratidal Mangrove Littorinids by Puffer Fishes (Tetraodontidae) in the Gulf of Nicoya, Costa Rica. R.S. DUNCAN AND W.S. SZELISTOWSKI, Department of Biology, Eckerd College, St. Petersburg, FL 33711. The predator-prey interaction of puffer fishes and the mangrove tree littorines *Littoraria faxiata* and *L. varia* was studied on the Pacific coast of Costa Rica. Puffers enter prop root systems on incoming tides and feed on snails at or just above the water surface, sometimes jumping up to 15 cm to snatch littorines from emergent roots or branches. Large and medium-sided individuals of the thin-shelled *L. fasciata* migrate to avoid tidal submergence, whereas the thicker-shelled *L. varia* have a more catholic vertical range, and can often be found submerged during high tides. Small snails of both species are apparently limited to remaining at or below the water surface. The results of gut content analyses and tests of puffer snail-crushing abilities suggest that puffers are important predators on littorine snails, and may limit the lower vertical distribution of *L. fasciata*.

8:45 am, BIO-20C Decomposition of Mangrove Leaf Litter: The Role of *Melampus coffeus* (Gastropoda: Pulmonata). C.E. PROFFITT (1) AND D.J. DEVLIN (2), (1) Natural Sciences Program, St. Petersburg Junior College, St. Petersburg, FL 33733 and (2) Center for Marine Conservation, St. Petersburg, FL 33701. Field experiments on the rates of mangrove litter decomposition with and without exclusion of the macrodetritivore *M. coffeus*

were carried out at War Veteran's Park, Boca Ceiga Bay (Pinellas County). Degradation of both *R. mangle* and *A. germinans* leaves was nearly complete within a few weeks when the leaves were exposed to grazing by *M. coffeus*. When the snail was excluded, decomposition was much slower, especially for *R. mangle* leaves. The data indicate that *M. coffeus*, that occurs in mean densities of about 100/m², are extremely important members of many mangrove forest communities. Mr. Kevin Johns and a number of students in the SPJC marine biology and Honors Biology courses were of integral assistance in these studies.

9:00 am, BIO-21C Timing of Egg and Larval Release in Mangrove Invertebrates in the Gulf of Nicoya, Costa Rica. S.J. SUTHERLAND AND W.A. SZELISTOWSKI, Eckerd College, St. Petersburg, FL 33711. We investigated the spawning periodicity of five intertidal species, including one snail, *Littoraria varia*, and four crabs, *Goniopsis pulchra*, *Aratus pisonii*, *Clibanarius panamensis*, and *Petrolisthes armatus*. Field and lab work was conducted in the Gulf of Nicoya, Costa Rica, to determine if reproductive effort was related to lunar/tidal cycles. *L. varia* released eggs on a lunar cycle. *G. pulchra* had a very strong semilunar pattern, whereas *A. pisonii* and *C. panamensis* exhibited less distinct semilunar patterns. *P. armatus* lacked any apparent pattern of reproductive output around the time of the spring tides. The possible ecological significance of reproductive cycles related to the locally strong tides is discussed.

9:15 am, BIO-22C Sabellariidae (Annelida; Polychaeta) in Florida. D.W. KIRTLEY, Florida Oceanographic Society, 890 E. Ocean Blvd., Stuart, FL 34996. Sand tube dwelling marine annelids, family Sabellariidae, Johnston, 1865, are conspicuous components of the local benthic assemblages in the marine waters around Florida. Of the 11 genera in the family recognized worldwide (Kirtley, 1992b) species representative of 2 genera in the subfamily Sabellariinae and 3 genera subfamily Lygdaminae are present off Florida. The ontogeny and apparent bathymetric and provincial limits of distribution of the sabellariid species in the nearshore waters of the Gulf and Atlantic coast are outlined and the occurrence of deeper water forms is detailed. The ecological implications of the extensive sabellariid reefs in the surf zone between Cape Canaveral and Key Largo are outlined. The general relationships of the Florida Sabellariidae are summarized in the framework of global occurrence and inferred zoogeographic distribution of members of the entire family.

9:30 am, BREAK

9:45 am, BIO-23C Immunological Identification of Conch Larvae. E. RUNYON, C.J. BERG, AND M.L. DAO, Department of Biology, University of South Florida, Tampa, FL 33620. The queen conch *Strombus gigas* is one of the five species of conch that are found throughout southern Florida, Bermuda, the Bahamas, and the Caribbean Sea. Once found in abundance, the queen conch has now become an endangered species due to overfishing. To develop appropriate conservation practices, it is necessary to study the migration of conch colonies. In order to achieve this, immunological reagents and techniques were developed in our laboratory to identify conch species at the larval stage. In the present study, a specific antibody was prepared which allowed the differentiation between larvae of

queen conch and milk conch (*Strombus costadus*). These two species were also characterized by Western immunoblot analysis.

10:00 am, BIO-24C **The Influence of Biological Invaders on the San Francisco Bay Estuary and the Relationship to Tampa Bay.** R.J. BROCK (1) AND F.H. NICHOLS (2), (1) U.S. Army Corps of Engineers, Environmental Branch, Jacksonville, FL 32232-0019, (2) U.S. Geological Survey, Estuarine Benthic Community Group, Menlo Park, CA 94036. San Francisco Bay was included in the U.S. EPA's National Estuary Program in 1988 with the expectation that reducing anthropogenic input into the Bay would improve water quality and enhance the Bay's biota. While northern San Francisco Bay is indeed influenced by the quality of the inflow of the Sacramento and San Joaquin Rivers, recent invasion by exotic mollusks and zooplankton has significantly influenced primary productivity and trophic level interactions in the Bay. The ecological consequences of the biological invasion of San Francisco Bay will be discussed as well as the likelihood that the Tampa Bay Estuary could suffer such a similar fate.

10:15 am, BIO-25C **Stocking of Hatchery-Produced Red Drum, *Sciaenops ocellatus*, in Bowlees Creek, Sarasota Bay, Florida: A Preliminary Evaluation.** R.O. DeBRULER, JR., C.L. NEIDIG, D.W. KEAL, AND J.M. SPRINKEL, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. In 1991, Mote Marine Laboratory established a stock enhancement research study with hatchery-produced, tagged red drum provided by the Florida Marine Research Institute. Thirteen thousand red drum (9,000 in 1991 and 4,000 in 1992) were released. The study site was divided into three zones, each contained four fixed stations, which included seagrass, sand, mangrove, and shell habitats. Each station was sampled weekly with seine nets. Results on survival, growth, and habitat preferences of the red drum and ichthyofaunal communities were provided. Forty-eight hour survival and tag retention of on-site caged fish were high (95% and 97%, respectively). To date, 11 tagged and 647 non-tagged red drum have been captured, predominantly in mangrove habitat. One tagged red drum was recaptured after six months. Growth rates ranged from 0.5-0.8 mm per day. Prey species included *Anchoa* spp. and *Eucinostomus* spp.

10:30 am, BIO-26C **Bottlenose Dolphin Mortality in East-Central Florida: 1978-1991.** M.K. WOODY (1) AND D.K. ODELL (2), (1) University of Central Florida, Department of Biology, Orlando, FL 32816, (2) Sea World, Inc., Orlando, FL 32821. The bottlenose dolphin (*Tursiops truncatus*) is the most common cetacean in Florida's coastal waters and the most common species of cetacean found stranded on Florida's beaches. Bottlenose Dolphin carcasses were documented from 1978 - 1991 by members of the Southeastern U.S. Marine Mammal Stranding Network. In 5 east-central Florida counties, 255 carcasses were documented on the Atlantic beaches (mean = 18.2+/-24.6/yr) while 293 carcasses were documented in the Indian River Lagoon (mean = 21.0+/-8.74/yr). Overall, sex ratios were about 1:1 in both groups. Higher mortality generally occurs during the calving season (spring/summer). As expected, mortality is higher in the very young and old.

10:45 am, BIO-27C Manatee Surveillance During High Speed Boat Races in Sarasota and Tampa, Florida. JESSICA J. KADEL AND JAY F. GORZELANY, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. The U.S. Fish and Wildlife Service and U.S. Coast Guard have developed guidelines for manatee watch programs during high speed watercraft events held in Florida's coastal waters to minimize the potential risk to manatees. Mote Marine Laboratory has conducted manatee surveillance for Sarasota and Tampa races since 1985. Not only race boats, but also increased traffic from spectator boats are an important consideration. Although manatees may be expected to leave the area due to increased boating activity, sightings have been confirmed on or near the race courses during eight of the eleven surveyed events. In each case, specific protocols were followed, and the risk to the animals was minimized. Results indicate regulatory agencies and race officials should consider historical manatee sighting data in proximity to the proposed event when selecting dates and sights.

Friday, March 26, 1993, 8:30 am - 10:45 am, Room DM-104

SESSION D: Ecology I

Dr. Henry Mushinsky, University of Florida, Presiding

8:30 am, BIO-28D Population structure of box turtles (Terrapene carolina) on Egmont Key in Tampa Bay. C. KENNETH DODD, JR. (1) AND RICHARD FRANZ (2), (1) U.S. Fish and Wildlife Service, 412 N.E. 16th Ave., Gainesville, FL 32601, (2) Florida Museum of Natural History, University of Florida, Gainesville, FL 32611. Egmont Key (162 ha) in Tampa Bay contains a large population of Florida box turtles (T. c. bauri). On 7 visits from January 1991 to October 1992, we marked 653 animals (342 males, 203 females, 105 juveniles), mostly on the southern end of the island. The population is strongly male-biased, with males larger than females. Population structure varies seasonally perhaps reflecting differential activity. The large number of juveniles suggests healthy reproduction. The management implications of large turtle populations on Florida islands and future research plans are discussed.

8:45 am, BIO-29D Raccoon Predation on Florida Box Turtles at Egmont Key, Hillsborough County, Florida. RICHARD FRANZ (1) AND C. KENNETH DODD, JR. (2), (1) Florida Museum of Natural History, University of Florida, Gainesville, FL 32601, (2) U.S. Fish and Wildlife Service, 412 N.E. 16th Ave., Gainesville, FL 32601. A single raccoon is thought to have killed at least 26 Florida box turtles (Terrapene carolina bauri) on Egmont Key, Hillsborough County, Florida. No live raccoons were reported from the island prior to us finding tracks in April 1991. Freshly-killed turtles were found in January and February 1992. Most adults were decapitated whereas juveniles and subadults were consumed except for the shells. Raccoon feces were associated with carcasses; shells frequently showed bite marks and tooth penetrations. The raccoon was physically removed in April 1992, after which no more freshly-killed turtles were observed.

9:00 am, BIO-30D The Use of a Metal Detector in Locating Hatchling Gopher Tortoises. LORA L. SMITH, Department of Wildlife and Range Sciences, University of

Florida, Gainesville, FL 32611. A technique was developed for locating hatchling gopher tortoises (*Gopherus polyphemus*) in the field using light-weight metal tags and a metal detector. The technique was used in a field experiment designed to compare hatchling survivorship at nests protected from predators to that of unprotected nests. At protected nests, 43% of the hatchling released were alive after 280 days, compared to less than 20% at unprotected nests. Predator induced mortality occurred even at protected nests, indicating that predation is a very important factor in hatchling gopher tortoise mortality.

9:15 am, BIO-31D Reproductive Ecology of *Pseudacris crucifer bartramiana* near its Southern Range Limit: Microhabitat Analysis Using Computer Assisted Cover Estimates (CACE). R.D. OWEN, University of Central Florida, Orlando, FL 32816. Forested wetlands represent a distinct component of Florida's landscape. *Pseudacris crucifer bartramiana* is a winter breeding frog in Florida that reproduces in ephemeral wetland systems. One aspect of microhabitat selection of *P. c. bartramiana* was assessed during 1992. Modification of a rectangular plot method of estimating vegetative cover was developed to quantify microhabitat at perch sites of males engaged in calling activities in the southern limits of the species range. Photographs of canopy cover and groundcover microhabitat (n=20) were scanned into a Macintosh™ and percent cover was determined, using Image™ 1.41, based on the number of black pixels (e.g. vegetation) divided by the total number of pixels in the image. Analysis of vegetative cover using CACE method produces a relatively undistorted photographic record at a given point in time.

9:30 am, BREAK

9:45 am, BIO-32D Reproduction in the Dusky Pigmy Rattlesnake, *Sistrurus miliarius barbouri*. T.M. FARRELL, P.G. MAY, AND M.A. PILGRIM, Stetson University, Deland, FL 32720. We predicted that pigmy rattlesnakes would have high relative clutch mass (offspring weight/gravid female weight) based on its body form, foraging mode and defensive response. To test this prediction and learn more about reproduction in this species we collected data on maternal and offspring characteristics in 25 gravid females that were either held captive until parturition or found in the field with their litter. Larger snakes gave birth earlier in the season than smaller individuals. There was high variation in offspring weight, and this was a result of maternal effects. Little size, but not offspring weight or relative clutch mass, was strongly correlated with female body length. As predicted, relative clutch mass was high compared to other species of snakes.

10:00 am, BIO-33D The Impact of PIT Tagging on the Growth and Movement of the Dusky Pigmy Rattlesnake, *Sistrurus miliarius barbouri*. J.N. SOURIAL, T.F. FARRELL, AND P.G. MAY, Stetson University, Deland, FL 32720. PIT (Passive Internal Transponders) tagging is a recently developed technique for individually marking animals. In this technique, small glass-coated tags are injected into the body cavities of reptiles. In August we began PIT tagging a randomly-chosen subset of population of adult pigmy rattlesnakes that had been previously individually marked by scale clips. Between August and November of 1992 we began monitoring the growth and movement of 26 PIT tagged

snakes and 24 snakes having only scale clips. A preliminary comparison of these two treatments indicates that PIT tagging appears to have no impact on either growth or movement patterns of snakes.

10:15 am, BIO-34D **Growth in Juvenile Dusky Pigmy Rattlesnakes, *Sistrurus miliarius barbouri*.** M.A. PILGRIM, P.G. MAY, AND T.M. FARRELL, Stetson University, Deland, FL 32720. We studied a dense population of pigmy rattlesnakes near Ocala National Forest from February 1992 to present. We used two techniques to quantify the growth rates of young snakes: mark-recapture of approximately 200 field-collected and captive-born individuals, and a longitudinal cohort method including measurements of 600 snakes. Neonate pigmy rattlesnakes typically double their birth weight in less than two months, although there is a great variation among individuals. At one year of age their average weight is 19.6g, approximately a four-fold increase of their average birth weight of 4.8 g. We attribute this relatively rapid growth to both high prey densities and snake activity throughout the year.

10:30 am, BIO-35D **The Seasonal Activity and Thermal Biology of the Dusky Pigmy Rattlesnake, *Sistrurus miliarius barbouri*.** J.W. EVERETT, S.C. JEMISON, P.G. MAY, AND T.M. FARRELL, Stetson University, Deland, FL 32720. We censused a dense population of pigmy rattlesnakes approximately once every three days for a full year. In this period over 1,500 rattlesnakes were located by visually searching a mesic hammock in central Florida. Unlike snakes in other parts of the United States, snakes remained on the surface of the ground throughout the year, being forced undercover only by extremely cold. In winter we encountered snakes less frequently (approximately 1.0 snakes/observer/hour) than in other seasons (approximately 2.0 snakes/observer/hour). The typical body temperatures of snakes ranges from 15-32 degrees C. In winter months snakes exhibited habitat selection by coiling in microsites that were warmer than the surrounding environment.

Friday, March 26, 1993, 2:00 pm - 4:15 pm, Room DM-101

SESSION E: Marine Ecology II

Dr. Richard Turner, Florida Institute of Technology, Presiding

2:00 pm, BIO-36E ***In vivo* Absorption Spectrum as an Indicator of Recent Light Exposure History of *Gymnodinium breve*.** G.J. KIRKPATRICK AND R. LINDSLEY, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. Phytoplankton photosynthetic and non-photosynthetic pigments photoacclimate to exposure irradiance on time scales of minutes to days. Thus the acclimated complement of pigments serves as a record of recent light exposure history. Fourth derivative analysis of *in vivo* absorption spectra reveals the major pigments and their relative abundance. Recent experiments with laboratory cultures of *Gymnodinium breve* have proven an ability to distinguish between cultures from different growth irradiances. Additionally, the absorption spectra of natural bloom samples are nearly identical to those of laboratory cultures. This suggests the possibility of determining the recent light exposure history of wild cells from simple and rapid absorption scans and potentially from remotely sensed reflectance spectra.

2:15 pm, BIO-37E **Densities and Dispersions of Sea Urchins (*Lytechinus variegatus*) in Relation to Benthic Vegetation at Two Sites in Biscayne Bay: Pre- vs. Post-Hurricane Andrew (1990-1992).** E.R. LEVINE, J.A. SANCHEZ, J.C. CARBALLO, M. CHACKEN, AND J.R. MONTAGUE, School of Natural and Health Sciences, Barry University, Miami Shores, FL 33161. We completed three field collections (June 1990, July 1991, and October-December 1992) from seagrass meadows in both Crandon Marina and the Bear Cut Channel near Key Biscayne. These revealed significant differences in mean urchin densities (roughly 1 urchin/m² in Crandon vs. roughly 0.3 urchin/m² in Bear Cut). The Crandon vegetation consisted mainly of turtle grass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*), while the Bear Cut vegetation consisted mainly of *T. testudinum* and manatee grass (*Syringodium filiformes*). Urchins at both sites tended toward random dispersions within the seagrasses. We made the 1992 collections after Hurricane Andrew; we found remarkably little change in the benthic communities despite the fact that the sites took a nearly direct-hit from the storm. (Funded partially by NIGMS-MARC Grant, Barry University).

2:30 pm, BIO-38E **Effects of Various Densities of the Echinoid *Echinometra lucunter* on the Benthic Algal Community, at Indian Key.** D.A. McARDLE, Florida Institute of Technology, Department of Biological Sciences, Melbourne, FL 32901. Herbivory is an intense selective pressure in the evolution of marine and terrestrial plants and is a determining factor in the development and composition of algal communities. The sea urchin *Echinometra lucunter* is a major inhabitant of tropical coral reefs and can exist in very high densities within the Florida Keys. Little research has been conducted however on the feeding activity and diet of *E. lucunter*. This study investigated the relationship among algal community composition and the density of *E. lucunter*. To maintain three experimental densities (high, intermediate and none), urchins were tagged and tethered. Algal percent coverage was measured every two weeks in each experimental quadrant, from June to December 1992. The changes over time of the algal community relative to each experimental urchin density will be discussed.

2:45 pm, BIO-39E **Roller-Frame Trawl Bait Shrimp Fishery Impacts on By-Catch, Seagrass Meadows, and Habitat Quality in Pine Island Sound, Florida.** M.J. MARSHALL, D.B. SNYDER AND K. DAIGNAULT, Mote Marine Laboratory, Sarasota, FL 34236. The effects of roller-frame bait shrimp trawling on by-catch seagrasses in Pine Island Sound were determined through quarterly by-catch surveys conducted from July 1991 to April 1992. Data are provided on species composition, size frequency, and seasonality within Pine Island Sound. Fifty-seven species were collected. Pinfish, silver jenny, pigfish, and silver perch were the most abundant fish, while pink shrimp and grass shrimp were the most abundant invertebrates. Other species included gray and lane snappers, spotted seatrout, black sea bass and swimming and hermit crabs. During the summer and winter surveys, by-catch mortality was assessed by placing by-caught fishes in floating pens and monitoring mortality over a 24-hr period. Very low mortality was observed among by-caught fishes from standard 8-min tows during summer and winter. Effects of roller-frame trawling on turtle grass blade length and blade area showed significant differences ($p < 0.5$) following 3 trawl passes, but not 0, 1, and 9 repetitive tows.

3:00 pm, BREAK

- * **3:15 pm, BIO-40E** **Human Impact on the Shark Nursery Grounds of Tampa Bay.** C.A. MANIRE AND R.E. HEUTER, Center for Shark Research, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. Coastal shark species generally utilize shallow, inshore bays and estuaries as nursery grounds. These are typically areas of high productivity where juvenile sharks find abundant prey and where they are less exposed to predation by larger sharks. Human activities in these nursery ground areas can lead to a significant impact on the juvenile sharks, primarily in the form of habitat degradation and fishing mortality. Tampa Bay serves as a nursery area for most of the year for several resident species of sharks and as a seasonal nursery area for several transient species. We have found nine different species of sharks in all areas of Tampa Bay, but the vast majority of these have been captured in the more pristine, relatively undeveloped habitats of South Tampa Bay where healthy grass flats appear to be very important as nursery ground habitat. Human impact in the form of both recreational and commercial fisheries has been found to occur in these areas and the relative importance of each of these fisheries will be discussed.
- * **3:30 pm, BIO-41E** **The Taxonomy and Distribution of Mysidacea in Tampa Bay, Florida.** WAYNE PRICE, Department of Biology, University of Tampa, Tampa, FL 33606. Nine species of mysids, belonging to five genera were identified from 75 samples and over 4500 individuals collected from Tampa Bay, Florida. Samples were taken using dip nets and an epibenthic sled in depths ranging from < 1 m to 10.5 m. Mysidopsis bahia and M. almyra were the most commonly collected species taken in shallow water ($\leq 2\text{m}$), and both were fairly abundant in deeper waters of the upper bay. Taphromysis bowmani was collected in grass beds from fresh-water to Gulf salinities. Bowmaniella brasiliensis was found on sandy substrates in shallow waters throughout the bay, but Metamysidopsis swifti was restricted to the surf zone of high energy beaches. Mysidopsis mortenseni was rarely taken in shallow and deep waters in the upper and lower bay. Brasilomysis castroi, Mysidopsis furca and an undescribed species of Mysidopsis were collected only in the deeper waters ($> 2\text{m}$) of the middle and lower bay.
- * **3:45 pm, BIO-42E** **Growth and Survival of Caged Adult Bay Scallops (*Argopecten irradians concentricus*) in Tampa Bay with Respect to Levels of Turbidity, Suspended Solids and Chlorophyll *a*.** J.R. LEVERONE, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. Growth (shell height) and survival of bay scallops and levels of turbidity, suspended solids and chlorophyll *a* were monitored biweekly in Tampa Bay from June 30 to Oct. 27, 1992. Scallop cages (25 individuals per cage) were placed in seagrass and sand bottom areas at two locations: 1) Beacon Key (BK), south of Cockroach Bay and 2) Boca Ciega Bay (BCB), between the Bunces and Maximo Pass bridges. Initial mean shell height ranged between 31 and 36 mm and, from June 30 to Sept. 15, increased as follows: 22.2 mm (BCB-sand), 18.0 mm (BCB-grass), 15.7 mm (BK-grass), and 12.5mm (BK-sand). Overall survival was 31% at BCB and 15% at BK. No differential mortality was observed between sand and grass at BCB; mortality was greater in sand at BK. Water quality

parameters were consistently higher at BK. Greatest mortality at BK (Oct. 13) followed dramatic increases in turbidity (to 20.5 NTU's) and volatile suspended solids (to 16 mg/L). Funding was provided by the Tampa Bay National Estuary Program.

* 4:00 pm, BIO-43E Diurnal Dissolved Oxygen in Two Tampa Bay Seagrass Meadows: Ramifications for the Survival of Adult Bay Scallops (*Argopecten irradians concentricus*). J.R. LEVERONE, Mote Marine Laboratory, Sarasota, FL 34236. Dissolved oxygen (DO), temperature (T) and salinity (S) were measured continuously in two Tampa Bay seagrass meadows from last August through October 1992. Grassbeds were (1) offshore Beacon Key, south of Cockroach Bay and (2) in Boca Ciega Bay between the Maximo and Bunces Pass bridges. Daily DO at Beacon Key fluctuated between a mean low of 3.20 ± 0.83 mg/L and a mean high of 8.18 ± 1.07 mg/L at higher water temperatures (28-30°C) and between 5.09 ± 0.71 mg/L and 8.97 ± 1.07 mg/L when water temperatures fell below 28°C. Mean daily low DO in Boca Ciega Bay was 4.71 ± 0.78 mg/L and 5.83 ± 0.52 mg/L during periods of high and low water temperature, respectively. Laboratory studies showed that adult bay scallops were able to survive prolonged exposure to low dissolved oxygen (2-4 mg/L for 8-24 h) at several T:S combinations. It appears that dissolved oxygen is not the limiting factor in the decline of adult bay scallops from grassbeds in lower Tampa Bay. Funding was provided by the Tampa Bay National Estuary Program.

Friday, March 26, 1993, 2:00 pm - 4:00 pm, Room DM-102

SESSION F: Physiology

Dr. George Dooris, St. Leo College, Presiding

2:00 pm, BIO-44F Does Nifedipine Affect Theophylline Depletion of Energy Stores in Amphibian Muscle? A. PARET, K. SANCHEZ AND E.T. HAYS, Barry University, Miami, FL 33161. High energy phosphate contents were determined in isolated frog sartorius muscles exposed to nifedipine (NIF) and to theophylline (THEO) and NIF to determine if NIF altered the depletion of high energy phosphate compounds usually evoked by subcontracture levels of THEO. Because procaine prevents some of the energy depletion induced by THEO, energy contents were measured in muscles exposed to procaine and NIF with and without THEO. NIF produced little or no reduction in energy stores. NIF also did not prevent THEO depletion. Procaine did not affect energy contents in the presence of NIF but did prevent some of the depletion produced by THEO when NIF was present. These results suggest the mechanism by which THEO depletes energy stores in frog skeletal muscle probably does not involve calcium entry via the dihydropyridine-sensitive calcium channel. (Supported by NIGMS-MBRS grant, Barry University).

2:15 pm, BIO-45F Intraspecific Variation in Response to Thermal Stress in the Tarantula, *Cugesia echina* (Orthognatha, Theraphosidae). F. PUNZO, Department of Biology, University of Tampa, Tampa, FL 33606. Thermal responses of *C. echina* from three altitudinal gradients in the Chihuahuan Desert were investigated. Upper lethal temperatures ranged from 39.7-42.2 deg C at 12% relative humidity (RH), and from 42.1-44.3 deg C at 72% RH. LLT₅₀ values were 3.3-4.3, and 3.1-4.3 deg C, respectively. CTM_{min} values ranged

from 4.9-5.2 dec C. CTM_{max} values ranged from 40.8-43.7 deg C, with significantly lower values occurring under xeric conditions. Optimal survival occurred between 15-30 deg C. The preferred temperature range was 24-27 deg C. Cuticular water loss was greater under xeric conditions for spiders from higher elevations. The adaptive significance of thermal responses and microhabitat preferences will be discussed.

2:30 pm, BIO-46F Differential Staining of Nucleic Acids with Vanadate Hematoxylin and Safranin. M. MAGURNO AND A.A. SMITH, Barry University, Miami Shores, FL 33161. Hematoxylin can be oxidized ("ripened") with an excess of ammonium vanadate. The remaining unreduced vanadate acts as a mordant for the oxidized hematoxylin ("hematein"). Vanadate in basic solution binds strongly to DNA, but safranin competes with it for RNA. It is thus possible to stain DNA blue and RNA red with vanadate hematoxylin and safranin.

2:45 pm, BIO-47F The Relationship Between Sound Pressure Level and Body Size in Some North American Cicadas (Homoptera: Cicadidae). A.F. SANBORN AND P.K. PHILLIPS, School of Natural and Health Sciences, Barry University, Miami Shores, FL 33161. Sound pressure levels (SPL's) of 38 species of North American cicadas are presented. The SPL's of the calling song of 20 species and the alarm calls of 36 species were measured. Mean advertisement call intensity ranged from 79.76-107.20 dB while mean alarm call intensity ranged from 75.33-105.45dB, similar to the values reported in the literature for other cicada species. The peak SPL of 108.0dB was measured in a calling *Tibicen winnemanna* (Davis) and an alarm call produced by *Diceroprocta apache* (Davis). Sound intensity increases as body mass increases for both the calling song ($Y = 57.82 + 14.566 \log(\text{mass})$; $r = .667$; d.f. = 18; $p < .002$) and the alarm call ($Y = 62.04 + 12.719 \log(\text{mass})$; $r = .713$; d.f. = 134; $p < .001$). This may be due to larger resonating structures or larger timbal muscles in the larger species. Variability in the sound intensity measured for a particular species may be due to factors such as age, physiological state, or the presence of rivals in the habitat. Supported in part by USPHS Traineeship GMSO7143 to PKP.

3:00 pm, BREAK

3:15 pm, BIO-48F Effects of Sugar Type on Meal Size and Lipid Storage in the Gulf Fritillary, *Agraulis vanillae* (Lepidoptera: Nymphalidae). P.G. MAY, Biology Department, Stetson University, Deland, FL 32720. Newly emerged, lab-reared adult *Agraulis vanillae* were fed ad libitum on 20% solutions (wt/wt) of either glucose, fructose or sucrose. Daily meal size and mass change over a five day period were compared among individuals feeding on different sugars. Butterflies were analyzed after the five-day period for total lipid content. Butterflies fed sucrose or fructose ingested significantly larger meals than did individuals fed glucose. Sucrose- and fructose-fed individuals differed significantly in mass change and lipid change from individuals fed glucose. Individuals on glucose diets, however, appeared to be more efficient in maintaining lipid reserves per unit energy ingested than did those in the sucrose and fructose groups.

3:30 pm, BIO-49F Identification and Partial Characterization of the Major Hematopoietic Tissues in Elasmobranch Fish. CARL LUER AND CATHY WALSH, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236. Since the elasmobranch fish (sharks, skates and rays) possess a cartilaginous skeleton and consequently lack bone marrow, the tissue sites responsible for hematopoiesis (formation of blood cells) are not well understood. Lymphoid organs in common with higher vertebrates, including spleen and thymus, are involved with lymphocyte production, but do not account for the total blood cell population. Tissues unique to elasmobranch fish, such as Leydig organ, epigonal organ and rectal gland, have been investigated for their potential hematopoietic function, with the documentation that both Leydig and epigonal organs contribute significantly to both lymphocyte and granulocyte production. The role of the rectal gland in hematopoiesis is unclear, although lymphocytes have been found associated with this tissue. An additional site worth of mention is the peripheral circulation, where significant blood cell replication, differentiation, and maturation have been observed.

3:45 pm, BIO-50F Functional Studies on Elasmobranch Epigonal Cells in Short-Term Culture. CATHY WALSH (1), CARL LUER (1) AND A.B. BODINE (2), (1) Mote Marine Laboratory, Sarasota, FL 34236, (2) Department of Animal, Dairy & Veterinary Sciences, Clemson University, Clemson, SC 29634. The epigonal organ, a paired organ associated with the gonads of elasmobranch fish, is presumed to be lymphoid based on ultrastructure. To provide functional data in support of this observation, cells from the epigonal organs of nurse sharks, lemon sharks, and clearnose skates were placed into short-term culture using a modified serum-free RPMI 1640 medium. Epigonal cells incubated with congo red stained yeast cells for 24 h resulted in significant phagocytosis of the yeast cells by epigonal cells of all three species. Conditioned medium (CM) from nine-day quiescent culture of nurse shark epigonal cells was assayed for the presence of cell proliferative factors using a chick thymocyte co-mitogenic assay and by a co-culture growth response assay with mouse embryos. Both assays resulted in proliferative responses characteristic of interleukin-1-like activity. Efforts are underway to characterize additional factors from nurse shark CM.

Friday, March 26, 1993, 2:00 pm - 4:45 pm, Room DM-103

SESSION G: Ecology II

Dr. Doug Levey, University of Central Florida, Presiding

2:00 pm, BIO-51G Limited Breeding Distribution of the Prothonotary Warbler (*Protonotaria citrea*) Within the Wekiva Basin. D.L. LEONARD, JR., University of Central Florida, Department of Biology, Orlando, FL 32716. The factors determining the southern range limits of the Prothonotary Warbler are poorly understood. As a breeding bird it is absent from large portions of the southern peninsula containing overtly suitable habitat; yet, a disjunct population breeds in and around the Big Cypress National Preserve. Within the Wekiva Basin the Prothonotary Warbler also has a puzzling breeding distribution. The warbler's presence was noted within the lower portions of the Basin but it was absent from the upper part of the Basin during the 1992 breeding season. Using presence-absence data, I related the breeding distribution of the warbler within the Basin to vegetation structure.

Of the 15 vegetational variables measured, 9 were significantly different between the upper and lower parts of the basin. Based on the literature and the fact that the differences found in vegetation can be related to hydroperiod I suggest that, within the Wekiva Basin, the presence of standing water may be an important aspect of the niche-gestalt used by Prothonotary Warblers in breeding site selection.

2:15 pm, BIO-52G **Breeding Biology of the Great Crested Flycatcher in Central Florida.** W.K. TAYLOR, Department of Biology, University of Central Florida, Orlando, FL 32816. For more than 10 years, the breeding biology of *Myiarchus crinitus* has been studied in central Florida. All birds used wood next boxes; data on 46 nests are reported herein. Males arrived in late March followed by females later. Forty-three percent of the 46 nests were begun between 16-30 April. Females built the nest, incubated the eggs for 13-15 days, and brooded the young for about 6 days. Clutch size ranged from 4-6 eggs. Hatching and fledging successes for 38 completed clutches were 71% and 72%, respectively. Hatching success was lower for April nests than for May and June nests, but fledgling success was higher for April nests than for May and June nests. Both adults fed and defended the nestling and fledgling flycatchers. A family group remains intact for at least 3 weeks after fledging occurred.

2:30 pm, BIO-53G **Nest Predation Within Central Florida Scrub Island.** PARKS SMALL (1), D.L. LEONARD, JR. (1), AND LORRIE HOFFMAN (2), (1) University of Central Florida, Department of Biology, Orlando, FL 32716, (2) University of Central Florida, Department of Statistics, Orlando, FL 32716. Nest predation is a major source of mortality for many avian species and increases in predation rates have been correlated to fragmentation. This increase has been attributed to artificial predators dispersing into the fragments from surrounding areas. Scrub is a community type virtually unique to Florida, characterized by a very abrupt edge, and distributed as habitat islands within the landscape matrix. Scrub is the primary habitat of one listed avian species, the Florida Scrub Jay. Little work has been done regarding fragmentation of scrub despite its inland-like character and the fact that it is an imperiled community type. We placed 180 artificial nests baited with Japanese Quail eggs in 9 scrub islands of varying area and with different adjacent habitats within the Wekiva Basin. Predation rates per island ranged from 5% to 100%. Data were interpreted after analysis by weighted regression methodology. Dependent variables were: area, distance from the edge, and type of adjacent habitat.

2:45 pm, BIO-54G **Roost Dynamics of Black Vultures in Central Florida.** E.D. STOLEN, University of Central Florida, Department of Biology, Orlando, FL 32816. Four-hundred and seventeen Black Vultures (*Coragyps atratus*) were tagged with patagial wing-tags at two communal roosts in Central Florida since May 1990. Using data obtained during the tagging episodes, as well as recapture and sign-recapture events, estimates of the population size and age structure are presented. The patterns of roost use by individual birds is examined. Implications pertaining to the use of communal roosts as information centers is discussed.

3:00 pm, BREAK

3:15 pm, BIO-55G A Nest Site Selection Study of the Florida Barred Owl. M. FRANZ and C. SHEA, Reynolds, Smith and Hills, Inc., 1715 N. Westshore Blvd., Suite 500, Tampa, FL 33607. Nest site characterization and analyses were carried out on a population of Florida Barred Owl (*Strix varia georgica*) in eastern Sarasota County. Owl pairs and nests were located by conspecific vocalization playback. Fourteen physical parameters of the nest cavity and nest site vicinity were compared between eight owl nest sites and nine randomly selected potential, but unused, nest cavity trees. No significant differences were revealed by nonparametric statistical analysis. Analysis of prey remains revealed a predominance of wetland species; the Florida Water Rat (*Neofiber alleni*) was the most commonly encountered prey species. Nesting behavior of the Florida Barred Owl is compared to published data on other owl species.

3:30 pm, BIO-56G The Effects of Satellite Nests on Predation in Artificial Nests of *Pseudemys floridana peninsularis*. P.E. COPLE AND M.A. PILGRIM, Stetson University, Biology Department, Deland, FL 32720. Nests of the peninsula cooter have side pockets (satellite nests) adjacent to the main nest. Satellite nests usually contain a single egg, while the main nest usually contains approximately 20 eggs. We tested the hypothesis that satellite nests reduce predation on turtle eggs at Lake Woodruff National Wildlife Refuge. Predation on thirty artificial nests in three treatment groups (no satellites, satellites with eggs, and satellites without eggs) was monitored. Eighty percent of the main nests were destroyed by predators. Treatment had no statistically significant effect on the predation rate of nests over a five week period. Our data does not support the hypothesis that satellite nests evolved due to selection pressure resulting from predation.

3:45 pm, BIO-57G Comparisons of Avian Diversity and Resource Utilization in Mangrove and Brazilian Pepper Dominated Habitat in South Pinellas County, Florida. V.E. SHEPHERD, Department of Biology, Eckerd College, St. Petersburg, FL 33711. Brazilian pepper (*Schinus terebinthifolius*) is an exotic tree species invading extensive areas of natural habitat in South Florida, and has replaced upland mangroves in some areas. To determine differences in avian community structure and resource utilization between upland mangrove and Brazilian pepper habitats, I am comparing species composition, diversity, and behavior of birds at three sites of each habitat type. Methods include point and transect census counts, mist-netting, and behavioral observation and quantification. Results are presented with regard to the conservation implications of invasion of native habitat by exotic species.

4:00 pm, BIO-58G Differences in Avian Community Structure of a Subsidized Created Marsh vs. an Unsubsidized Created March. HOWINGTON, T.M. (1), C. GRAHAM (2), M.T. BROWN (3) AND G. RONNIE BEST (4), (1) Center for Wetlands & Water Resources, University of Florida, Phelps Lab, Gainesville, FL 32611-2061. The Florida St. Johns River Water Management District Apopka Flow Way Marsh Demonstration Project (212 acres) is designed as an experimental model of a larger created marsh (5000 acres) which will be engineered to reduce the eutrophication of Lake Apopka.

Pumps circulate water from lake Apopka into one marsh subsidizing the energy. The unsubsidized marsh receives water inputs from rain and groundwater. Line-transect bird surveys conducted from August 1990 through May 1992 suggest that the subsidized marsh has higher avian densities, a higher species diversity index, and a greater abundance of each community type including wading birds, waterfowl, shore birds and gallinules. Because the subsidized marsh is becoming dominated by fewer vegetative species, the long-term effects of the additional inputs into the subsidized marsh, avian usage may eventually decrease.

4:15 pm, BIO-59G Floating Habitats and Nest Boxes for Suburban Lake Waterfowl. T.J. ANDERSEN, Math Department, St. Petersburg Junior College, St. Petersburg, FL 33710. In an effort to provide artificial habitats for suburban waterfowl, a series of floating feeders, habitats and nest boxes have been designed, built and tested. The floating sites provide protection from predators, shelter from the elements and an ideal location for nesting and hatching chicks. The habitats were constructed from inexpensive commonly found materials. The presentation will cover several design and construction considerations including platform elevation, floatation, floor ventilation, anchoring and wind stability.

4:30 pm, BIO-60G The Effects of Avian Breeding Colonies on a Man-made Freshwater Marsh in East Central Florida, J.L. BURNEY, JR., University of Central Florida, Orlando, FL 32764 and Post, Buckley, Schuh, and Jernigan, Inc., 1560 Orange Ave., Winter Park, FL 32789. Avian breeding colonies have been shown to affect or alter aquatic ecosystems by the addition of nutrients, primarily nitrogen and phosphorus, via excreta. In this study the influences of a 400 nesting pair rookery of Cattle Egret (*Bubulcus ibis*) in 1990 and a 75 nesting pair rookery in 1991 were examined. Increased localized eutrophication associated with the rookeries resulted in increased mosquitofish (*Gambusia affinis*) populations and increased aquatic macroinvertebrate species diversity and richness. Aquatic macrophyte community structure was also altered during the nesting period. Observations on predation, nest site selection, and life history characteristics of the nesting species were also noted.

4:45 pm, BIO-61G Organization of a "Symposium on the Conservation of Florida Turtles." GEORGE HEINRICH, Gopher Tortoise Council, P.O. Blx 61301, St. Petersburg, FL 33784. We are requesting input from interested parties on the organization of a "Symposium on the Conservation of Florida Turtles." Over the last few years, several turtle biologists and conservationists have discussed the need for and possibilities of such a meeting. Several biologists have already been approached and are interested in speaking on particular species' biology and conservation. Interest in this subject has been expressed by conservation organizations, the environmental education community, and outdoor and environmental reporters/writers. The main intent would be to bring these groups together for the benefit of Florida turtle conservation. If you are interested in participating in such a meeting or would like to exchange ideas, please let me know.

ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCE

Friday, March 26, 1993, 8:30 am - 11:00 am, Room SHC-103

SESSION A

Dean F. Martin, I.E.S., University of South Florida, Presiding

8:30 am, ENV-1A Management of Scale Deposits by Diamagnetism. A Working Hypothesis. ROBERT F. BENSON AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Diamagnetism (repulsion from a magnetic field) is used to eliminate deposition of calcium carbonate and other diamagnetic materials (cf. Carpenter, R.K. 1919. Magnetic Treatment. Today's Alternative. Paper presented at 1991 National Association of Corrosion Engineers, Maracaibo, Venezuela, Nov 20-22). The basis of the effect has been thoroughly considered, and hypotheses include structure-forming forces, reduced mechanical strength of scale formed, effects on crystal size, and rates of nucleation. Another hypothesis, proposed here, is that the magnetic field of suitable strength imposes a Zeeman effect on the diamagnetic substance, and an increase in entropy results (increase in the number of available "boxes"). The hypothesis and its testing will be discussed. We gratefully acknowledge the support of Aqua Magnetics International, Safety Harbor, and the encouragement of Roland K. Carpenter.

8:45 am, ENV-2A Removal of Radium from Phosphate By-Product Gypsum. JAY W. PALMER, Department of Chemistry, University of South Florida, Tampa, FL 33620. Processes for removal of radium from phosphate by-product gypsum are discussed. In Florida alone, around 30 million metric tons of by-product gypsum are produced in phosphate operations. Gypsum building materials are used in many applications in the construction industry. However, only gypsum raw materials can be used that have radium concentration that are at background levels. Most phosphate processed gypsums have radium levels that are much higher than these levels. Therefore, there is keen interest in developing economical processes for reducing the radium concentration to background levels, so that these gypsums can be utilized.

* **9:00 am, ENV-3A** Preliminary Results and Analysis of Monitoring of Ambient Water Quality and Runoff to Nearshore Waters in Pinellas County. D.D. MOORES, Pinellas County Department of Environmental Management. In 1989, Pinellas County Government adopted significant revisions to its comprehensive plan. Under the goals of this revised plan, the County would establish a water monitoring program, prioritize watersheds in terms of degree of water quality impairment, and prepare watershed specific management plans for water bodies and watersheds in order of priority. In August, 1990, the County initiated its surface water monitoring program. The Water Resources Management Section staff has developed an evaluative matrix which permits comparison of the monitoring sites in terms of the degree to which water quality is impaired. The results of this analysis and its implications for pollutant loading to Tampa Bay will be discussed.

9:15 am, ENV-4A **Sediment Toxicity in Tampa Bay: Spatial Extent and Magnitude.**
EDWARD R. LONG, National Oceanic and Atmospheric Administration/ORCA, Bin C15700, 7600 Sand Pt. Way NE, Seattle, WA 98115. Sediment samples collected throughout the Tampa Bay estuary were tested for toxicity in a battery of laboratory tests. Toxicity was observed in several regions of the estuary, particularly in northern Hillsborough Bay. Toxicity was highly correlated with elevated concentrations of potentially toxic chemicals in the sediments. Spatial patterns and severity of toxicity are described and results are compared with those from other large estuaries in the USA.

9:30 am, ENV-5A **Characterization of Organized Self Assembled Monolayers of Thiols on Various Crystallographic Surfaces of Gold.** A.T. D'AGOSTINO AND R.Q. RUBINI, University of South Florida, Department of Chemistry, Tampa, FL 33620. Monolayers of 11-mercaptoundecanoic acid were assembled on (111), (100) and polycrystalline surfaces of Au. Variable angle X-Ray Photoelectron Spectroscopy, Fourier Transform Infrared Reflection Absorption Spectroscopy and electrochemical means were used to characterize the structure, conformation, thickness and properties of the chemisorbed thiol adlayers. Surface conductance was used as an insitu probe to monitor the thiol monolayer formation and assembly process on thin film Au substrates. It was found that the organized self assembly of the thiol monolayer on Au (111) was complete within a few minutes and may be described using a Langmuir model. The absorption/formation process on Au (100) and polycrystalline Au are described.

9:45 am, BREAK

10:00 am, ENV-6A **Synthesis of Supported and Unsupported Nickel Chelate Compounds for the Dehalogenation of Trihalomethanes (THM).** DUKE D. POORE, ROBERT F. BENSON, AND DEAN F. MARTIN. Institute of Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. The present study involves the examination of supported vs unsupported bis (N-n-octylsalicylidineiminato) nickel (II) toward the dehalogenation of chloroform in the presence of ethylenediamine. The samples were screened for activity in terms of percent chlorine converted to chloride ion following a 72 h reflux period. The determination of Cl⁻ released was accomplished via Mohr, conductometric, and potentiometric titrations. Atomic absorption methods were utilized for the determination of Ni²⁺.

10:15 am, ENV-7A **Application of Supported Chelating Agents for Extraction of Cadmium.** CHARLES D. NORRIS, ROBERT F. BENSON, AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. The commercial importance of phosphate is evident that so many commodities are produced from it. However, impurities present in phosphate ore at high concentrations can render it unmarketable. This study is concerned with the removal of one of these impurities, cadmium. Commercially available chelating agents (LIX 54, LIX 860, LIX 662, and others) were loaded onto solid supports (silica gel, Linde 3A molecular sieve). Ammonia/Ammonium chloride buffers (pH 7 to 11) that were spiked with 1 ppm

cadmium nitrate were extracted for periods of 0.25, 1, 2, and 3 hours with the supported chelators. Extraction was determined by analysis of the solution by atomic absorption, and then was related to pH and to extraction time. Three-dimensional isotherms were constructed to relate these three variables to one another for each agent.

10:30 am, ENV-8A Further Characterization of *Ptychodiscus brevis* Inhibiting Natural Product. MARK-ALLEN WALKER AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. This study is part of a continuing project based upon marine allelopathy. Here, a chloroform-soluble extract from *Nannochloris oculata* was separated via flash chromatography and tested for antagonistic responses against *P. brevis*, the red tide organism. Collected fractions were measured for absorbance in the UV-Visible range of 600-200nm. Peaks were obtained at 420 and 280 nm. Upon further analysis two peaks were found when the samples were measured at 280nm only. The samples making up these peaks were combined separately and a bioassay against *P. brevis* was performed. In the bioassay both sets of fractions showed inhibition against the *P. brevis* cells. After 24 hrs 48% of the cells were killed in fraction set #1 and 37% were killed in fraction set #2. After 48 hrs 59% and 69% were killed, respectively. A bioassay was also run with whole *Nannochloris* extract. After 24 hrs complete inhibition of the *P. brevis* was found.

10:45 am

SECTION MEETING

Dean Martin, University of South Florida, Presiding

Friday, March 26, 1993, 2:00 pm - 4:45 pm, Room SHC-103

SESSION B

Robert F. Benson, I.E.S., University of South Florida, Presiding

2:00 pm, ENV-9B Electrical Conductivity Studies of Bismuth Palladate, Bi_2PdO_4 , and Bismuth Cuprate, Bi_2CuO_4 . JOSEPH A. STANKO, DAVIS R. LOWELL, AND MATTHEW E. SCHILLER, Department of Chemistry, University of South Florida, Tampa, FL 33620. There is much current interest in electrically conductive ceramic-oxides. We have studied the parent oxides Bi_2MO_4 , where $\text{M} = \text{Cu}^{2+}$ or Pd^{2+} , and the doped phases $\text{Bi}_{2-x}(\text{Pb})_x\text{MO}_4$ where the lower valent lead ion, Pb^{2+} , partially replaces Bi^{3+} . This doping on the bismuth site should induce Cu^{3+} or Pd^{3+} formation on the transition metal site. Such mixed-valence is essential for achieving high electrical conductivity and even superconductivity in oxide systems such as $\text{La}_{2-x}(\text{Sr}_x)\text{CuO}_4$ and $\text{YBa}_2\text{CuO}_{6+x}$. However, while the latter have sheetlike structures, the Bi_2MO_4 oxides consist of square-planar $[\text{MO}_4]$ units stacked to give a linear-chain arrangement. Electrical conduction in such structures has not been fully explored. We will report our results on the conductivity in the parent and doped phases of these oxides.

2:15 pm, ENV-10B Isolation and Characterization of a Hydroxamate Siderophore Produced by *Lyngbya Majuscula*. ELSIE GROSS AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. *Lyngbya majuscula*, a common marine blue-green alga (cyanobacterium) adapted to freshwater, contributes to the eutrophication of Florida lakes. Because current control methods are inadequate, studies focused on iron as a required nutrient were undertaken in the hope that information gained would be helpful in developing better control methods. In these studies, *L. majuscula* showed significantly greater weight gain when grown in iron-sufficient media than when grown in iron-deficient media. A similar demand for iron in many microbes induces production in iron chelators known as siderophores. A chloroform-soluble extract from *L. majuscula* in iron-deficient media gave a positive Csáky test, indicating the presence of bound hydroxamate siderophore. Separation and Characterization of the siderophore will be described.

2:30 pm, ENV-11B Effects of Treated Kraft Black Liquor on *Hydrilla Verticillata* (Royle). ANDREW L. HASSELL, BARABARA B. MARTIN, AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. *Hydrilla Verticillata* Royle (Hydrilla) is a rootable submersed, perennial plant that is found in surface waters. Hydrilla is not a native plant to Florida but since its introduction to Florida in the late 1950's it has spread rapidly. Hydrilla can form quite dense mats near the surface of the water which can hinder the movement of water vehicles. Hydrilla is only eaten by a few animals that are native to Florida so once Hydrilla infests an area it tends to spread rapidly. Hence, Hydrilla is considered a nuisance aquatic plant. It was observed that in the bodies of water that contained Kraft Black liquor the growth of Hydrilla was severely restricted. Hence, questions were raised about the nature of the inhibitor. A series of bioassays were performed to determine whether the inhibitor was of a chemical nature or of a physical nature (most notably its dark brown color).

2:45 pm, ENV-12B A Map of Elemental Carbon Concentration of the Air over Florida, 1990-1991. JOHN LEONARD AND R. DEL DELUMYEA, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville, FL 32211. Recently, Elemental Carbon (EC) particles have been found in the lungs of dolphins. The question arose as to whether these particles originated over land or water. This project undertook to determine the amount of EC particulate found in Florida's air. Portions of air particulate filters (approximately 2,000) during the period from 1/90 through 12/91 were obtained from fourteen counties which have either highest population or population density. Using reflectance spectroscopy and using data provided by the Florida Department of Environmental Regulation, atmospheric concentrations of Total Suspended Particulate matter and EC were determined. These data are being used as input into a computer program to plot the temporal changes in EC concentration over the state: a "Carbon Map."

3:00 pm, ENV-13B Preparation and STM Characterization of Smooth Gold Surfaces. J.C. BRUNA (1), R.E. BAKER (2), L.T. ZHANG (2), AND A.E. KAIFER (2), (1) Barry University, Miami Shores, FL 33161 and (2) University of Miami, Coral Gables, FL 33124.

The Scanning Tunneling Microscope was used to characterize the surface of epitaxial gold on mica in air. These surfaces can easily be prepared in a vacuum evaporator. In addition, they must be kept inert to the exposure of air or water. The STM images have shown atomically flat surfaces that extend for up to several hundred angstroms. The images observed with the use of the Scanning Tunneling Microscope are believed to be consistent with that of Au (111) surface. This instrument provides atomic resolution as well as the distances between the nearest and next nearest gold atoms. The imaging of gold beads on the other hand, brings about a number of difficulties that are not encountered with gold deposited onto freshly cleaved mica slides. This fact may be due to the difference in structure between the two substrates.

3:15 pm, ENV-14B **Inhibition of Aspartate Racemization in Proteins by Dimethyl Sulfoxide (DMSO).** DIEGO TORRES, MIRTHA CHÁVEZ, LENORE POLO, GREGORY CUSANO AND GEORGE FISHER, Department of Chemistry, Barry University, Miami Shores, FL 33161. Amino acid racemization is the change in configuration from L to D or vice versa. Aspartic acid (Asp) is one of the fastest racemizing amino acids due to stabilization of the intermediate carbanion by the electron withdrawing beta carboxyl group. In previous work we reported that symmetrical solvation of the intermediate carbanion by DMSO gives further stabilization thus resulting in increased racemization of free Asp. We hypothesize that within the chiral environment of a protein with all L-amino acids, any intermediate Asp carbanion would be asymmetrically solvated by DMSO such that any D-Asp residue might be reversed back to the normal L-Asp configuration. We have tested this hypothesis using human myelin basic protein (MBP) which contains high levels (> 10%) of D-Asp. Aqueous solutions of seven MBPs of various ages were heated for one week at 100° with and without DMSO. The proteins were hydrolyzed, and the D- and L-Asp were measured by HPLC. The amount of heat-induced racemization of Asp was 7-30% less in the DMSO solutions than in the aqueous solutions.

3:30 pm, BREAK

3:45 pm, ENV-15B **The Determination of Selenium by Anodic Stripping Voltammetry with an Insitu Gold-Plated Glossy Carbon Electrode.** JOSEPH A. SARACENO, DAVID BRETT, DAVID R. LOWELL AND ROBERT F. BENSON, Department of Chemistry, University of South Florida, Tampa, FL 33620. A follow-up study of selenium concentrations in McKay Bay and Palm River in Hillsborough county, Florida is presented. The original work in 1976 found definite selenium levels in these regions. The current study employed anodic stripping voltammetry using an in-situ gold-plated glassy carbon electrode to detect selenium. Selenium was detected at levels greater than the previous study. Selenium levels in McKay Bay and at the mouth of Palm River show relatively high concentrations of selenium at 220 - 1200 ppb.

4:00 pm, ENV-16B **Wildlife Usage and Agricultural Chemical Occurrence in Citrus Grove Reservoirs in Southwest Florida.** D.W. BLACK AND G. SAWKA, South Florida Water Management District, West Palm Beach, FL 33406. Biological and chemical sampling

programs were conducted in citrus groves in Collier and Hendry Counties. Groves have a relatively high species richness (203 vertebrate species) with a majority of the species (159) occurring in agricultural reservoirs, which in most locations are natural wetlands that have been incorporated into on-site wet detention areas. Endangered species such as snail kites (*Rostrhamus sociabilis plumbeus*), wood storks (*Mycteria americana*), and Florida panthers (*Felis concolor coryi*), utilize groves. Chemical sampling revealed the herbicides diuron and bromacil in reservoirs. Because of the biological importance of agricultural reservoirs and the use of a variety of agricultural chemicals in citrus groves, additional research on potential chemical threats to animals in these areas would be appropriate.

4:14 pm, ENV-17B **Ammonia Levels in the Biscayne Bay Watershed.** L GULICK AND R. ALLEMAN, South Florida Water Management District, 3301 Gun Club Road, West Palm Beach, FL 33416. Metro-Dade County Department of Environmental Resources Management instituted a monitoring system for water quality which has been continuously sampled since 1979 as part of the Biscayne Bay Restoration and Enhancement Program. The goals of the Biscayne Bay Water Quality Monitoring Program are to establish an adequate baseline of data, detect water quality trends, identify areas that are in need of improvement, and to augment other studies. In 1988 the SFWMD's Surface Water Improvement and Management Plan for Biscayne Bay was approved by DER. Under this plan the sampling network was continued and expanded. Seventy-eight stations are sampled monthly for ammonia concentration. Median ammonia nitrogen concentrations for the period of record were input into an Arc Info database for analysis. Analysis of data for the Bay's tributary canals showed elevated ammonia concentrations in the western reaches, lower concentrations in the middle reaches and the highest concentrations in the eastern reaches near the highly developed mouths of the canals. This pattern suggests two kinds of ammonia sources; one associated with drainage from the Everglades and another associated with urban development.

4:30 pm, ENV-18B **Improving the Analytical Recovery of Radiostrontium from Environmental Samples.** L. ACOSTA, HRS Radiation Control, Orlando, FL 32868. Radiostrontium is found in the environment from fallout, waste disposal operations, and the useful application or beneficial use of atomic energy and its by-products. Factors causing low yield in radioactive Strontium in environmental samples was determined. Acid strength was considered the main factor when using ion exchange chromatography techniques.

Friday, March 26, 1993, 2:00 pm - 4:30 pm, Room SHC-102

SESSION C

Robert S. Braman, University of South Florida, Presiding

2:00 pm, ENV-19C **Impact of NO_x Chemistry on Tobacco.** ROBERT S. BRAMAN, STEVEN A. HENDRIX AND MITCHELL F. KATZ, Department of Chemistry, University of South Florida, Tampa, FL 33620. The recent development of analytical methods for NO_x compound speciation in air and aqueous samples has led to some studies of NO_x chemistry associated with tobacco. Primary tobacco smoke contains largely NO but significant amounts

of nitrous acid are also found. Nitrosophenol compounds are also present. Nitric oxide is converted largely to nitrites at physiological pH values. This implies that NO content of tobacco smoke can lead to production of n-nitrosamines and nitrosophenols in lung tissue. Analyses for nitrate content have been conducted on cigarettes from many different countries. Results range from 0.05% to 3.0% expressed as potassium nitrate. The nitrate content of US cigarettes is in the 1.5-2.8% range. Mortality rates of tobacco smokers from various countries correlate with the nitrate content of the tobacco ($r = 0.95$). The implication is that the nitrate content of the tobacco is responsible for most of the excess mortality among smokers.

2:15 pm, ENV-20C **Effects of Ozonation on Bromine and Chlorine Speciation in a Closed Seawater System.** G. GRGURIC (1), J.H. TREFRY (1), AND J.J. KEAFFABER (2), (1) Department of Oceanography and Ocean Engineering, Florida Institute of Technology, Melbourne, FL 32901 and (2) Science and Technology Group, EPCOT Center/The Living Seas, Walt Disney World Co., Lake Buena Vista, FL 32830. During ozonation of seawater in closed marine systems, reduced chemical species such as bromide and chloride are oxidized to a variety of higher oxidation state products. We have developed a computer model of ozone reactions with artificial seawater at The Living Seas aquarium. In this facility, total bromine concentration is $57 \mu\text{M}$, with $5 \mu\text{M}$ present as bromate and the remainder as bromide. Results of the model show that ozonation can account for the concentration of bromate observed after 6 years of operation at The Living Seas. We conclude that even in an artificial seawater system where bromide is purposely not added, the trace impurity present is the dominant oxidized species during ozonation.

* **2:30 pm, ENV-21C** **The Continued Use of Copper Sulfate Pentahydrate in the Hillsborough River Reservoir.** J.C. HOHMAN AND D.F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. The amounts of copper sulfate pentahydrate used as an aquatic herbicide and algicide in the Hillsborough River, and the extended time of use may have a negative impact on the ecology of the area. In addition, the present means of algae control may not be the most effective in terms of ecology or economy. The river is sampled from the reservoir entrance near Temple Terrace, to Lowry Park, including the treated area. Several parameters are considered, with primary interest focused on the disposition of the copper, which appears to precipitate near the point of application, and accumulate in the sediment. The Hillsborough River is also compared to an extensive 58 year study done on the Fairmont Lakes in southern Minnesota.

2:45 pm, ENV-22C **Enantiospecific Synthesis from Alkene Substrates Catalyzed by Chiral Copper(II) Chelates.** VENKATRAJ V. NARAYANAN, LEON MANDELL AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. In recent years there has been an increased need for the efficient syntheses of chiral molecules due to the importance of molecular recognition in physical and biological sciences and in the technologies of molecular electronics and optics. The first catalytic asymmetric reaction of a prochiral compound

caused by a soluble chiral metal complex was reported in 1966. Ethyldiazoacetate when treated with excess styrene in the presence of a chiral copper catalyst (bis-[N-(+)- α -phenylethylsalicylaldiminato]) copper(II) at 60°C, yields *cis*- and *trans*-2-phenylcyclopropanecarboxylates. The use of one enantiomer of this copper catalyst in the reaction must lead to an enantiospecific synthesis of the product, yielding one isomer in preference to the other.

3:00 pm, ENV-23C **Leaching From Stone Crab Traps Dipped In Fungitrol: Diesel Fuel Preservative.** J.S. BARRE AND E.S. VAN VLEET, Department of Marine Science, University of South Florida, St. Petersburg, FL 33701. Stone crab fisherman in South Florida have traditionally treated their wooden traps with a copper plus diesel fuel-based chemical preservative to prevent biodegradation. The current study was undertaken to determine the amount of preservative absorbed by the traps during dipping and the subsequent release during weathering and use. In addition, acute toxicity tests of the water soluble fraction (WSF) of diesel fuel were conducted on postsettlement juvenile stone crabs. Results show, with increased weathering time, dipped traps enter seawater with decreased amounts of diesel fuel, but copper concentrations tend to remain nearly constant regardless of weathering time. Most of the remaining diesel fuel and copper is released to seawater upon submersion. Results from the acute toxicity tests show a 96hf LC₅₀ of 25.0% diesel fuel WSF (0.40 ppm). The stone crabs themselves do not seem to be bioaccumulating the diesel fuel, nor are they being exposed to toxic concentrations of diesel fuel.

3:15 pm, ENV-24C **Micellar Electrokinetic Capillary Chromatographic Separation of Cationic Porphyrins.** T. WELLENS AND J.M. ROBERT, Department of Chemistry, University of South Florida, Tampa, FL 33620. Porphyrin macrocyclic structures are prevalent in nature (for ex. chlorophyll and heme protein), but separation and characterization of these species can be challenging because of self-aggregation and surface interactions. Many porphyrinic moieties are isolated by low-resolution methods, then further separated using high-performance liquid chromatography (HPLC), but long retention times and column bleed-off are often problematic. Capillary electrophoresis (CE) is a relatively new separation technique which can offer better resolution and higher efficiency than HPLC. By using surfactants in the CE buffer, porphyrins may be separated based upon electrophoretic mobilities, ion-pairing with the micelles, and partitioning into the micellar hydrophobic region in a related micellar electrokinetic capillary chromatographic (MECC) method. The application of MECC to the separation of synthetic, cationic porphyrins used as diagnostic agents or as photosensitizers in aqueous redox systems is discussed.

3:30 pm, BREAK

3:45 pm, ENV-25C **Chemiluminescence Method for Trace Analysis of Ammonia, Organic and Inorganic Nitrogen.** MITCHELL F. KATZ AND ROBERT S. BRAMAN, Department of Chemistry, University of South Florida, Tampa, FL 33620. A method is presented in which nitrogenous compounds are determined. Environmental samples are introduced onto an alkaline packed tube. Nitrogen compounds are then thermally desorbed

and oxidized to nitric oxide. The NO is then swept into a chemiluminescence analyzer and the resulting signal recorded. Typical injection volumes range from 1 to 100 L with a sensitivity approaching picograms.

4:00 pm, ENV-26C Speciation and Determination of N-Nitrosodimethylamine and NO_x Species in Ambient Air. M.S. THOMSON AND R.S. BRAMAN, Department of Chemistry, University of South Florida, Tampa, FL 33620. Recently there has been an increased interest in the quality of indoor air and its components. Of particular concern are volatile compounds which are either known or potential carcinogens, such as the nitrosamines. A method has been developed to speciate and quantify N-Nitrosodimethylamine in the presence of other NO_x compounds. Volatile nitrogen compounds are preconcentrated on a series of specially coated hollow tubes and each tube selectively absorbs a compound of interest. Sample determination is achieved by thermal desorption followed by conversion to NO which is then passed to a conventional chemiluminescence analyzer. Detector response is linear with sample size and the current detection limit is approximately 0.25 ng/sample or 0.05 ng/L for a typical ambient air sample. Preliminary ambient air analysis indicates the presence of N-Nitrosodimethylamine in concentrations in the fractional to low nanograms/L range which is consistent with results published using other methods. Representative calibration data and typical ambient air analyses will be presented.

4:15 pm, ENV-27C Trace N-nitrosamines in Environmental and Biological Materials. MITCHELL F. KATZ AND ROBERT S. BRAMAN, Department of Chemistry, University of South Florida, Tampa, FL 33620. The coincident presence of secondary amines and nitrogen oxide compounds can result in the formation of N-nitrosamine (NA) compounds. These compounds are characterized by their high carcinogenicity. Detection of these compounds requires highly sensitive and specific analytical methodology. Such a methodology has been developed using a chemiluminescence analyzer and the appropriate reduction chemistry. In addition to NA analysis the method also offers quick reliable analysis for nanogram amounts of nitrite. Detection limits for the method are near 0.1 ng/sample.

FLORIDA COMMITTEE ON RARE & ENDANGERED PLANTS & ANIMALS

Friday, March 26, 1993, 8:30 am - 11:00 am, Room SHC-102
Paul Moler, Florida Game and Freshwater Commission, Presiding

8:30 am, REB-1 The Gulf Coast Smooth Softshell in Florida. P.E. MOLER, Florida Game and Fresh Water Fish Commission, 4005 South Main Street, Gainesville, FL 32601. The Gulf Coast smooth softshell, *Apalone (=Trionyx) mutica calvata*, has previously been reported from Florida based on a series of specimens collected from the Escambia River in 1953-54. No subsequent records have been reported. Visits to the upper Escambia

River in May and June, 1992, confirmed the continued occurrence of the Gulf Coast softshell in Florida, extended its known range southward in the Escambia River, and provided additional information on its natural history.

8:45 am, REB-2 Site Fidelity of the Florida Green Turtle at the Archie Carr National Wildlife Refuge. STEVEN A. JOHNSON, University of Central Florida, Department of Biology, FL 32816. Site fidelity of nesting *Chelonia mydas* was studied at Melbourne Beach, Florida, during the summers of 1991 and 1992. Nightly surveys were conducted for nesting green turtles along the 12 km study site. At first capture each turtle was marked with two monel metal tags after egg deposition was complete. The locations of initial capture and all recaptures were recorded for each individual. Locations to the nearest 0.1 km were taken using previously determined, fixed landmarks. During 1991, 26 green turtles were encountered two or more times, for a total of 96 captures and recaptures. For 1992 these values were 82 and 291, respectively. These data were used to analyze site fidelity within and between individuals. Given the extreme degree of fidelity exhibited by many of the turtles, celeritous acquisition of all proposed Carr Refuge property seems to be one of the most expedient measures toward eventual recovery of the Florida green turtle.

9:00 am, REB-3 Notes on the Occurrence of *Liguus fasciatus* (Muller) in a Coastal West Indian Hardwood Hammock on Horr's Island--Collier County, Florida. CHARLES M. COURTNEY (1), BEVERLY COURTNEY, JILL JOHNSON (2), (1) Environmental Protection Commission of Hillsborough County, 1900 9th Avenue, Tampa, FL 33605, (2) University of Florida, Gainesville, FL 32611. Horr's Island's unique archaeological and historical resources as well as its diverse vegetative assemblage are described as a setting for the recovery plan for this endangered species. A particular coastal hardwood hammock at the north end of the island was approved for the development of a bridge, necessitating the relocation of an entire population. Statistics which were recorded on a number of variables during the relocation and the results include: 946 *Liguus* collected, the majority on Jamaican dogwood, marlberry, Spanish stopped, gumbo limbo, and myrsine; size/frequency showed a bimodal distribution with peaks in the 10-20 mm and 40-50 mm categories and an average size of 30.5 mm; 40% (each) were found between 0-5 ft. and 5-10 ft. above the ground with decreasing abundance at higher elevations to a maximum height of 27 ft.

9:15 am, BREAK

9:30 am, REB-4 Regional Wildlife Habitat Planning in the Tampa Bay Region. J.W. BEEVER III, Florida Game and Fresh Water Fish Commission, 29200 Tuckers Grade, Punta Gorda, FL 33955. The need for regional wildlife habitat planning is critical in the Tampa Bay region because of high rates of growth and habitat removal. The commitment to regional wildlife habitat planning in order to help maintain regional listed species viability and biodiversity has been adopted in Goal 10 of the Tampa Bay Regional Comprehensive Plan and in many local government comprehensive plans. The plan includes the ground-truthed identification and protection of large preserves linked by coastal, riverine, and large mammal wildlife corridors utilizing a variety of wildlife biology tools. Implementation

techniques to protect identified wildlife habitat include regulatory techniques, acquisition programs, and incentive programs. The difficulties of establishing the plan include resolving multiple use conflicts, the applicability of conservation biology theory to real world situations, and the need for accurate, basic information on regional biology.

9:45 am, REB-5 Burrow Use by the Florida Mouse in South-central Florida. J.N. LAYNE AND R.J. JACKSON, Archbold Biological Station, P.O. Box 2057, Lake Placid, FL 33852. The Florida mouse (*Podomys floridanus*) is one of several vertebrates narrowly restricted to xeric upland habitats in Florida. Although it appears to be an exclusive burrow dweller, detailed knowledge of its homesites is lacking. Eighteen individuals radiotracked in several xeric vegetation types on the Archbold Biological Station used gopher tortoise (*Gopherus polyphemus*) burrows exclusively. Most presumed nest locations were inside passages off the main tunnel. Female nest sites tended to be farther from the main tunnel and farther from the burrow entrance than those of males. In an earlier study in the same area, cotton mice (*Peromyscus gossypinus*) also used tortoise burrows extensively. Competition between the two species for nest sites is presumably reduced by the tendency for Florida mice to nest inside tunnels while cotton mice nest in the main burrow.

10:00 am, REB-6 A Disjunct Population of *Pseudotriton montanus floridanus* and Other Amphibian Records from Central Florida. L.M. EHRHART AND R.D. OWEN, University of Central Florida, Orlando, FL 32816. The salamander family Plethodontidae is a temperate-adapted group whose species richness declines markedly from north to south in Florida. Southern range termini for many Florida forms occur near mid-peninsula but most are poorly defined. *Pseudotriton montanus floridanus* is known as far south as Alachua Co., except for a single problematic record from Seminole Co. We report the occurrence of *P.m. floridanus* in Orange Co., in a semi-isolated wetland known locally as the MacKay Tract. Eleven metamorphs (mean SVL=47.0 mm) and nine larvae (mean SVL=30.4 mm) have been collected over the past 20 years. Associated with the *Pseudotriton* are populations of *Pseudacris crucifer*, and *Rana clamitans*, both at or near the southern limits of their ranges. We also report *P.m. floridanus* records from eastern Marion and eastern Lake Counties.

10:15 am, REB-7 The Enigmatic Gulf Hammock Dwarf Siren. P.E. MOLER, Florida Game and Fresh Water Fish Commission, 4005 South Main Street, Gainesville, FL 32601. The Gulf Hammock dwarf siren, *Pseudobranchius striatus lustricolous*, was described by W.T. Neill in 1951 based on 11 specimens from localities in Levy and Citrus counties. It has not been recorded since. Both the narrow-striped dwarf siren, *P. axanthus*, and the slender dwarf siren, *P.s. spheniscus*, have been collected within the reported range of *P.s. lustricolous*, and the taxonomic relationship of *P.s. lustricolous* remains problematic. Information available on the Gulf Hammock dwarf siren will be summarized.

10:30 am

SECTION MEETING

Paul Moler, Florida Game and Freshwater Commission, Presiding

GEOLOGY AND HYDROLOGY

**Friday, March 26, 1993, 2:00 pm - 4:15 pm, Room FO-114
Donald W. Lovejoy, Palm Beach Atlantic College, Presiding**

2:00 pm, GHY-1 Anthropomorphic Impacts to Freshwater Inflow to Tampa Bay, Florida, with respect to Nonpoint Source Pollutant Loading. H.W. ZARBOCK, D.L. WADE AND A.J. JANICKI, Coastal Environmental, Inc., 9500 Koger Blvd., St. Petersburg, FL 33702. Tampa Bay's freshwater inflow regime has a profound effect on ecological elements in both the bay and its tributaries. Recent modeling and statistical work, funded by the Tampa Bay National Estuary Program has provided new evaluations of current and historical freshwater inflow budgets to the bay, with emphasis on refining flow estimates from ungaged areas. These data have been used to help develop total pollutant loading to the bay. Point sources, gaged and ungaged streamflow, precipitation and groundwater all contribute to the freshwater budget for this important estuary. Using a Geographic Information System-based modeling system, these inputs can all be addressed without the massive unique data requirements of some other modeling methods. In addition, estimates of historical flows to Tampa Bay under relatively undeveloped conditions have been made. Current and historical loadings can be compared to determine potential pollutant load reduction goals.

2:15 pm, GHY-2 O-18 Composition of Various Water Types in the Hydrological Cycle of West-Central Florida. T. NETRATANAWONG, Marine Science Department, University of South Florida, St. Petersburg, FL 33701. Oxygen-18 (O-18) content is an intrinsic, chemically stable property of water, which can be used to characterize water types and to estimate mixing, exchange, and evaporation processes. Previous studies of O-18 composition in water suggested that rainwater was a major source for deep ground water. Water in the upper Floridan (deep) aquifer (mean $\delta^{18}\text{O} = -4.1$ o/oo). A transect study of upper Floridan aquifer from recharge area to coastal discharge area suggests the occurrence of 2 distinct end members, i.e. recharged water from the Green Swamp and coastal seawater. This mixing pattern suggests an effect of salt-water intrusion in the south Hillsborough County onto the freshwater aquifer. Further studies of evaporation process and atmospheric-water vapor relationship, together along with previous studies, will help in modeling the water balance in the area.

2:30 pm, GHY-3 Collier County's Ground Water Quality Protection Programs. C.G. GIBSON, Pollution Control Department, Collier County Government, 3301 E. Tamiami Trail, Naples, FL 33962. Collier County currently implements several ground water quality monitoring programs whose primary goal is to provide technically sound information from which to make decisions regarding protecting ground water quality. These programs include: the Trend and Random Ground Water Quality Monitoring projects, which monitor selected wells on a quarterly and monthly basis respectively; operating the quarterly Temporal Variability and annual Background Network monitoring networks under contract

with FDER; and maintaining monitoring wells at the County's solid waste and domestic sludge land disposal sites. Implementation of the County's Ground Water Protection Ordinance and Well Construction Code provide regulatory criteria for land use activities and well construction that could contaminate the ground water.

2:45 pm, GHY-4 **The Underground Flow Path of the Santa Fe River in O'Leno State Park.** R.A. HISERT, Department of Geology, University of Florida, Gainesville, FL 32611. The Santa Fe River crosses a soluble group of Eocene limestones which comprises the upper Floridian aquifer. As it enters this karstic region it disappears as it enters O'leno Skin, travels 5km underground and rises again to form a surface stream. Along this 5km reach of the river numerous karst features provide an indication of the river's approximate subterranean route. To determine which of these karst features are connected to the underground river, a geochemical tracing experiment, and temperature and major cation analysis study was performed in the area. The results show that the man-made geochemical tracer, SF₆, is a successful tracer in karstic terrane and that simple measurements of water temperature and cation concentration can be very useful in distinguishing between different water sources.

3:00 pm, GHY-5 **Basement Features of the Floridan Plateau Delineated from Digitally Filtered Bouguer Gravity Anomaly Maps.** K.M. LORD, University of Florida, Department of Geology, Gainesville, FL 32611. A Bouguer gravity anomaly map of the Floridan Plateau was digitized on a 9 km grid and various digital filters were applied to produce an enhanced series of maps which suggest a modification of previous basement models. When interpreted with drill hole and offshore seismic reflection data, the distribution of Paleozoic lithotectonic units under northeast Florida is well constrained and the Mesozoic extensional features of the southwestern half of the plateau are clearly delineated. A prevailing feature which divides the plateau and has strongly influenced its evolution is the Jay Fault zone, a probably Paleozoic right-lateral strike-slip boundary, segments of which were reactivated during the Mesozoic to accommodate differential vertical movement related to extension.

3:15 pm, GHY-6 **Paleontological Reconnaissance of the Quartz Sand Subfacies of the Miami Limestone in Palm Beach County, Florida.** RICHARD A. JOHNSON, Independent Geologist, P.O. Box 3560, Tallahassee, FL 32315. Four samples from two exposures of Miami Limestone oolitic quartz sand subfacies in southeast and eastcentral Palm Beach County, southeastern Florida, yielded a total of 34 species of mollusks. The fauna is predominantly dwarfed and/or immature and almost exclusively molluscan. Common species include: Cerithium muscarum, Olivella mutica, Nassarius vibex, Modulus modulus, and Bulla occidentalis (gastropods); and Chione cancellata, Transennela conradina, Laevicardium mortoni, Loripinus chrysostomas, Anomalocardia caloosana, and Codakia orbiculata (pelecypods). Seventy-five percent of the mollusk species recovered from all four beds of the Miami quartz sand subfacies are characteristic of the type Coffee Mill Hammock Marl Member of the Fort Thompson Formation in Glades and Hendry Counties, southcentral peninsular Florida. This suggests that the Miami Limestone is correlative with

the uppermost portion of the Fort Thompson Formation, the Coffee Mill Hammock Marl Member.

3:30 pm, GHY-7 North Carolina's Late Precambrian Fossils. G.G. GIBSON, Pollution Control Department, Collier County Government, 3301 E. Tamiami Trail, Naples, FL 33962. The Carolina Slate Belt in North Carolina is composed of several thousand meters of late Precambrian metavolcanic and metavolcanosedimentary units. In some areas, original sedimentary features are preserved along with fossil evidence of late Precambrian marine life. The fossil assemblages include the body fossils *Pteridinium* and *Vermiforma*, representatives of the Ediacarian fauna. Several genera of ichnofossils have been described from strata of Stanly County, NC. These include such genera as *Planolites*, *Neonerites*, *Syringomorpha*, and *Gordia*. The significance of these fossils is that they provide corroboration for interpretations of depositional environments, *Pteridinium* provides intercontinental biostratigraphic correlation, and they were the basis of several earth science teacher enhancement workshops.

3:45 pm

SECTION MEETING

Donald W. Lovejoy, Palm Beach Atlantic College, Presiding

MEDICAL SCIENCES

Friday, March 26, 1993, 2:00 pm - 4:15 pm, Room DM-103

A.M. Dhople, Florida Institute of Technology, Presiding

2:00 pm, MED-1 Role of Iron in Host-Parasite Interaction During Chronic Infections. MARIA A. IBANEZ, ARVIND M. DHOPLÉ AND TIMOTHY C. POIRIER, Department of Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901, and Holmes Regional Medical Center, Melbourne, FL 32901. For efficient metabolism and growth of plants, protists, and animals, appropriate qualitative and quantitative balances of essential metallic ions are required. It is becoming increasingly evident that the ability of a microbe to compete successfully with the host for iron is an important factor in the establishment of many bacterial infections. In order to evaluate the role of iron, supplemented with animal fat, on the fate of bacteria causing chronic infections, *Mycobacterium lepraemurium* (causative agent of murine leprosy) infection in mice, as a model for tuberculosis and MAC infections in AIDS patients, was studied. Data will be presented to demonstrate that both in mice and in in vitro culture system, iron enhances the infection process and bacterial growth. Furthermore, supplementing iron with beef fat further hastens the infection rate, as well as increases the bacteria mass during systematic infections. The extent of infection is directly related to percent saturation of iron in serum.

2:15 pm, MED-2 Isolation and Partial Characterization of Allergenic Components of Grass and Tree Pollens. S.HUNTER, M.J. SWEENEY, Ph.D., R.S. WHITE, Ph.D., AND S.D. KLOTZ, M.D., Department of Molecular and Microbiology, University of Central Florida, Orlando, FL. Unique as well as crossreactive allergenic components of pollen extracts of two trees, Callistemon citrinis (bottlebrush) and Melaleuca leucadendron (melaleuca), and the grass pollen, Paspalum notatum (Bahia) were isolated and identified using SDS-PAGE, Isoelectric focusing (IEF), Rast Inhibition and Western Blotting. The complex pollen extracts were separated into 20 individual fractions using the Rotofor preparative IEF cell. The fractions obtained from each of the three extracts were analyzed by SDS-PAGE. This revealed that several proteins had been isolated from each mixture. Intradermal skin testing was used to identify which fractions contained allergenic components. Further characterization of fractions containing allergenic components was performed using western blotting and rast inhibition.

2:30 pm, MED-3 Isolation of Mycobacteria from Water Samples. ALBERTO E. PAZ, MARIA A. IBANEZ AND ARVIND M. DHOPLE, Department of Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901. Non-tuberculous mycobacteria are increasingly implicated in human diseases, particularly in immunocompromised patients. The organisms are widely distributed in nature, including soil and water. They are comparatively resistant to chlorine, so piped water supplies are a potential source of human infection. Studies were undertaken to determine the effects of various decontaminating agents on M. avium and also on the recovery of M. avium from water sources. With pure M. avium cultures, Nahypochlorite was found to be the most lethal to bacteria, followed by sulfuric acid and hydrochloric acid. In the recovery experiments, cetylpyridium chloride was most effective in killing the S. aureus in water samples, with maximum recovery of M. avium; however, SDS-OH was proved to be the least efficient in decontaminating the water sample prior to isolation of M. avium.

2:45 pm, MED-4 Immunization of Sheep Against the Human Recombinant Inhibin α -Subunit. D.W. WASHINGTON (1), J.K. VOGLMAYR (2), M. MIZUMACHI (3), (1) University of Central Florida, Orlando, FL 32816, (2) Universitat Gottingen, Federal Republic of Germany, (3) Azuma 2-Chrome, Tsukuba-City, Iaragi, Japan. Adult Suffolk rams and Rambouillet ewes were immunized four times against the human recombinant inhibin α -subunit over a period of 80 days. Ram blood samples were collected at weekly intervals and serum levels of follicle stimulating hormone (FSH), luteinizing hormone (LH), and testosterone were determined by radioimmunoassay procedures. Blood was collected from the ewes before and after ovulation. Ovulation rates were determined by laparotomy, beginning on day 87, Estrous cycles were synchronized by means of vaginal protestagen sponges. The ewes were reexamined after synchronization. This work was performed in the laboratory of Dr. J.K. Voglmayr, Florida Institute of Technology, Melbourne, and was supported by NIH Grants HD-22625 (to J.K.V.) and DK-3449 (to C.-L.C.).

3:00 pm**SECTION MEETING****A.M. Dhople, Florida Institute of Technology, Presiding****PHYSICS AND SPACE SCIENCE****Friday, March 26, 1993, 8:00 am - 10:30 am, Room SE-102****SESSION A****Bobbie Himes, Edgewater High School, Orlando, Presiding**

8:00 am, PSS-1A **Experiments Pursuant to Measuring the Duration of Quantum Tunneling.** L. ZHAO AND M.J. HAGMANN, Department Electrical and Computer Engineering, Florida International University, Miami, FL 33199. A variety of theoretical procedures and several experimental approaches have been used to determine the duration of quantum tunneling, but no consensus has been reached on this topic. We will use lasers to modulate the barrier height in the junction of a scanning tunneling microscope (STM) by the electric field of light. Theory suggests that tunneling has two distinct regimes in respect to frequency, the crossover between them occurring when the angular frequency of the modulation equals the reciprocal of the traversal time. The STM built for these measurements has decreased noise and improved stability. Our calculations suggest that a 670 nm laser diode at a power density of 100 mW/cm^2 will reduce the tunneling current, which is contrary to most phenomena caused by laser illumination.

8:15 am, PSS-2A **Computation of Distributions for the Duration of Quantum Tunneling.** M.J. HAGMANN, Department Electrical and Computer Engineering, Florida International University, Miami, FL 33199. A variety of theoretical procedures has been used to determine tunneling times with differing results. Most give definite values for a specific problem, which appears inconsistent with the statistical nature of quantum phenomena. We model tunneling on the basis of fluctuations permitted by the uncertainty principle. Numerical simulations are made by calculating the traversal time and action for a large number of velocity profiles. Distributions of traversal time are determined by assuming that the probability of each profile decreases exponentially with the action of the fluctuation it requires. For opaque (highly reflecting) barriers the distributions are leptokurtic and centered at the semi-classical value. The distributions are platykurtic (broad) for small barriers, and more difficult to evaluate due to slower convergence.

8:30 am, PSS-3A **Solution of the Waveguide Problem by a Method Based on the Integral Definition of the Curl Operator.** G.T.S. PESSOA AND M.J. HAGMANN, Department Electrical and Computer Engineering, Florida International University, Miami, FL 33199. At least 17 different numerical procedures have been used with the waveguide problem. We have developed a new method which is particularly suitable for waveguides having cross-sections of general shape, containing media with inhomogeneous dielectric and magnetic properties. Our method is based on the integral definition of the curl operator, and

uses basis functions consisting of the value of the electric field parallel to each edge of a subvolume, at the midpoint of the edge. Both Rutishauser's method and the inverse power method have been used to find the eigenvalues. We have calculated the cutoff frequency and field patterns for the lowest mode in waveguides of triangular, trapezoidal, and hexagonal cross-sections, and the results are consistent with known solutions.

8:45 am, PSS-4A **Functional-Integral Studies of Strongly Correlated Fermions.** A.F. DeLIA, Department of Physics, University of Central Florida, Orlando, FL 32816. Functional-integral techniques are used to study the Hubbard model, the t-J model, and the t model (with constraint) of strongly correlated fermion systems. Recent advances in the study of the Hubbard and t-J models exploit the concept of pseudo-fermions: fermions whose spin quantization axis varies from point to point in space and time. By mapping the real fermions into these pseudo-fermions, SU(2) invariance of the system is preserved and massive fluctuations about the saddle points is avoided. For these models a sampling method is introduced to evaluate the contribution of various spin configurations to the partition function in a 2D lattice. In the case of the constrained t model, promising results have been obtained which suggest that the system can be evaluated in terms of spinless fermions. For this case, a path integral formulation is outlined for general spin degeneracy of the fermions on the lattice and a suggestion is made on how to recover the $N = 1$ (spinless fermion) limit.

9:00 am, PSS-5A **Femtosecond Pulse Generation in a Ti:Sapphire Laser at Extended Wavelengths.** C.R. BOGUSCH, P. BEAUD, P. WIGLEY, AND M. RICHARDSON, CREOL, University of Central Florida, Orlando, FL 32826. A novel method of mode-locking Ti:Sapphire lasers is examined which will allow femtosecond (10^{-15} seconds) pulse generation at the extreme of the laser's gain bandwidth. Cadmium Sulfide (CdS), a semiconductor crystal, is used as an additional Kerr lens element initiating mode-locking with less intracavity flux than is needed for Ti:Sapphire alone. Kerr lens mode-locking (KLM) theory and design considerations for KLM lasers are discussed. The optical properties of semiconductors, particularly CdS, will be described, and experimental results achieved using this method presented. This work is supported by the State of Florida and Schwartz Electro-Optics.

9:15 am, BREAK

9:30 am, PSS-6A **Coulomb Explosions in Fullerenes.** A.F. DeLIA (1)(2), M.C. RICHARDSON (1)(2), AND P. BEAUD (1), (1) Center for Research in Electro-Optics and Lasers, 12424 Research Parkway, Orlando, FL 32826, (2) Department of Physics, University of Central Florida, Orlando, FL 32816. A proposal is made for using unique characteristics of the Laser Plasma Lab's (LPL's) ultra-high intensity laser to induce extreme and nearly complete ionization of members of the fullerene family. Such induced ionization will occur on the time scale of hundreds of femtoseconds and will produce an anisotropic burst of highly relativistic electrons followed by a more symmetric expansion of complete and partially ionized Carbon ions. Using various detector systems, the momentum distribution of the ejected electrons and Carbon nuclei can be mapped. Dynamics of these coulomb explosions will be predicted and potential insights of various features of the fullerene structures gained by such studies will be suggested.

9:45 am, PSS-7A Ambient Pressure Synthesis and Study of the "1212" High T_c Superconductor $\text{GaSr}_2\text{Ca}_x\text{Y}_{1-x}\text{Cu}_2\text{O}_7$. T. CZARNIAK, NSF-REU Fellowship, Florida State University, Center for Materials Research and Technology, Department of Physics, Tallahassee, FL 32306. The compound series $\text{GaSr}_2\text{Ca}_x\text{Y}_{1-x}\text{Cu}_2\text{O}_7$ ($0.1 < x < 0.5$) was synthesized using the standard solid state reaction technique and was tested for superconducting properties. The samples were annealed in air, oxygen, nitrogen and argon atmospheres in an attempt to study the effects of the annealing conditions on the superconducting transition temperature. Measurements of magnetic susceptibility and resistivity showed no signs of superconducting transition down to 5K in the air, argon, and nitrogen annealed samples. Anomalies were observed between 5K and 60K in the electrical resistivity data of the O_2 annealed samples, but no indisputable evidence for a superconducting transition was apparent in the ac susceptibility data.

10:00 am, PSS-8A Kronig-Penney Models for Band Structure of Superlattices. H.K. YEUNG AND J.D. PATTERSON, Physics and Space Sciences Department, Florida Institute of Technology, Melbourne, FL 32901. A superlattice consists of alternating layers of epitaxial materials. The best known example is layers of GaAs/AlGaAs. The conventional Kronig-Penney model is suitable for describing the energy bands inside a periodic arrangement of potential wells. We make use of the boundary conditions from Bastard to solve for the allowed "mini" bands in superlattices in the Kronig-Penney like approximation and also in a newer formulation due to Cho and Prucnal. Our results are compared to experiment and simulation of the Schrodinger equation by the Numerov method.

10:15 am, PSS-9A A Study of Classically Forbidden Mass Ratios for Charge Transfer. P.R. SIMONY, E.J. WELTON, AND J. GERKEN, Jacksonville University, Jacksonville, FL 32211. The application of energy and momentum conservation laws to three particle scattering has resulted in a classical two step model for charge transfer. The quantum mechanical version of this two step model has been found to be in good agreement with experimental results. The projectile/target mass ratios for which the classical two step model is forbidden have been determined for the general case of collisions in which the particles exchange mass. Recent quantum mechanical calculations indicate an expected but interesting structure at the forbidden region boundary.

10:30 am

SECTION MEETING

Bobbie Himes, Edgewater High School, Orlando, Presiding

Friday, March 26, 1993, 2:00 pm - 5:15 pm, SE-202

SESSION B

Bobbie Himes, Edgewater High School, St. Orlando, Presiding

2:00 pm, PSS-10B Retrieval of Mesospheric Atomic Oxygen: I. Modelling $\text{O}(^1\text{S})$. J.J. LEKO AND H.K. RASSOUL, Florida Institute of Technology, Melbourne, FL 32901. Atomic oxygen plays a fundamental role in the photochemistry of most mesospheric constituents, however, currently no reliable remote sensing technique exists to retrieve

profiles of mesospheric O. One manner in which to monitor this concentration is to observe the intensity of the green line (5577Å) of oxygen in the mesosphere, and statistically fit it to a modelled intensity based on a set of known chemical reactions. The fitting procedure results in an extracted concentration of atomic oxygen. In this paper, we report our efforts on the modelling of mesospheric 5577Å from the Chapman reaction ($O + O + M \rightarrow O_2 + M$). The recent ATLAS-1 ISO observations provide the dataset necessary for comparison between the modeled values and the measured intensities.

2:15 pm, PSS-11B Thermosphere-Ionosphere Coupling: Neutral Winds-HmF2 Relation. FANGHWA CHIU AND H. RASSOUL, Physics and Space Science Department, Florida Institute of Technology, Melbourne, FL 32901. The measurement of upper atmospheric neutral winds is valuable in any study of the earth's ionosphere-thermosphere coupling. The neutral wind affects many of the observable quantities and physical processes of the ionosphere, including the density profile of the ionospheric F region, the generation and maintenance of ionospheric electric fields. Wind measurements on a global scale are difficult to make, and the existing data base is sparse, especially in the southern hemisphere [Hedin et al, 1991]. Richards et al [1991] presented a new technique of determining meridional thermospheric winds from measurements of the height of the maximum electron density in the F2 layer (HmF2). The technique is based on the approximately linear relationship between changes of neutral wind speed (U) and variation of the height of F2 layer (h). The relationship can be written as $\Delta h = \alpha \Delta U$ where α is a constant for a given site and a given time. However, α is expected to change (by unknown %) with latitude, season, solar activity (F10.7 dependency), and geomagnetic activity (Ap dependency). The purpose of our study is to investigate variations of α with each of the above geophysical parameters. We use different sets of geophysical parameters, an atmospheric model (FLIP), and an ionospheric model (IRI) to derive h and U and calculate α . We use the Factorial Designs method to analyze the dependency of α on combinations of changes. Knowing the exact variation of α , one can derive upper atmospheric winds on a global scale.

2:30 pm, PSS-12B Collimation of X-Rays through Glass Pipes. E.V. SCHNETZER AND M.C. RICHARDSON, CREOL/UCF, Orlando, FL 32826. Many important potential applications for X-Rays in industry today depend on the capacity for X-Rays to be collimated or focused. Refractory materials used to make lenses, etc. in the optical region, unfortunately are fully absorbing at X-Ray wavelengths. One useful property of X-Rays is that they exhibit total external reflection for angles less than some critical angle of reflection. This angle is on the order of one degree. Thus, when X-Rays are directed into a capillary tube such that the angle of reflection is less than this "critical angle," the X-Rays could be redirected theoretically without loss. We report some initial experiments on a technique for collimating and focusing X-Rays using this property in this approach.⁽¹⁾ Bundles of fine, precision glass capillaries are used to collect X-Rays from a laser-induced plasma source to form a collimated or focused X-Ray beam. (1) D. Mosher and S.J. Stephanakis, "X-ray light pipes," Applied Physics Letters, Vol 29, No. 2, July 15, 1976. This work is supported by the State of Florida.

2:45 pm, PSS-13B **A New Observatory at the University of Central Florida.** L.D. BRADLEY II, A.F. DeLIA, AND R.L. VOOR, Department of Physics, University of Central Florida, Orlando, FL 32816. At the University of Central Florida, a 26-inch optical telescope is being refurbished and placed in a new observatory on campus. A short history of the telescope is presented along with a description of the instrument and the observatory facilities. The planned use and operation of the observatory site and the surrounding regions will be described as well as the impact of the telescope on local astronomy.

3:00 pm, PSS-14B **White Dwarf Stars in Wide Binary Systems: Useful Probes of Stellar and Galactic Evolution.** T.D. OSWALT, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. We present an overview of our observational study of several hundred Luyten common proper motion binaries (CPMBs) suspected of containing degenerate stars, with special emphasis on the determination of the: (1) gross spectroscopic properties of the CPMB sample; (2) gravitational redshifts and masses for several hundred newly identified WDs; (3) space motions and population membership of the CPMB sample; (4) luminosity functions for the cool white dwarf and main sequence components; and (5) orbital evolution history of CPMBs as a probe of post-main sequence mass loss and Galactic structure.

3:15 pm, BREAK

3:30 pm, PSS-15B **Radial Velocities and Gravitational Redshifts for White Dwarf Stars in Common Proper Motion Binary Systems.** J.A. BARKER, Florida Institute of Technology, Department of Physics and Space Science, Melbourne, FL 32901. Common Proper Motion Binary Systems (CPMBs) composed of one Main Sequence (MS) and one White Dwarf (WD) component provide a way to determine the gravitational redshift for the WD star. The net redshift for the spectral features of WDs are caused by two separate phenomena, the Doppler shift and the gravitational redshift. The radial velocity of the system is determined from the spectrum of the MS star, this can then be removed from the net redshift of the WD. The radial velocities of these systems are determined as well as gravitational redshifts. We have observed 42 pairs in our CPMB sample with echelle spectroscopy to determine the radial velocities and gravitational redshifts. The gravitational redshifts are used to estimate the masses of the WDs which have radius determinations available. The system radial velocities are used to determine space motions when photometry is available for the system. This work supported by National Space Foundation grant AST-9016284 to Florida Institute of Technology.

3:45 pm, PSS-16B **Stellar Spectroscopic Classification through the use of Neural Networks.** T.L. BECK, Florida Institute of Technology, Department of Physics and Space Science, Melbourne, FL 32901. An automatic classification system for stellar spectra using a hierarchical back-propagation neural network has been developed. The architecture consists of 8 separate neural nets, where the output from the first net determines which of the other 7 nets will be used. Each of the other 7 nets corresponds to one of the main color classes (O B A F G K M). These 7 "subnets" determine the subclass and luminosity

classification of the star (0 to 9). The time required for training varied from 2 to 45 hours on the Harris Night Hawk computer (running at 20 MIPS). The training spectra were taken from A Display Atlas of Stellar Spectra by Bruce Margon, University of Washington, and the Common Proper Motion Binary (CPMB) project database described by Oswalt et al, 1991. Spectral classification of these training patterns was found in the literature or provided by the SIMBAD database operated at CDS, Strasbourg, France. The network was then tested with the training data and other spectra from the CPMB database. This work was supported by National Science Foundation grant AST-9016284 to Florida Institute of Technology.

4:00 pm, PSS-17B Investigation of Color Indices for White Dwarfs in Wide Common Proper Motion Binaries (CPMB). S.R. SHUFELT, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. We have compared the "b-v" color indices extracted from our survey spectra to the Jacoby, Hunter, and Christian (1984) and present the dereddened "b-v" as a function of spectral class. We find our main sequence objects are slightly bluer than the standards, suggesting that a significant fraction of our CPMB sample belongs to the very old disk and/or halo population. This work was partially supported by the National Science Foundation grant AST-9016284 to the Florida Institute of Technology.

4:15 pm, PSS-18B White Dwarfs in Wide Common Proper Motion Binaries and the Age of the Galactic Disk. A.A. SIMON, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. In studying in common proper motion binaries, we have obtained photometry for many of the degenerate components found in our survey. The finite age of the galactic disk leads to a limiting absolute magnitude in the observed white dwarfs (Winget, et al). With color and radial velocity measurements to determine population membership, the age of the galactic disk and possibly the galactic halo can be determined by the limiting magnitudes of the respective white dwarf populations. This work was partially supported by the National Science Foundation grant AST-9016284 to the Florida Institute of Technology.

4:30 pm, PSS-19B Photometric Parallax Determinations for a Sample of White Dwarfs in Common Proper Motion Binary Systems. J.A. SMITH, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. We are currently studying a sample of over 500 common proper motion binary star systems suspected of containing a White Dwarf (WD) component. These WDs are crucial to studies of Galactic evolution as they can be used to set limits on the age of the Galactic disk. The first step in deriving a Luminosity Function for these stars involves determining the distances to them. Results for approximately 100 pairs will be presented and compared with trigonometric parallax determinations from the U.S. Naval Observatory parallax program. This work was partially supported by a Sigma Xi Grant-in-Aid of Research 9203 to J.A. Smith and National Science Foundation grant AST-9016284 to the Florida Institute of Technology.

4:45 pm, PSS-20B Washboarding, Fogbows, and Video Feedback: A Review of the Phenomena. R.W. LOWRIE, Dade Design and Engineering, Inc., 1010 Lowrie Lane, Dade City, FL 33525. Road tests were run to determine the causes of washboarding on sand roads. Results show washboarding to be proportional to tractive force with a period proportional to speed. The fogbow is a colorless band of brightening of the fog seen under rainbow conditions. If a video camera is aimed at a TV screen and the video output is fed back to the TV, a series of continually changing patterns appear.

5:00 pm, PSS-21B UHV-MOCVD Growth and In-Situ Analysis of Epitaxial Titanium Oxide Thin Films. SAM CHEN (1), M.G. MASON (1), H.J. GYSLING (1), G. PAZ-PUJALT (1), T. CASTRO (2), K.M. CHEN (2), C.P. FICTORIE (2), W.L. GLADFELTER (2), A. FRANCIOSI (2), P.I. COHEN (2) AND J.F. EVANS (2), (1) Corporate Research Labs, Eastman Kodak Company, Rochester, NY 14650, (2) Center for Interfacial Engineering, University of Minnesota, Minneapolis, MN 55455. In a two chamber ultra high vacuum system TiO_2 thin films have been deposited on a variety of single crystal oxide substrates, over a growth temperature range of 250-800 C, using titanium (IV) isopropoxide as the metal organic precursor. In-situ thin film analysis by Auger electron spectroscopy and reflection high energy electron diffraction show that the resulting films are high in crystalline quality and contain negligible carbon contaminating species.

5:15 pm, PSS-22B Scanning Tunneling Microscopy of Mercury Cadmium Telluride. R. FRIEDFELD, Florida Institute of Technology, Melbourne, FL 32901. A Scanning Tunneling Microscope (STM) is constructed and calibrated for operation in air. Electrically conductive materials are successfully imaged with atomic scale resolution. Of particular interest is the ternary alloy Mercury Cadmium Telluride (MCT) which is a popular material for use in I.R. detectors with good response for (8-12) μm wavelengths at 77K. These images are important in the characterization of defect structures commonly found in terrestrially grown samples of MCT. The STM may be a good characterization tool for samples grown in orbit where defect structures can be minimized. This work was supported by the NASA/University Joint Venture (JOVE) program.

SCIENCE TEACHING

Friday, March 26, 1993, 8:00 am - 11:00 am, Room SE-218

SESSION A: Problems and Procedures

Rita A. Karpie, Brevard Community College, Presiding

8:00 am, TCH-1A How To Solve the Problem of First-Year College Chemistry Courses: Abolish the Courses. J. GOODWIN, D. GROVE, R. HUDSON, AND A. SOLI, Eckerd College, St. Petersburg, FL 33733. There exists widespread dissatisfaction with first-year college chemistry courses and they have been the subject of nationwide debates for many years. Eckerd College, with assistance from the Howard Hughes Medical Institute,

recently has decided to radically restructure its first-year chemistry program. The current courses will be deleted from the college catalog and replaced by a new set based largely on topics now taught in sophomore organic chemistry courses. This paper will take the form of an announcement and a progress report. We will review the decision to abolish the traditional courses and will describe the new program to be implemented in the fall of 1993. Lecture and laboratory schedules will be given. Advantages and disadvantages noted to date will be presented.

8:15 am, TCH-2A **General Chemistry - Content and Tests: 1958-1988.** L.B. SANDERS, Division of Mathematics and Sciences, Central Florida Community College, Ocala, FL 34478. Thirty-eight (38) colleges and universities and 19 community colleges had faculty members who had a range and breadth of tests which allowed the evaluation of (1) emphasis of content, (2) types of testing, (3) levels of difficulty of items, (4) critical thinking, and (5) problem solving skills. Most likely used texts were surveyed for the time periods involved. In spite of broad changes throughout industry both technologically and across disciplines, there were few significant changes within the content of texts and tests. Students' learning styles have changed.

8:30 am, TCH-3A **A Discussion of the Role of LeChatelier's Principle in the Determination of Strontium-90 in Milk.** J. EMS-WILSON (1) AND L. ACOSTA (2), (1) Valencia Community College, Orlando, FL 32802, and (2) HRS Department of Environmental Radiation Control, Orlando, FL 32868. The determination of radioactive strontium, one of the isotopes which might be present in milk exposed to nuclear radiation, is examined from an equilibrium viewpoint. Sample preparation and chemical analysis is described. LeChatelier's principle and the theory of acid-base equilibria are used to explain why the 21-step procedure works.

8:45 am, TCH-4A **Laboratory Based Introductory Physical Science for the Non-Science Major.** T.D. EMBRY AND D.T. LOEHR, Indian River Community College, Fort Pierce, FL 34981. The majority of Florida's four year colleges and Universities now require that all students complete a laboratory science course. The laboratory science courses which are normally available at the community college level are designed for science majors and do not meet the needs of the non-science major. In order to fulfill this need, IRCC has restructured its introductory physical science program. The restructured course covers the basics of physics and chemistry in a laboratory setting. The class meets twice a week for two hour blocks during which the concepts are discussed and examined using simple experiments. The results of the first two years of operation have shown a marked increase in student interest and a sharp decrease in the dropout and failure rate. Representative laboratory experiences in physics and chemistry will be examined.

9:00 am, TCH-5A **Putting the Oceans on the Tube: Teaching Science with Television.** ALBERT C. JENSEN, Division of Mathematics and Science, Central Florida Community College, Ocala, FL 34478. Science instructors today find they enter classrooms filled with a "plug-in generation" of students. The students have succumbed to the lure of

the TV screen and neglect reading, writing, and intellectual exercises. Instructors find that to reach these students, TV must be judiciously used in the classroom. This concept is not without its critics, however. The role of electronic technology in the college science classroom is discussed. As a case in point, our experience with an oceanography telecourse is discussed, and research in student acceptance is presented. The inclusion of TV as it affects retention is examined for science courses, and its use in other disciplines is reviewed. Suggestions are included for wise use of electronic technology in science classes.

9:15 am, BREAK

9:30 am, TCH-6A **Field Experience in Environmental Education for Pre-Service Teachers: Experiences in Reality.** R. MOHR (1), AND R.A. KARPIE (2), (1) FGFWFC, 620 S. Meridian St., Tallahassee, FL 32299, (2) Brevard Community College, Melbourne, FL 32935. The Summer Youth Conservation Camp Program at the Everglades Youth Camp is examined as an example of a cooperative venture between a state resource agency and educational institutions. The Florida Game and Fresh Water Fish Commission, Brevard Community College, and Florida Institute of Technology pooled resources to provide environmental education training and leadership skills development to future educators through hands-on experience. Summer staff recruited from pre-service education and service education programs spent nine weeks learning and practicing the art of outdoors education. Key elements included the use of Project WILD and other model environmental education materials, cooperative learning and collaborative teaching styles, drawn from David W. and Roger T. Johnson and the educational psychology theory of William Glasser. Discussion will center on the advantages and obstacles to the creation of such a program, the need for its key elements, and the lessons learned.

9:45 am, TCH-7A **Marine Data Collection at Florida Keys Community College.** WILLIAM TRANTHAM, Florida Keys Community College, Key West, FL 33040. This paper will include a lecture slide presentation of biological, physical and chemical data collected from selected sites while conducting surveys of reef, turtle grass and mangrove ecosystems during a cooperative project between Florida Keys Community College and the Naval Air Warfare Center, Key West Detachment. The data was obtained by students while taking the courses in the Marine Biology Technology Program during the past two years.

10:00 am, TCH-8A **Collection, Classification and Preservation of Marine Echinoderms of the Florida Keys for a Teaching Museum.** KENNETH HAYES, Florida Keys Community College, Key West, FL 33040. This paper will include a lecture slide presentation of the collection, classification and preservation of marine echinoderms obtained during biological surveys of selected reef, turtle grass and mangrove ecosystems during a cooperative project between Florida Keys Community College and the Naval Air Warfare Center, Key West Detachment. The collection was obtained while taking courses in the Marine Biology Technology Program during September and October 1992.

10:15 am, TCH-9A Collection of Batteries for Proper Disposal from Five Schools in Duval County. **NANETTE MADIGAN AND R. DEL DELUMYEA**, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville, FL 32211. Americans purchase \$3 billion worth of batteries annually. These portable power sources appear in such things as toys, cellular phones, electric toothbrushes, and drum-pounding bunnies. Most end up in the trash and ultimately a landfill or an incinerator. Conventional alkaline batteries contain up to 0.1% by weight mercury. The anticipated rise in use of rechargeable batteries, which contain cadmium, will result in a smaller but more environmentally harmful mass. The ACS Student Affiliate Chapter at J.U. has received an Innovative Activities Grant for a project to educate school-age students on the chemistry and hazards of batteries, and to determine how many batteries could be collected in a disposal project at five local schools whose students differ in age and demographic composition.

10:30 am, TCH-10A A Report on Attitudes on Topics of Medical and Biological Ethics. **ERNEST L. RHAMSTINE**, Valencia Community College, Orlando, FL 32802. Beginning in 1978 a questionnaire addressing ethical issues was administered to select groups of students at Valencia Community College. Student views were solicited on organ transplants, fetal tissue research, AIDS, privacy, condoms, RU-486, assisted death and related topics. A question on condom availability revealed a sub-group of students with statistically divergent attitudes on numerous issues. Demographic characteristics of sex, age, number of children, marital status, sibling group size or place of birth did not suggest a plausible explanation for the divergent views. Results from the years 1991 and 1992 are presented.

10:45 am

BUSINESS MEETING

Rita A. Karpie, Brevard Community College, Presiding

Friday, March 26, 1993, 2:00 pm - 3:45 pm, Room SE-218

SESSION B: Problems and Perceptions

Rita A. Karpie, Brevard Community College, Presiding

2:00 pm, TCH-11B Controversies, Myths and Facts Surrounding HIV & AIDS. **L.B. SANDERS**, Division of Mathematics and Sciences, P.O. Box 1388, CFCC, Ocala, FL 34478. HIV rate of infection is practically unchanged for Florida over the past 10 years; the economic impact of AIDS (U.S.) exceeds \$66 billion dollars; Florida ranks first or second in the rate of transmission of most STDs; HECAP resolves that every State educational facility will actively promote sound, accurate, relevant information ideally through (1) ALL courses and to ALL faculty, staff and students on an ONGOING basis to reduce prejudice, bigotry and to change behaviors, and (2) to facilitate similar programs by businesses. HECAP, a new program, is funded by the CDC and supported by the SDOE AND SHDRS. Implementation is with the hope that new, creative programs will produce changes in behavior, HIV infection rates, and economic impact. The science and health curricula are ideal focal points for implementation.

2:15 pm, TCH-12B Environmental Education through Service Learning. R. HENRY AND R.A. KARPIE, Brevard Community College, Melbourne, FL 32935. The role of Service Learning in the biological sciences as a mechanism for generating student involvement and enhancing academic motivation is explored. Students have been placed in volunteer positions with community organizations resulting in benefit to the student, the community, and the academic institution. The student knowledge base is expanded through learning by concrete models and by application of concepts; community interests are served through increased manpower and continued involvement; increased resource availability and enhancement of faculty/community networking benefits the academic institution. Assessment and evaluation of student learning is accomplished through use of reflective journals and seminars. Working models for implementing service learning with the science curriculum will be presented.

2:30 pm, TCH-13B Earth Science in the Elementary Grades--It Can Be Exciting! BETTY GIBSON, 26948 Piva Ct., Bonita Springs, FL 33923. By second grade or even earlier, most children have the ability and interest to grasp basic Earth Science concepts and knowledge. However, good programs are often lacking because: many teachers do not have the educational background and confidence in science; lesson plans often need adjustment to accommodate a science lesson; budgets are usually so limited that even basic supplies are not available; and few activities seem to be readily obtainable, in easily understood printed form, so teachers can gain the confidence to convey science literacy and enjoyment to their students. Activities and programs used in nine southwestern counties of North Carolina for over 5 years demonstrated that with help from scientific professionals, imagination and simple, inexpensive materials, teachers can teach exciting earth science, and that elementary students can learn concepts.

2:45 pm, TCH-14B Earth Science Teacher Enhancement Programs: A Student's Perspective and Input. J. MATTHEW GIBSON (1) AND G.G. GIBSON (2), (1) Eckerd College, St. Petersburg, FL 33733, (2) Pollution Control Dept., Collier County Government, Naples, FL 33962. Teacher enhancement programs are commonly organized with little thought given to the applicability of the material to the classroom. Student input into teacher enhancement programs during their organization, execution, and subsequent evaluation can provide a different perspective, and influence the knowledge, activities, and approaches to teaching taken back to the classroom. As a student, I participated in teacher enhancement programs that were conducted in Puerto Rico, the Appalachian Physiographic Province, and Bermuda. My input into these programs included: material covered, laboratory and field applications for the class, and ways to replace the traditional "paper activities" with hands-on laboratory/field experience.

3:00 pm, TCH-15B Photoemission Measurements of Photocathode Materials in the (115-400Å) Range. S. GRANTHAM (1), M.C. RICHARDSON (1), R. WATTS (2), T. LUCATORTO (2), C. TARRIO (2) AND F. POLLACK (2), (1) Center for research in Electro-Optics and Lasers, University of Central Florida, Orlando, FL, (2) National Institute of Standards and Technology, Gaithersburg, MD. With the intent of finding a sensitive

photocathode material in the 130Å (100eV) X-ray range for use in a high resolution x-ray photoelectron microscope, photoelectron yields of several materials (mostly alkali halides) were measured at NIST's Synchrotron Ultraviolet Radiation Facility II (SURF II). These measurements were made as a function of wavelength in the spectral range (115Å-400Å). The measured values are comparable to previous measurements of the photoelectron yields of these and similar materials, and to existing models of photoemission. We also determined the effects of prolonged exposure to X-ray light on performance. Moreover, because of the hygroscopic nature of Alkali Iodides, measurements of photoelectron yield versus wavelength were repeated for samples of CsI that were kept in storage for periods of time and samples that were exposed to air in order to determine the effects of storage time and water absorption on the photoelectron yield.

3:15 pm, TCH-16B **The AAUW Report: How Schools Shortchange Girls.** HELEN LANDERS, Chair, FL Council Education and Employment for Women and Girls, 321 Southeast Tenth Court, Fort Lauderdale, FL 33316. Purpose: To provide participants with an overview of this groundbreaking report by focusing on three perspectives of the science classroom: The formal curriculum, the classroom curriculum, and the evaded curriculum. Goal: Participants will be encouraged to bring gender awareness and equity to the science classroom. Description: The workshop will involve participants through visual aids, lecture, and discussion in the development of gender equity strategies into classroom procedures.

SOCIAL SCIENCE

Friday, March 26, 1993, 9:30 am - 11:00 am, Room FO-114
Michael Raich, J. Clifford MacDonald Center, Presiding

9:30 am, SOC-1 **Improving Human Capabilities.** WILLIAM TRANTHAM, Florida Keys Community College. This paper will include a lecture-slide presentation of students working in quality circles and applying total quality control principles to human behavioral process to improve the outcome of specific tasks. In addition, the curriculum of this course will be shared with the audience. Their goal of the course is to assist students in becoming happier, healthier, and more effective human beings.

9:50 am, SOC-2 **Training the Disabled in Light of the Americans with Disabilities Act.** MICHAEL RAICH, J. Clifford MacDonald Center, 4304 Boy Scout Blvd. West, Tampa, FL 33607. Disabled people have experienced unfair discrimination in the workplace that has taken many forms. The recent Federal legislation, the Americans with Disabilities Act is expected to significantly reduce unfair discrimination against the disabled. The present paper examines the role in an organization that training the disabled can play in providing fair employment opportunities in the organization for the disabled.

10:10 am, SOC-3 When Rewards Reduce Task Motivation and When They Don't. **MICHAEL RAICH**, J. Clifford MacDonald Center, 4304 Boy Scout Blvd. West, Tampa, FL 33607. Research has accumulated over 20 years showing that rewards can reduce, increase, or have no effect on measures of intrinsic motivation. The literature is examined and a view is presented that seeks to integrate findings. The view focuses on achievement rather than intrinsic motivation. It is proposed that factors including task appeal, reward level and contingency, and standing on an individual difference variable assessing achievement when conformity is salient affect the level of achievement motivation for a task when rewards are present.

10:30 am
SECTION MEETING
Michael Raich, J. Clifford MacDonald Center, Presiding

URBAN AND REGIONAL PLANNING

Friday, March 26, 1993, 8:15 am - 11:00 am, Room FO-120
Wayne Daltry, Southwest Florida Regional Planning Council, Presiding

8:15 am, URP-1 Interagency Data Sharing through GID for the Cockroach Bay Aquatic Preserve--Hillsborough County, Florida. **CHARLES M. COURTNEY**, Environmental Protection Commission of Hillsborough County, 1900 9th Avenue, Tampa, FL 33605. Geographic Information System (GIS) utilization is expanding at a rapid rate among government entities because it provides managers and analysts with a unique way to handle spatial and database information simultaneously for instant analyses. The greatest expenditure of public money for these types of data is in the data collection and mapping phases. This paper describes a way to magnify the impact of such expenditures by the sharing of data originally collected for one public purpose for an entirely different public use. Procedures developed by the State of Florida's Growth Management Data Network Coordinating Council are used to define issues of concern, target data for acquisition, describe the data, and transfer the data from a variety of producers to a local governmental user to aid in the protection of the Aquatic Preserve.

8:30 am, URP-2 Cooperative Watershed Management In Tampa Bay. **R.M. ECKENROD AND H.S. GREENING**, Tampa Bay National Estuary Program, 111 7th Ave. South, St. Petersburg, FL 33701. The Tampa Bay National Estuary Program (TBNEP) is a partnership of local, regional, state, and federal governments charged with drafting a comprehensive conservation and management plan (CCMP) for the restoration and protection of living resources in Tampa Bay. Point and nonpoint pollution sources from the 2,300 square mile watershed have been identified as major factors affecting the condition of living resources in the Bay. TBNEP is providing a forum in which consensus may be reached on an approach for allocating reductions in contaminants among major industries and local governments that are currently contributing pollutant loads to the bay. Specific

commitments, including timeliness and identification of funding sources and monitoring requirements, will be developed and included in the overall plan for bay management.

- * **8:45 am, URP-3** **Changes in the Age Structure of Southwest Florida's Population.** WILLIAM M. SPIKOWSKI, Spikowski Planning Associates, 1617 Hendry Street, Suite 307, Fort Myers, FL 33901. Southwest Florida, like many parts of Florida, has been a retirement haven for the past several decades. However, other age trends are also occurring, especially in the more urban communities. These trends can be examined using graphic techniques based on easily-obtainable data from the U.S. Census, and can be compared to state-wide and national trends over the same period. Examples are provided at the county level. These same techniques are transferable to smaller geographic areas for use by planners and others who need to understand local demographic changes. A typical use of this data for planning purposes is described by the author.

9:00 am, URP-4 **Review of the Historical Record of Air Quality Research in Jacksonville, Florida.** JENNIFER HOROWITZ AND R. DEL DELUMYEA, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville, FL 32211. The lung cancer mortality rate in the Jacksonville area has been found to be significantly higher than both the national and the Florida averages. The reason is popularly believed to be related to air quality. A complete inventory of studies of Jacksonville's air quality has never been available. This prompted the search for all reports, papers, and studies done on air quality in the Jacksonville/Duval County area. The term "aircheology" was given to the historical dig for information. A file has been compiled through library and computer searches and interviews with personnel from corporations, organizations, and government agencies. Between 75 and 100 documents have been obtained. These have been chronologically filed in hard copy, and put into a database for sorting and retrieval.

9:15 am, URP-5 **The Role of a Local Government in Wetlands Protection.** CHARLES M. COURTNEY, Environmental Protection Commission (EPC) of Hillsborough County, 1900 9th Avenue, Tampa, FL 33605. The EPC was created by a Special Act of the Florida Legislature and protects wetlands by exerting jurisdiction over all public (County and Municipal) and private parties. Local environmental protection succeeds because wetlands occur locally, where short travel time (1 hr) and quick responsiveness allow the citizenry to know who they can rely on. Protection is accomplished by interlocal and local-regional agreements and state and federal reliance on a competent local wetland review team. Key elements include: preemptive review of all wetland delineations (345/yr) and applications for development approval (1157/yr); prompt investigations (1 day) of citizen's complaints (575/yr) and strict compliance standards (268 reviews/yr) and monitoring (235/yr); and enforcement, where rules are violated. These efforts have led to a net gain in wetland resources within the county of 298 acres since 1985, when rules protecting wetlands were adopted.

9:30 am, URP-6 Impacts to Biscayne Bay from Hurricane Andrew. R.W. ALLEMAN, South Florida Water Management District, 3301 Gun Club Rd., West Palm Beach, FL 33416. Hurricane Andrew passed directly over lower Biscayne Bay on the morning of August 24th, 1992. The expected damage to benthic communities did not occur, but wetland and upland forests were heavily damaged. Water quality appeared to be surprisingly good immediately after the storm. Water quality began to degrade within a few days, however, resulting in the lowest water transparency ever recorded in South Biscayne Bay. Post-hurricane water quality degradation appeared to result from preventable events. The regional sanitary sewage collection and treatment infrastructure was disabled for weeks sending heavy nutrient loadings into ground and surface waters. The pollution was carried into the Bay by runoff from a series of rain storms and was followed by phytoplankton blooms. Additionally, fuel and oil poured into Biscayne Bay for several days from hundreds of capsized vessels. Inadequate provisions were in place to contain or clean up the spills. While natural damages to the ecosystem cannot be controlled, better planning might have prevented the human related impacts.

9:45 am, BREAK

10:00 am, URP-7 Successful Experiences with Advisory Committees for Research and Planning Projects Involving Controversial Environmental Issues in South Florida. F.J. MAZZOTTI (1) AND D.W. BLACK (2), (1) Department of Wildlife and Range Sciences, University of Florida, Davie, FL 33314, (2) South Florida Water Management District, West Palm Beach, FL 33416. Recent experiences with advisory committees show that they can be beneficial for dealing with environmental topics for which public attitudes in South Florida are polarized, including wetland preservation and mitigation strategies, water quality protection, and water supply planning. Benefits experienced in the environmental research process are similar to those widely reported for planning, including decreased polarization of participants, introduction of constructive ideas not thought of by the experts, and increased tendency to accept the rules. The best experiences with committees occurred when they participated most actively.

10:15 am, URP-8 Tree Planting and Preservation Practices at Single Family Residences: Policy Consideration. L.B. DODD (1), T. ECKERT (2), AND J.S. MANGUN (3), (1) 306 Little Grove Lane, N. Ft. Myers, FL 33917, (2) Lee County Soil and Water Conservation District, P.O. Box 787, Ft. Myers, FL 33902, (3) Division of Forestry, Ft. Myers District, 10941 S.R. 80, Ft. Myers, FL 33905. Trees in residential areas have been related to the public health, safety and welfare. Many local jurisdictions have considered tree planting requirements for new homes. Unincorporated Lee County possesses no regulation for tree planting in the vast majority of single family lots. In consideration for new regulations, tree planting and preservation practices without regulation were tested. On the average lot, over 15 trees were planted or preserved per lot; over half of these trees were exotic. Planting practices varied regionally within Lee County. Regional variation affected the cost effectiveness of regulatory requirements when compared to a public tree planting program.

10:30 am
SECTION MEETING
Lisa Dodd, Presiding

FLORIDA ASSOCIATION OF PHYSICS TEACHERS**Saturday, March 27, 1993****8:00 am, BREAKFAST****8:15 am****SECTION MEETING****Bobbie Himes, Edgewater High School, Orlando, Presiding****Saturday, March 27, 1993, 9:00 am - 11:30 am, Room SHC-102****SESSION A****Bobbie Himes, Edgewater High School, Orlando, Presiding**

9:00 am, APT-1A An Acoustic Resonance Tube Experiment. R.A. RHODES II, Eckerd College, St. Petersburg, FL 3373. A closed-tube, open-tube sound resonance experiment using apparatus similar to that marketed by Pasco has been developed at Eckerd. A one-meter lucite tube of I.D. 1.75 in. has at one end a 2 in. loudspeaker fed by a function generator and a 1 in. crystal microphone that inputs to a CRO and has a variable-position piston fitted from the other end. In the closed-tube mode a constant frequency is used and there is plotted the piston position versus the (odd) ordinal number of the resonating harmonic. The straight-line slope is used to find the speed of sound in air and the (negative) ordinate intercept becomes the end correction at the open end. Thus the acoustic length of the open tube is the actual length plus two end corrections. Next the open-tube resonating frequencies are plotted versus the ordinal numbers (odd and even) of the resonances. The slope of the straight line leads to a second value for the sound speed that checks well with the first.

9:15 am, APT-2A A New Computer Laboratory at Seminole Community College: Uses and Reactions. LAWRENCE BIGELOW, ARTHUR LITKA, ALEXANDER DICKISON, Department of Physical Sciences, Seminole Community College, Sanford, FL 32773. This past Summer a physics Macintosh computer laboratory was installed. In the Fall we began using it in all of our physics courses: university physics, college physics, and physical science. In this paper we will explain what laboratories we have accomplished and the reaction of the students and instructors.

9:30 am, APT-3A An Evaluation of the Structures and Interactions Model of the Introductory University Physics Project (IUPP). P.R. SIMONY, Jacksonville University, Jacksonville, FL 32211. The Structures and Interactions model of the IUPP (which is being implemented at Jacksonville University during the 1992-1993 academic year) will be compared with the traditional calculus based physics course in terms of content and pedagogy. Advantages and disadvantages of the model will be discussed along with feedback from students taking the course.

9:45 am, APT-4A **Multimedia and Physics Instruction.** ROBERT G. CARSON, Physics Department, Rollins College, Winter Park, FL 32789. With the advent of faster and more sophisticated personal computers has come the use of mass storage output devices such as video discs and CD-ROMs. The AAPT has been involved with several recent projects using these media. I will give comments of (1) *Physics: Cinema Classics*, a three-videodisc collection of vignettes taken from many film sources and (2) *Physics InfoMall*, a single CD-ROM containing items such as textbooks, experiments, demonstrations, and journal articles. The advantages and disadvantages of multimedia in general will be discussed including preparation times as an author, the targeting of students, and economic implications. A brief overview of Macintosh multimedia software such as Director 3.1, Animation Works, and Premiere that are useful for producing presentation and individual study physics modules will also be given.

10:15, BREAK

10:30 am **Fourth Annual Lowell Seacat Memorial Lecture**
Magnetic Fields: Science and Technology.
(Is there a Magnet in your Life?)
Dr. Jack Crow, Director, National High Magnetic Field Laboratory
Florida State University, Tallahassee, FL 32313

Saturday, March 27, 1993, 11:45 am - 4:00 pm, Room SHC-102
SESSION B

Bobbie Himes, Edgewater High School, Orlando, Presiding
(Lunch and breaks will be arranged in the workshop)

11:45 am, APT-1B **Electrostatics: A Workshop for High School and Middle School Teachers of Physics and Physical Science.** BOBBIE HIMES, BETTY VAIL, JANE NELSON, GAYLE HODGES, MARY WINN, BETTY PREECE; Edgewater High, Cypress Creek High, University High, Orlando; Winter Park High, Winter Park; Chamberlin High, Tampa; Indialantic, FL. As a part of the PTR A Plus program (American Association of Physics Teachers), a well sequenced curriculum in electrostatics will be offered for high school and middle school teachers of physics and physical science. The experiments are devised to work even in humid Florida conditions and the materials are inexpensive. Please register by writing to Bobbie Himes, Edgewater High School, 3100 Edgewater Drive, Orlando, FL 32804. NSF sponsored in part.

POSTER SESSION

Friday, March 26, 1993, 4:00 - 6:00 pm, Lobby, Science Hall

POS-1 Environmental Factors Affecting the Distribution of *Aphaostracon asthenes* in Blue Spring Run, Florida. M. PURDY (1) AND M.A. REITER (2), (1) Department of Biology, Rollins College, Winter Park, FL 32789, (2) Department of Biology, Seminole Community College, Sanford, FL 32773.

POS-2 Experiments on the Effects of Oil on the Survival, Health, and Growth of Mangroves. C.E. PROFFITT (1) AND (2) D.J. DEVLIN, in association with numerous students in SPJC Honors, Marine Biology, and Botany Courses.

POS-3 Arthritis in Dolphins. ALFRED M. HINTZ, MD, Mote Marine Laboratory, 1600 Thompson Parkway, Sarasota, FL 34236

POS-4 The Effect of Substrate Stability on the Benthic Algal Assemblage of Blue Spring Run, Florida. S. SHIRAZI AND M.A. REITER, Department of Biology, Seminole Community College, Sanford, FL 32773.

POS-5 Postnatal Development of the Metacarpalphalangeal Collateral Ligaments. M.L. O'NEAL, T. GANEY, Ph.D., J.A. OGDEN, M.D., Shriners Hospital, Tampa, FL.

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