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Program Issue

THE FORTY-THIRD ANNUAL MEETING OF THE ACADEMY

in conjunction with

THE FLORIDA JUNIOR ACADEMY OF SCIENCE

and the

FLORIDA SECTION OF THE
AMERICAN ASSOCIATION OF PHYSICS TEACHERS

featuring

ENVIRONMENTAL ASPECTS OF OFFSHORE DRILLING
ON THE FLORIDA SHELF

ANTHROPOLOGY IN FLORIDA: TODAY AND DOWN THE ROAD

Florida International University

Miami, Florida March 22-24, 1979

1979

QUARTERLY JOURNAL OF THE FLORIDA ACADEMY OF SCIENCES
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FLORIDA ACADEMY OF SCIENCES, Inc.
810 East Rollins Street
Orlando, Florida 32803

An Affiliate of AAAS

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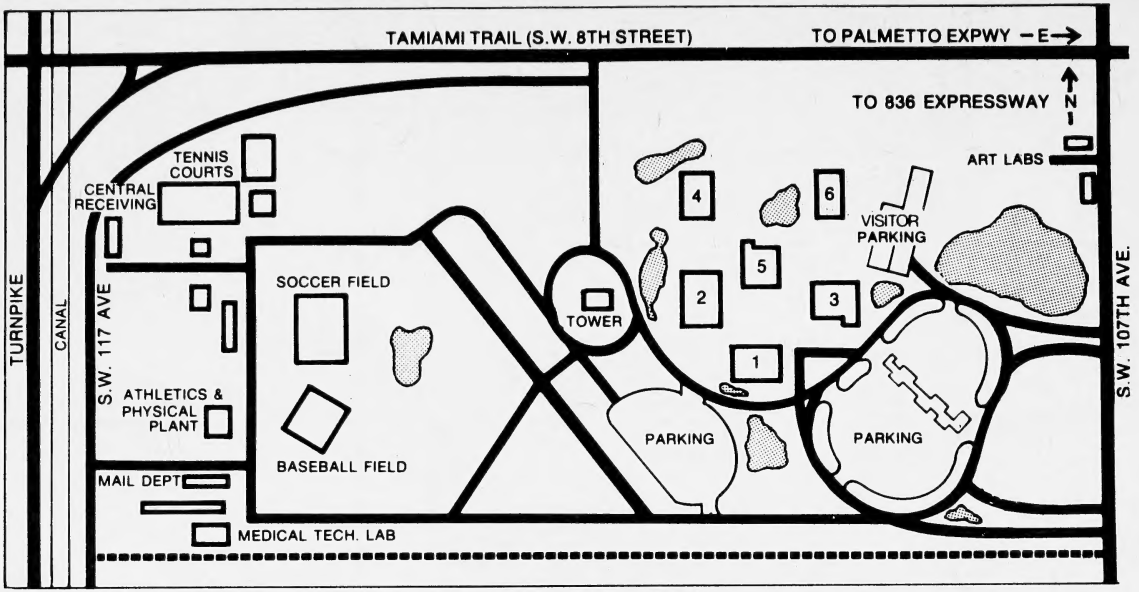
Local Arrangements Committee

Chairman	John Sheldon
Hospitality	Peter C. Martini
Registration	Sheila Weber
Physical Plant	Collins Thurman

Florida International University Tamiami Campus



1 PRIMERA CASA
(Administrative Offices)

2 DEUXIEME MAISON

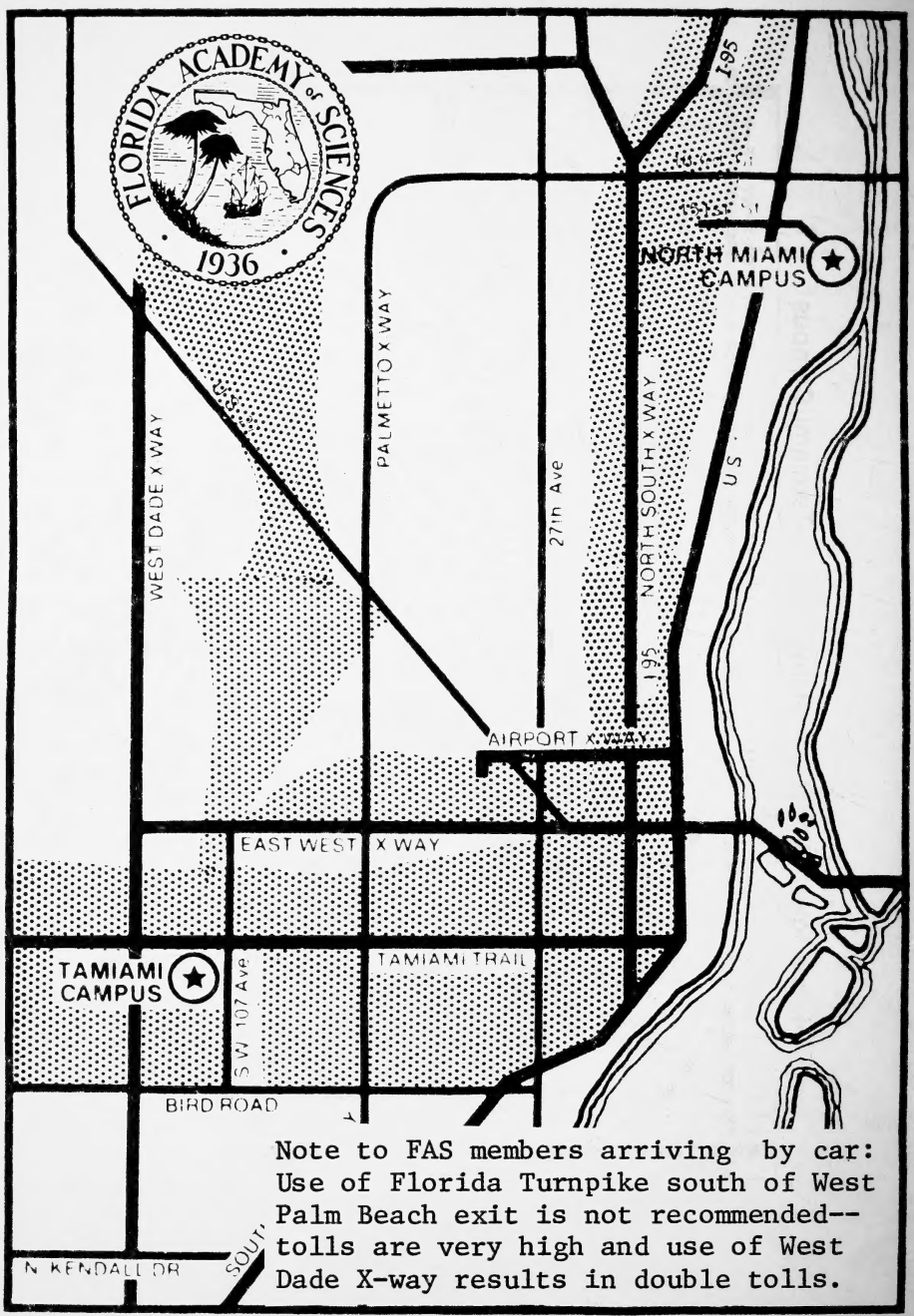
3 UNIVERSITY HOUSE
(Student Services)

4 VIERTES HAUS

5 ATHENAEUM
(Library)

6 OWA EHAN

FLORIDA INTERNATIONAL UNIVERSITY



Note to FAS members arriving by car: Use of Florida Turnpike south of West Palm Beach exit is not recommended--tolls are very high and use of West Dade X-way results in double tolls.

FORTY-THIRD ANNUAL MEETING OF THE FLORIDA ACADEMY OF SCIENCES

at

FLORIDA INTERNATIONAL UNIVERSITY, MIAMI, FLORIDA

22,23,24 March,1979

All registrants for the Senior and Junior Academy meetings and the meeting of the American Association of Physics Teachers-Florida Section are welcome to attend all sessions of all organizations.

Florida International University

The University is located west of downtown Miami at the intersection of Tamiami Trail (U.S. 41) and SW 107 Avenue. The University can be approached from the north by taking the Florida Turnpike south toward Homestead (toll is collected to Homestead even if you get off early), getting off at the Tamiami Trail (where additional exit toll is collected) exit and going east. Access from the west is from U.S. 41.

Registration

Registration will be in the Anthenium 100 lobby 7:00-9:00 pm Thursday, and in Owa Ehan 200 from 8:00 to 4:00, Friday.

Registration fee is $5.00 for members and $7.00 for non-members, with the program. This fee is waived for students.

Lodging

PLEASE MAKE YOUR RESERVATIONS AS SOON AS POSSIBLE BY CONTACTING THE MOTEL OF YOUR CHOICE. A deposit of one night's rent or credit card number will probably be requested. The meeting comes at a time when the tourist business in Miami is very heavy and early reservations are thus highly recommended. No rooms are reserved (after 1 January), and rates given below are tentative quotes for persons identified with the Florida Academy of Sciences.

Quality Inn South 14501 South Dixie Highway (U.S. 1) Miami, Florida 33176	(305) 251-2000 Single $29 Double $35
Howard Johnson's Motor Lodge 1430 South Dixie Highway (U.S. 1) Coral Gables, Florida 33416	(305) 665-7501 Single $28 Double $30
Runway Inn 656 East Drive Miami Springs, Florida 33166	(305) 888-6411 Single $14 Double $18

Food Service

The cafeteria in University House will be open for breakfast on Friday and Saturday, and for lunch on Friday. The meeting is being held between University sessions, and most facilities will be closed.

Field Trip

The local committee is planning a field trip to Taylor Slough by private car on Saturday. Details will be available at the Registration desk.

PROGRAM OF EVENTS

Thursday pm 22 March 1979

1:30 - 4:10	Anthropology Section: NEW CONTRIBUTIONS TO THE ARCHAEOLOGY OF ABORIGINAL FLORIDA	OE 135
2:00 - 5:00	Registration: Junior Academy	Ramada Inn
3:00	Council Meeting	PC 521
6:00 - 9:00	Junior Academy: Junior Literary Papers	DM 100
- 9:00	Junior Academy: Senior Literary Papers	DM 150
7:00 - 9:00	Registration: Senior Academy	Anthenium Lobby
7:30 - 9:00	GENERAL SESSION: Academy Lecture	Anthenium
9:00 - 10:00	Wine and Cheese Social	Anthenium Walkway

Friday am 23 March 1979

8:00 - 4:00	Registration: Senior Academy	OE 200
8:15 - 9:45	Atmospheric and Oceanographic Section: AIR-SEA INTERACTIONS	PC 212
8:45 - 11:45	Anthropology Section: NUTRITIONAL ANTHROPOLOGY	OE 135
- 9:45	Atmospheric and Oceanographic Section: THE AIRCRAFT AS A RESEARCH PLATFORM	PC 211
9:00 - 10:45	Biological Section: FISH BIOLOGY	PC 213
- 10:45	Biological Section: ANIMAL PHYSIOLOGY AND BEHAVIOR: I	PC 214
- 11:45	Engineering Section	PC 244
- 11:45	Environmental Chemistry	OE 101
- 11:15	Geology and Hydrology Section: HYDROLOGY	PC 246
- 11:30	Medical Sciences Section	OE 102
- 11:15	Geology and Hydrology Section: HYDROLOGY	PC 246
- 12:00	Physical Sciences Section	PC 247
- 11:15	Science Teaching Section	PC 249
- 11:30	Social Sciences	OE 105
- 12:00	Junior Academy: Junior Experimental Papers	DM 100
	Junior Academy: Senior Experimental Papers (Biological)	DM 150
	Junior Academy: Senior Experimental Papers (Physical)	DM 110
10:00 - 11:30	Atmospheric and Oceanographic Section: NUMERICAL AND THEORETICAL MODELING IN TROPICAL METEOROLOGY	PC 212
- 11:30	Atmospheric and Oceanographic Section: PROJECT STORMFURY	PC 211
11:00	Agricultural Section Business Meeting	PC 214
	Biological Section Business Meeting	PC 213
11:20	Science Teaching Section Business Meeting	PC 249
11:30	Atmospheric and Oceanographic Section Business Meeting	PC 211
	Geology and Hydrology Section Business Meeting	PC 246
	Social Sciences Section Business Meeting	OE 105
11:45	Engineering Section Business Meeting	PC 244
12:00	Anthropological Section Business Meeting	OE 135

Friday pm 23 March 1979

1:00	ACADEMY ANNUAL BUSINESS MEETING	Anthenium 100
1:30	Anthropology Section: ANTHROPOLOGY IN FLORIDA COMMUNITY COLLEGES TODAY	OE 135
2:00 - 4:00	Atmospheric and Oceanographic Section: HURRICANE WARNING, FORECASTING, AND PREPAREDNESS	PC 211
- 4:15	Geology and Hydrology Section: GEOLOGY	PC 246
- 3:45	Physical Sciences Section	PC 247
- 3:15	Urban and Regional Planning Section	OE 105

2:30 - 4:15	Biological Section: MARINE ECOLOGY	PC 213
- 4:15	Biological Section: ANIMAL PHYSIOLOGY AND BEHAVIOR: II.	PC 214
3:30	Urban and Regional Planning Section Business Meeting	OE 105
3:45 - 4:45	Anthropological Section: PALAEOANTHROPOLOGY, PHYSICAL ANTHROPOLOGY, PRIMATE BEHAVIOR	OE 135
6:30	Junior Academy Banquet	Ramada Inn

Saturday am 24 March 1979

8:30	Agricultural Section	PC 213
- 10:15	Biological Section: PLANT BIOLOGY	PC 213
9:00	Junior Academy General Meeting	Anthenium 100
- 12:00	American Association of Physics Teachers-Florida Section	PC 247
- 12:20	Anthropological Section: APPLIED ANTHROPOLOGY INTERNSHIPS AT THE MASTERS' LEVEL	OE 135
- 10:45	Atmospheric and Oceanographic Section: CUMULUS RESEARCH IN FLORIDA	PC 211
- 10:45	Atmospheric and Oceanographic Section: GENERAL OCEANOGRAPHY	PC 212
- 11:30	Biological Section: LIMNOLOGY AND WETLANDS ECOLOGY	PC 214
10:30 - 12:00	Biological Section: TERRESTRIAL ECOLOGY	PC 213
11:45	Agricultural Section	PC 213

GENERAL SESSION

Thursday 7:30 pm Anthenium 100

Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science

The Environmental Aspects of Offshore Drilling on the Florida Shelf.

ACADEMY SOCIAL HOUR 22 March, Thursday, 9:00 pm

Plan to attend the wine and cheese social in the Athenium Walkway immediately after the Academy Lecture.

Abbreviations of building names are used as follows: OE = Owa Ehan

PC = Primera Casa

DM = Deuxieme Maison

THE FLORIDA JUNIOR ACADEMY OF SCIENCES

FORTIETH ANNUAL CONVENTION

Florida International University
Miami, Florida

March 22-24, 1979

State Director	Carl Wilkinson, Stone Middle School, Melbourne
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Assistant Director	Bill Lavinghouse, Melbourne High School, Melbourne
Director-Elect	Dorothy Henley, Cardinal Gibbons High School, Ft. Lauderdale

Thursday,	2:00-5:00 pm	Registration	Ramada Inn, 3941 NW 22nd St., Miami	
	6:00-9:00 pm	Junior Literary Papers	Deuxieme Maison	100
		Senior Literary Papers	Deuxieme Maison	150
Friday,	9:00-12:00	Junior Experimental Papers	Deuxieme Maison	100
		Senior Experimental Papers (Biological)	Deuxieme Maison	150
		Senior Experimental Papers (Physical)	Deuxieme Maison	110
	6:30 pm	BANQUET, Ramada Inn		
Saturday,	9:00 am	General Meeting	Anthenium	100

ALL MEMBERS OF THE FLORIDA ACADEMY OF SCIENCES ARE WELCOME TO ATTEND SESSIONS OF THE JUNIOR ACADEMY AND TO ATTEND THE BANQUET. Banquet tickets must be purchased in advance.

ANTHROPOLOGICAL SCIENCES SECTION

Thursday 1:30 pm Owa Ehan 135

MICHAEL J. HANSINGER, Chairman, Anthropological Sciences Section, presiding

1:30 pm ANS-1 The 1979 Theme. MICHAEL J. HANSINGER, Florida-Based Field Associate, Yale University, Peabody Museum, Box 351, Ft. Myers, FL 33902.

1:45 pm ANS-2 Seminar: NEW CONTRIBUTIONS TO THE ARCHAEOLOGY OF ABORIGINAL FLORIDA Organizer: WILLIAM J. KENNEDY, Dept. of Anthropology, Florida Atlantic University, Boca Raton, FL 32345.

1:45 pm ANS-3 Settlement Patterns of Prehistoric Sites on Sanibel-Captiva Island, Lee County, Fl. WILLIAM J. KENNEDY, Florida Atlantic University, Boca Raton, Florida.
Summary of data and recent archaeological field work on Sanibel Island. The focus will be on settlement patterns and site distribution both temporally and spatially in relationship to a varied island ecosystem.

2:00 pm ANS-4 Archaeology of Bishop Harbor/Terra Ceia Island, Manatee County, Florida. BRAD W. BURGER, New College of the University of South Florida, Environmental Studies Program, 5700 N. Tamiami Trail, Sarasota, FL 33580. A survey was made of a section of coastal Manatee County comprised of Bishop Harbor, Terra Ceia Island, and Rattlesnake Key. Previous experience, interviews, and black & white and infrared aerial photographs were used to locate areas of archaeological potential. The areas were verified by field inspection and surface collections were taken when applicable. Test excavations were made at six of the twenty-two sites located. Survey and test results indicate an intense Safety Harbor occupation, quite probably by the Tocobaga. The variety of sites represented and generally excellent state of their preservation indicates a potential for settlement and subsistence studies in the future.

2:15 pm ANS-5 Radiocarbon Dating, Coastal Archeology and Charcoal-A Potential Problem. D.S. INTRONE, J.J. STIPP, Radiocarbon Dating Lab, Dept. of Geology, Univ. of Miami, Miami, FL 33124 and CHARLES A. HARRY, The Archeological Society of the Museum of Science, 3280 S. Miami Av., Miami, FL 33129. Archeological excavations at the Key Largo Site, Key Largo, FL produced an excellent, apparently undisturbed, sequence of clearly identifiable pottery types from Ft. Drum to Historic Period. Charcoal carefully collected from each level was chemically pretreated to remove common natural carbon contaminants, and then radiocarbon dated. The results were unexpectedly disordered, with inversions and impossibly old ages. Sample and site reevaluation has revealed the presence of a hard-tar substance absorbed into the charcoal and associated as small pieces through the mound, necessitating the development of new chemical cleaning techniques. Sources for the contaminant are under investigation and will be discussed in relation to the environmental and/or cultural significance.

2:30 pm Discussion.

2:45 pm ANS-6 Ceramic Chronology of the SW Calusa Subarea in the Glades-Archeological Region. CHARLES A. HARRY, GARY AUDY, The Archeological Society of the Museum of Science, 3280 S. Miami Ave., Miami, FL 33129, J.J. STIPP AND D.S. INTRONE, Dept. of Geology, University of Miami, Coral Gables, FL 33124. The new pottery type, Turner River linear Punctate, along with unusually excellent ceramic seriation has been excavated from a clear stratigraphic sequence associated with charcoal and marine shell at the Turner River Site in SW Florida. This discovery provides a unique opportunity for dating the Fort Drum pottery type and the little known Goodland Ceramic Culture. Radiocarbon dates of 100 to 400 AD and 300 to 700 AD respectively were measured. These Periods have been successfully correlated with new radiocarbon dates from the Key Largo Site.

3:00 pm BREAK

3:15 pm ANS-7 Crewleader Alternatives to Coercive Power. MARY-MARGARET TAYLOR Department of Anthropology, Florida Atlantic University, Boca Raton, Fl. 33431. The utilization of power by crewleaders in the control, manipulation, and exploitation of agricultural laborers was observed for 14 months in 6 South Florida counties. It was found that the more successful crewleaders employed a multi-dimensional power base with only a partial reliance upon the use of coercive power to achieve their goals. This finding is in contrast to most of the previous literature which stressed coercive power as the primary, and sometimes exclusive, element in the power base foundation of crewleaders.

3:30 pm ANS-8 Colonization in Lowland Bolivia: The San Julian Project. ALLYN M. STEARMAN, Florida Technological University, Box 25000, Orlando, Florida, 32816. For over 20 years the Bolivian government has been involved in colonization programs to resettle indigenous groups of the densely populated highlands in the lowland regions. For the most part, these programs have been extremely costly and have exhibited high rates of abandonment. A new project, the San Julian colony,has been attempted which presents an innovative response to many of these earlier problems. This paper is a critical evaluation of the new colonization policy being implemented in the Bolivian lowlands.

3:45 pm Discussion.

3:55 pm ANS-9 Summary. WILLIAM J. KENNEDY.

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 8:45 am Owa Ehan 135

SYMPOSIUM IN NUTRITIONAL ANTHROPOLOGY

Organizers: LESLIE SUE LIEBERMAN, Dept. of Anthropology, University of Florida, Gainesville, FL 32611 and RANDY FRANCES KANDEL, Dept. of Sociology/Anthropology, Florida International University, Miami, FL 33199, presiding.

8:45 am ANS-10 Introduction. L. S. LIEBERMAN and R. F. KANDEL

9:00 am ANS-11 Worldview of Health and Well Being: Its Effect on Nutrition During Pregnancy and Lactation. JAYNE O. LYONS, University of Florida, Anthropology Department. Gainesville, Fl. 32611. The worldview of health and well being found among the residents of San Juan Sacatepequez, Guatemala is presented. The effects of this view of health are discussed as they pertain to the population of pregnant and lactating women and their weanling offspring. Emphasis is placed on the theory of hot and cold properties found in food, emotions and activities. Other special properties that affect food and feeding behaviors are considered.

9:15 am ANS-12 Causal Factors of Malnutrition in Mojui dos Campos, Brazil: A Preliminary Analysis. SUSAN VIRGINIA POATS, Department of Anthropology, University of Florida. A nutrition survey carried out in a Brazilian middle Amazon village during 1977-1978 found that 28.2% of 511 children under 72 months of age were moderately to severely malnourished, and 45.2% were mildly malnourished according to Latin American standards for weight and age. Results from the survey as well as data from the author's field research prior to survey initiation revealed that the causes of malnutrition were imbedded in a complicated, interwoven mesh of social, cultural, economic and institutional factors. A preliminary analysis of some selected interrelated causal factors is presented here in addition to a brief summary of the survey site, survey instrument utilized and the role played by the anthropologist in the nutrition research project. Dr. A.F. Hartman, Fundação Esperanca, directed the project. Nutrition students from the Universidade Federal do Pará, Brazil aided in the survey. NDEA-Title VI, University of Florida Foundation and Fundacão Esperanca funded the author's research.

9:30 am ANS-13 Growth and Development, Nutrition and Activity Among Diabetic Youngsters. LESLIE SUE LIEBERMAN, Dept of Anthropology, University of Florida, Gainesville, FL 32611. Ultrasonographic and anthropometric measurements were made of body composition, height, weight and skinfolds in 150 children with diabetes mellitus and in 87 control children matched for age, sex, and race. Diabetic children weighed less, were significantly shorter, had lower bone densities, reduced muscle mass and greater adiposity than control children. These growth and developmental differences are discussed with regard to diabetes pathology, diet and activity levels. This research was supported by Biomedical Research Support Grant 216E38.

9:45 am ANS-14 Diet, Obesity and Diabetes Mellitus Among the Florida Seminole. SANDRA K. JOOS, Dept. of Anthropology, Univ. of Florida, Gainesville, FL 32611. The incidence of adult-onset diabetes has increased dramatically since the 1950's in this population, and constitutes a major health problem. Four months were spent at the Brighton Indian Reservation identifying economic, social and cultural factors which influence dietary behavior, the incidence of obesity and diabetes, and account for the inability of health care personnel to induce participation in self-management through dietary modification and weight loss. Based on these factors, suggestions are made as to how changes in dietary behavior and weight loss might be achieved. This research was partially supported by a Sigma Xi Grant-in-Aid of Research.

10:00 am Discussion.

10:15 am BREAK

10:30 am ANS-15 Dietary Patterns and Styles of Social Involvement Among Elderly Women in Dade County, Florida. RANDY FRANCES KANDEL, Department of Sociology/Anthropology, Florida International University, Tamiami Trail, Miami, Florida 33199. Based upon dietary recall and social questionnaire data from an economically and ethnically heterogeneous sample of elderly women in Dade County, Florida, this paper examines the relationship between dietary patterns and quantity and quality of social involvement. Implications of the data for life satisfaction, social adjustment, health and nutritional status are considered.

10:45 am ANS-16 Changing Dietary Conditions in Rural North Wales: A Historical and Anthropological Overview. DWIGHT L. SCHMIDT. Anthropology Department, University of Florida, Gainesville, FL, 32611. Certain notable dietary changes among indigenous populations in the rural uplands of Northern Wales are found to be the result of long-term socio-economic and historical forces mediated by the ecological limitations of the region. The changing conditions forced the Welsh to rely more heavily upon the external market economy. Despite a period of insecurity and poverty, this economic factor has stabilized and diversified the Welsh diet. Contemporary social welfare and government programs have raised the standards of living in Wales and allow the populace to successfully exploit the new market and nutritional opportunities available to them.

11:00 am ANS-17 Slave Diet and Evidence of Supplements to the Standard Allotment. TYSON GIBBS AND KATHLEEN CARGILL, Dept of Anthropology, University of Florida, Gainesville, FL 32611. Previous historical research suggests that slaves supplemented their weekly rations with domestic and wild food stuffs. Our research project, using archeological and zooarcheological data, shows concrete evidence that slaves used supplemental food resources extensively. These additional resources partially accounted for a relatively low incidence of nutritionally related diseases and a high intrinsic rate of population increase in the Southeastern coastal regions from 1800 - 1860.

11:15 am ANS-18 Supplemental Foraging in Free-Ranging Monkeys. ELIZABETH H. SARRIS, Department of Anthropology, University of Florida, Gainesville, FL 32611. Despite seemingly adequate provisioning, free-ranging rhesus monkeys (Macaca mulatta) at Silver Springs, Florida continually supplement their diet with leaves, buds, twigs and dirt. Plant species consumed do not represent the full range of species available indicating selectivity by the monkeys. Fecal analysis indicates some insect eating. Consumption of other sources of animal protein (e.g. small vertebrates or eggs) was never observed in the field or detected in the feces. The difficulties of determining the nutritional significance of supplemental foraging will be discussed. This research was supported by the Florida State Museum and the University of Florida.

11:30 am Discussion.

11:45 am ANS-19 Summary. LESLIE SUE LIEBERMAN and RANDY FRANCES KANDEL.

12:00 n Annual Business Meeting of the Anthropological Sciences Section.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

Friday 1:30 pm Owa Ehan 135

SEMINAR ON ANTHROPOLOGY IN FLORIDA COMMUNITY COLLEGES TODAY

Organizers: W. G. GLOVER, Edison Community College, Ft. Myers, FL 33901, M. M. PARDI, Polk Community College, Winter Haven, FL 33880, R. E. PINDER, JR., Indian River Community College, Ft. Pierce, FL, D. E. SHAW, Miami Dade Community College, Miami, FL 33176, S. CLAPHAM and R. H. FURLOW, Broward Community College, Ft. Lauderdale, FL 33314.

W. GERALD GLOVER, presiding.

1:30 pm ANS-20 Introduction. W. GERALD GLOVER

1:45 pm ANS-21 Digging Up Anthropology. RAYMOND E. PINDER, JR., Indian River Community College, Fort Pierce, Florida. Through the means of a questionnaire, the paper will address the current state of Anthropology in the community colleges in Florida. An attempt will be made to assess the status of each of these programs; looking specifically at the enrollment, how many courses are offered, how often, if an anthropologist is teaching them, and what part of problems they experience in "selling" their discipline. Also, an attempt will be made to assess the possibility of an Anthropology program at those schools in which it is not presently offered. Based on the findings of the survey, suggestions will be offered for raising the status of Anthropology at the community college level in Florida.

2:00 pm ANS-22 Death Education. MARCO M. PARDI, Polk Community College, Winter Haven, Florida 33880. In this paper the anthropologist describes the evolution and development of a death education program at Polk Community College in Polk County, Florida. Included is an overview of the community role involvement typical of such colleges and a working model for enhancing that involvement in any college/community setting. The social and institutional resources usually available in the environment of most colleges are listed and discussed as areas of need and as justification for the development of death education programs at community colleges.

2:15 pm ANS-23 The Role of An Anthropologist in Human Service Development. W. GERALD GLOVER, Edison Community College, Ft. Myers, Florida 33901. This paper discusses a community-wide human service's training program developed by an anthropologist. A community college is used as a vehicle for diffusion of the innovation. Directions for anthropologists in community colleges and in human service organizations are discussed.

2:30 pm Discussion.

2:45 pm BREAK

3:00 pm ANS-24 The Status of Anthropology In Florida's Community Colleges. DENNIS E. SHAW, Miami-Date Community College, Miami, Florida 33176. Exactly what is the status of anthropology at the community college level? How much anthropology is being taught in community colleges? What is the background of anthropology instructors in the community colleges, and how do they view themselves in relation to anthropologists at the senior institutions? To answer these and other questions, the anthropologist surveyed the 38 community colleges in the state of Florida. The data presented here are the results of that survey.

3:15 pm ANS-25 "Anthropology in the Community College Setting: A Case Study". STEPHEN CLAPHAM AND RICHARD H. FURLOW, Broward Community College, Fort Lauderdale, Florida 33314. The status of anthropology at two-year institutions appears ambiguous. At a time when many doctorates in the discipline are prepared to seek a teaching post in a junior college, those in the curriculum decision making process at the two-year schools deal with anthropology usually with mixed feelings as to its viability as a social science offering. This paper examines these trends and attempts to define some of the problems and prospects involved in the teaching of anthropology at the two-year college. What can be accomplished is illustrated by the anthropology program at Broward Community College, Central Campus, which serves as a case study for the purposes of this paper.

3:30 pm Discussion and Summary.

3:45 pm PALEOANTHROPOLOGY, PHYSICAL ANTHROPOLOGY AND PRIMATE BEHAVIOR

MICHAEL J. HANSINGER, presiding.

3:45 pm ANS-26 Possible Presence in Southern Africa of East African Taxa: Homo habilis and Australopithecus boisei. MICHAEL J. HANSINGER, Florida-based Field Associate, Yale Peabody Museum, P.O. Box 351, Ft. Myers, FL 33902. A statistical analysis was made of length and breadth variates of 409 cheek teeth of Plio/Pleistocene hominids. Samples used were Kenya National Museum specimens usually classified as H. habilis and A. boisei, and Transvaal National Museum teeth assigned to A. africanus and A. robustus. Certain of the South African distributions appeared anomalous. These included a lower first premolar, first and second lower molars, and an upper third molar from Makapan; and upper first and third molars from Sterkfontein. The anomalies are explained by teeth having dimensions appropriate, within reasonable confidence limits, to populations of H. habilis and A. boisei, as these are known in the East African record.

4:00 pm ANS-27 Photogrammetric Determination of Cranial Capacity. DANIEL R. HENDERSON, Florida Atlantic University, Boca Raton, FL, 33432. Close range stereophotogrammetry was employed to create a contour image of a human skull in profile. Areas were measured by a polar planimeter and volume computed by formula. The result was compared to anthropometric methods of estimating cranial capacity. Since the photogrammetry produced an external measure of 1330 cubic centimeters compared to a direct internal measure of 1140 cc, it necessitated a correction factor to bring the estimate within an acceptable range. Several techniques for correction were examined and evaluted. Other possible applications of cranial photogrammetry are discussed along with the limitations and practicability of the photogrammetry methods for the physical anthropologist.

4:15 pm ANS-28 Male Caretaking of Infants in Primate Groups. CANDACE ALCORTA, Florida Atlantic Univ., 8888 SE Rigdon Way, Hobe Sound, FL 33455. The participation of males in infant care among the primates is linked to both evolutionary and ecological factors and is positively correlated with the intra- to inter-group competitive ratio experienced by the primary social group. Not only does such caretaking enhance offspring viability, but it further permits a reduction of aggressivity within the social group by altering neonatal hormonal secretions, thereby affecting later adult endocrine responses. As most primate societies are comprised of kin groups, the raising of aggression thresholds in high intra-group competitive situations would permit the operation of kin selection and secure enhancement of reproductive success. Conversely, a clear correlation of high male aggressivity and low male caretaking of young is demonstrable throughout the primate order, including the social groups of man.

4:30 pm Discussion.

Saturday 9:00 am Owa Ehan 135

SYMPOSIUM ON APPLIED ANTHROPOLOGY INTERNSHIPS AT THE MASTERS' LEVEL

Organizers: CURTIS W. WIENKER, J. RAYMOND WILLIAMS, and ALVIN W. WOLFE, Dept. of Anthropology, University of South Florida, Tampa, FL 33620

ALVIN W. WOLFE, presiding.

9:00 am ANS-29 Introduction to Symposium on Applied Anthropology Internships at the Masters Level. ALVIN W. WOLFE, Department of Anthropology, University of South Florida, Tampa, Florida 33620. Internships provide practical experience to students at the master's level in medical anthropology, public archaeology, and urban anthropology in a program at the University of South Florida. Some ideas of the range of projects and skills involved in applied anthropology are demonstrated in the brief internship reports that make up this symposium. These reports should also provide evidence of the prospects for developing professional anthropology at this level.

9:10 am ANS-30 Applied Anthropology and Cardiovascular Disease in the Tampa Bay Area. WENDY J. WALLACH, Department of Anthropology, University of South Florida, Tampa, Florida 33620. A synthetic estimate calculated at the Florida Gulf Health Systems Agency indicates that the prevalence rate of hypertension is higher for the Tampa region (22.1%) than for the nation (18.1%). The intent of this paper is to develop recommendations for a model cardiovascular disease screening program in the Tampa Bay Area in order to reduce the rate of heart disease. Data used in the study were collected from national statistics, available literature and a local survey administered by the FGHSA. The synthetic estimate, calculated by the Agency, was compared to the results of the survey in order to assess the present screening programs. Recommendations directed toward a more effective and accessible program according to the specific populations' needs are presented. The study demonstrates the valuable perspective and assistance an applied medical anthropologist can provide in the design of a disease screening program.

9:25 am ANS-31 The Psychological Effects of Crime on the Elderly. ANDREA SHELTON, Department of Anthropology, University of South Florida, Tampa, Florida 33620. Studies initiated by the Victim Assistance For Older Adults Program (VAP) confirm findings of federally conducted surveys taken in major metropolitan areas-elderly persons (aged 55 +) are more fearful of crime than any age group, although they are victimized least in proportion to population size. The VAP provides short term crisis intervention, support and referral services, victim advocacy, and crime prevention information to all elderly victims of Par 1 crimes in Hillsborough County, Florida. The program, which began in January, 1978, has aided more than 2,500 victims to date. Still to be investigated are VAP findings that suggest anxiety accompanies fear, especially among victims who have been made aware of preventive measures that could have been taken to avoid the crime and consequences.

9:40 am ANS-32 An Analysis of the Socioeconomic Factors That May Influence Successful Functioning in Families with Chronically Ill Children. VERA E. VANDEN, Department of Anthropology, University of South Florida, Tampa, Florida 33620. Thirty families participating in a public health care program for children with chronic medical problems were interviewed over a three month period within the clinic setting. A selected number were also interviewed more extensively at home. Some of the socioeconomic factors considered are income, age, ethnicity, religion, family composition, presence or absence of extended family and neighborhood support systems, parental attitude toward the child's illness and the clinic, parental expectations for the child and for the outcome of health care. Consideration is also given to the interrelationship between the public health system and levels of functioning in families with chronically ill children.

9:55 am ANS-33 The Management of Cultural Resources at the Fletcher Avenue Park Site, Hillsborough County, Florida. DAVID L. McCULLOUGH, Department of Anthropology, University of South Florida, Tampa, Florida 33620. An archaeological investigation was conducted on the proposed site of the Fletcher Avenue park for eight weeks during the summer of 1978. Site boundaries were located during the early stages of park planning so that adverse impact from park development could be minimized. Data recovery was designed to produce cultural-historical information about the parks sites for use in on-site public displays. At the same time, problem-oriented excavations will contribute to an understanding of regional cultural processes in prehistory. Recommendations to park developers include site preservation techniques whose long-term effectiveness can be measured in the future. Scientific site preservation, coupled with public interpretation of the park's cultural resources all contribute to an over-all program of management of cultural resources at the Fletcher Avenue park.

10:10 am ANS-34 An Appraisal of Hardee County Archaeology: Hinterland or Heartland? BARRY R. WHARTON AND J. RAYMOND WILLIAMS, Department of Anthropology, University of South Florida, Tampa, Florida 33620. Hardee County is poorly understood archaeologically, despite a spate of recent archaeological surveys performed on large areas in the county's western portion. The county conveniently circumscribes the middle reaches of the Peace River Valley which is located between the Central Lake Ridge on the east and the Gulf coastal strand on the west. Far from being a cultural buffer zone between the cultural centers of Tampa Bay and the Okeechobee Basin, the county was occupied by sparsely-distributed Late Archaic hunter/gatherers. By Weeden Island times or later, a society organized at a chiefdom level of sociocultural integration was centered in the eastern part of the county. Further research of the chiefdom's probable seat, a large rectangular, flat-topped temple mound and associated burial mound, should shed new light on the sociocultural developments of the late prehistoric Tampa Bay, Ft. Myers, and Lake Okeechobee areas.

10:25 am ANS-35 Report of excavations of the Fort Brooke Site (8-Hi-13) Conducted by the University of South Florida's 1978 Summer Archaeological Field School. ELIZABETH A. FISHER, Department of Anthropology, University of South Florida, Tampa, Florida 33612. Excavations conducted in a portion of the Fort Brooke site located in downtown Tampa revealed no subsurface structural remains of the fort period; however, a quantity of fort-period artifacts were recovered. These findings, revealed in a context of modern disturbance, provide some substantiation to the evidence in available historical documents. The nature of the archaeological evidence at the site demonstrates the nearby location of the fort, as well as some of the circumstances of its existence. During the excavations a relatively intact aboriginal shell midden was also encountered. This aboriginal component consisted of lithic tools and debris, along with animal remains and pottery, and is tentatively associated with the late Weeden Island cultural period.

10:40 am BREAK

10:50 am ANS-36 A Needs Assessment Study Among Migrant/Farmworkers in Southern Hillsborough County. REUBEN D. FERNANDEZ, JR., Department of Anthropology, University of South Florida, Tampa, Florida 33620. This paper presents some of the findings of a needs assessment survey among migrant/farmworkers in rural southern Hillsborough County. The study concentrates on educational levels, family size and income levels of the predominately Hispanic target population. Some attitudinal data are presented.

11:05 am ANS-37 Producing a Comprehensive Plan. C. MARTIN BANSPACH, Department of Anthropology, University of South Florida, Tampa, Florida 33620. In 1975, the Florida Legislature adopted the "Local Government Comprehensive Planning Act. This act requires all counties and municipalities to create a comprehensive plan to guide future urban development. This paper concerns the application of anthropological techniques and skills to the production of a comprehensive plan. The paper demonstrates the integration of ethnography and ethnoscience into the urban planning process. The perspective of this report is that of an interdisciplinary approach, as practiced through a private consulting firm.

11:20 am ANS-38 Applied Anthropology in the Public School System: Folklore collecting as a Methodology for Teaching Values Clarification. LARRY GOODWIN, Department of Anthropology, University of South Florida, Tampa, Florida 33620. This paper is a presentation of both the various methods explored and utilized for teaching folklore on the sixth grade level and the actual results obtained from an AAIP internship at the Williams Elementary School, Tampa, Florida. The paper is ethnographic in nature and deals with the training of two hundred and sixty children, sixth grade classes, in the basics of both folklore collection and archiving. The scope of the project included the use of the collected material as a vehicle for teaching values clarification and the anthropological perspective, and utilizing the basic fieldwork techniques as a methodology for addressing the basic problem of student anomie.

11:35 am ANS-39 The Functions of Job Attitudes in a Bureaucracy. ANN M. PYTYNIA, Department of Anthropology, University of South Florida, Tampa, Florida 33620. An examination of the results of a five month study that concerned itself with work-related activities and attitudes of non-supervisory white collar workers in a bureaucratic setting. Problems and advantages of the ethnographic method of study will be addressed. Job functions are related to attitudes towards supervisory personnel, job attitudes, and job tasks. Suggestions are made as to input by the non-supervisory staff.

11:50 am Discussion

12:10 am ANS-40 1979 Anthropology Section Meeting, Summary. MICHAEL J. HANSINGER, Chairman, Anthropological Sciences Section, 1978-79.

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 8:45 am Primera Casa 211

Session A: THE AIRCRAFT AS A RESEARCH PLATFORM

C. B. EMMANUEL, Research Facilities Center, NOAA, Miami, presiding.

8:45 am AOS-1 The Aircraft as a Research Platform - Its Capabilities and Potential. C. B. EMMANUEL, NOAA/ERL, Research Facilities Center, Miami, Florida. A multiengine, long-range aircraft has the ability to support a multitude of sophisticated research systems for atmospheric and oceanic studies. When coupled to the aircraft navigation system, such research systems can, and do, afford the investigator detailed spatial and temporal observations of the pertinent physical parameters. Indeed, to comprehend and appreciate the excellent research platform that the aircraft affords one need only consider its capability for covering long distances in short periods and for remaining on station for long periods of time. In addition to a general discussion of research aircraft, emphasis is placed on the present capabilities of the Research Facilities Center's aircraft as modern efficient, and highly versatile research platforms capable of meeting even the most stringent research requirements. Also, future requirements for improved capabilities to meet the needs of new research problems now under consideration will be addressed.

9:00 am AOS-2 The Research Systems Aboard the RFC Aircraft. JAMES D. DU GRANRUT AND TERRY L. SCHRICKER, NOAA/ERL Research Facilities Center, Miami, Florida. The research systems presently aboard the RFC aircraft will be discussed in some detail. The presentation focuses on the operational environment, monitoring restrictions, response characteristics, resolution, sampling rates, etc., of all sensors. Special emphasis is placed on weather radar, cloud physics, radiation as well as atmospheric dynamics instrumentation.

9:15 am AOS-3 The Data Collection and Processing Capabilities of the RFC Aircraft. W. J. BROWN AND EDDIE A. BRUNSON. The WP-3D data acquisition system samples 64ADC channels at a rate of 40 samples per second per channel. It also collects information from the aircraft navigation system (dual Carousel IV with Omega update) at the same rate. This information is filtered and then recorded on magnetic tape. There are three HP-2100A systems aboard the aircraft: One is used for the data collection and recording, the second for disc storage, graphics and real-time analysis, the third for the weather radar data recording. Filtered data are displayed on CRTs throughout the aircraft. Through interactive terminals the investigator has control of the data reduction he/she wishes to perform in real-time. A graphic subsystem exists which allows a wide range of versatility in the presentation of the data.

9:30 am Discussion

9:45 am BREAK

10:00 am PROJECT STORMFURY

ROBERT SHEETS, National Hurricane and Experimental Meteorology Laboratory, NOAA, Miami, presiding.

10:00 am AOS-4 An Evaluation of Diagnostic Marine Boundary Layer Models Applied to Tropical Cyclones. MARK D. POWELL, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. Four diagnostic marine boundary layer models were evaluated for applicability to the hurricane regime with the goal of developing an operational method of estimating surface variables with research aircraft flight level (500 m) data. Model evaluation consisted of comparing model wind speed, temperature and dewpoint to "ground truth" buoy and ship data from Hurricane Eloise (9/22/75) and Anita (8/30-9/2/77) and vertically stacked several-level aircraft data in Eloise (9/17/75) and Caroline (8/30/75). Three of the models were similar in estimating wind speed, giving an error of 12%. Temperature and dewpoint were estimated to an accuracy of ±1°C. Model results also included surface layer turbulent paramters, sea surface heat, momentum, and moisture fluxes and 10 m level neutral drag coefficients which were discussed in terms of range of magnitude and comparison to previous studies. The model computed dissipation rate of turbulent kinetic energy was found to compare favorably with measured values.

10:15 am AOS-5 Synoptic Analysis of an Easterly Wave. LAWRENCE N. LAHIFF, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. A five day period of Caribbean synoptic data is analyzed. Use is also made of satellite photos and film loops and data acquired from research aircraft. Two methods of analysis are employed. One is the traditional hand analysis, the other an objective line integral technique. The results from the different methods are intercompared. The patterns of vertical velocities calculated are compared to the depiction of clouds from the satellite and to the precipitation depicted by the radar on the research aircraft.

10:30 am AOS-6 On the Structure and Natural Variability of Hurricanes. ROBERT C. SHEETS, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. Hurricane Anita and Ella aircraft data analyzed using the variational approach are used to investigate the horizontal spatial and temporal variability of selected parameters and "gust" characteristics of the wind field as a function of height and storm intensity. Analyses of Hurricane Anita data reveal a highly asymmetric convective element pattern and related wind field during early stages of the storm's development. The "gust" factor is quite large during this early stage and related to the cellular nature of the convection. Later, as the storm attained more classical hurricane characteristics, the cellular structure of the convection and related wind gusts became less dominant. Hurricane Ella data revealed similar characteristics.

10:45 am AOS-7 In-Situ Comparison of Radar Reflectivities and Drop Spectra in Hurricane Anita. PAUL T. WILLIS, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. For six hours on 1 Sept. 1977 quantitative 5 cm. radar measurements were made with the NOAA P-3 aircraft in Hurricane Anita, while the storm was well developed and very intense. Also, two dimensional raindrop images were recorded with a P.M.S. optical spectrometer. The measured radar reflectivities in several range gates, immediately ahead of the 3 km. altitude flight track, are compared with the drop number density spectra computed from the spectrometer data a few seconds later as the aircraft penetrated the same volume. The radar reflectivities (Z), computed from the summation of the drop diameters to the sixth power, are compared with the measured radar reflectivities. The data span a wide range of dbZ values and agree fairly well except for regions of large reflectivity gradient. Rainfall rates are also computed from the drop spectra and a Z-R relationship derived from a fit to the data points.

11:00 am AOS-8 Rainfall Rates From Selected Hurricanes as Determined From Digitized Airborne Radar. BILLY M. LEWIS, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. Quantized radar reflectivity (Z) recorded digitally onboard NOAA WP-3D aircraft during the 1977 and 1978 hurricane seasons are used to obtain estimates of rainfall rates (R) in several hurricanes. These rainfall rate estimates are computed from an empirically derived Z-R relationship. This Z-R relationship was determined from a drop size distribution obtained from foil sample and Knollenberg spectra observations recorded on NOAA aircraft in hurricanes. These 5 cm radar rainfall rate estimates will be presented as observed geographically distributed about the hurricane center. The effects of precipitation attenuation and radar beam filling affecting the rainfall rate estimates will be discussed.

11:15 am Discussion

11:30 am Business Meeting of the Atmospheric and Oceanographic Sciences Section.

Friday 8:15 am Primera Casa 212

Session B: AIR-SEA INTERACTION

DUNCAN ROSS, Atlantic Oceanographic and Meteorological Laboratories, NOAA, Miami, presiding.

8:15 am AOS-9 Atmospheric Structural Variations Off Oregon That Resulted in Upwelling. JEFF D. HAWKINS, FSU Dept. of Meteorology, Tallahassee, Florida 32306. The lower atmospheric structural variations along Oregon's central coast are studied before and during an upwelling event. The affect of these fluctuations on the surface ocean layer are documented. A vast array of meteorological and oceanographic observations were taken by aircraft, pibals, rawinsondes, buoys, land stations, and ships during the Coastal Upwelling Experiment I (CUE-1) in the summer of 1972. The winds, currents, air and water temperature from the surface ocean layer to 1.5 km (5000') are compared for weekly periods of southerly winds (16-22 August) followed by NW winds (23-29 August). The lower atmospheric layer was well mixed and the upper ocean layer was becoming horizontally homogeneous during the southerly wind regime. A synoptic scale change aloft on 22 August shifted all winds to the NW, causing the subsequent appearance of a strong marine inversion, subsidence, clear skies, and intense inland surface heating. The resultant large coastal temperature gradient precipitated well marked sea breeze events. Increased equatorward and offshore flow brought about an intense upwelling event.

8:30 am AOS-10 Measurement of Hurricane Surface Winds by Satellite Radar. PETER G. BLACK, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. The Seasat-A Satellite Scatterometer (SASS) obtained measurements of the sea surface radar backscattering cross section, σ^o, at K-band in Hurricane Fico. Wind vector computations were made from 3 different computer algorithms over a swath 600 km wide parallel to the spacecraft subpoint track covering a range of wind speeds from 5 to 26 m/s. Comparison of "surface truth" data from ships, aircraft and cloud trajectories revealed that the initial SASS derived winds were biased high by 4-8 m/s. However, details concerning the low level circulation features were well resolved. Adjustments to the algorithms required to reduce the bias will be discussed. These data suggest that satellite based measurements of radar backscatter can be used to infer hurricane wind fields that will be useful in defining storm location, radius of gale force and hurricane force surface winds. The usefulness of these data sets as initial data sets for dynamical hurricane prediction models is presently under study.

8:45 am AOS-11 A Numerical Model of Upwelling Off Peru. JAMES J. O'BRIEN, Florida State University, Tallahassee, FL 32306. An x-y-t, two-layer β-plane numerical model is used to examine upwelling off Peru from 14°S to 15°30'S. The most distinctive feature of the Peruvian upwelling circulation is a predominant poleward flow. The model, when forced by wind stress only, shows no poleward flow. Forcing, due to the effect of the atmospheric pressure gradient, is applied in the model and results in the dominating poleward flow. In time, the effects of wind stress are felt on the upper layer and an equatorward flow develops near the coast. Results show that the observed upwelling maximum approximately 40 kilometers north of 15°S is due to the effects of a broad flatish shelf. The upwelling maximum south of 15°S is the result of a mesoscale topographic feature, a seamount. Based on Ekman dynamics, vertical cross-sections of the model results show strong poleward flows with a narrow layer of equatorward flow near the coast. As a result of the effects of rotation on this poleward flow, the vertical cross-sections reveal offshore flow in the upper 40 meters and in a narrow layer over the shelf, with a thicker onshore layer between the two. These circulation patterns agree closely with observations.

9:00 am AOS-12 Numerical Forecasting of Hurricane Surges in Bays. W. C. THACKER, NOAA/AOML/SAIL, 15 Rickenbacker Cswy., Miami, FL 33149. Surges are anomalously high tides which are caused by strong winds pushing the sea up against the land. To forecast surges it is necessary to solve the hydrodynamic equations which govern the motion of the sea as it responds to the stresses of a hurricane. The highly populated areas around bays and estuaries where these forecasts are most needed are difficult to model because of their highly irregular coastlines and their variable bathymetry. These difficulties can be overcome by basing the computations on an irregular grid of triangular elements whose areas are proportional to corresponding depths with a boundary that conforms closely to the coastlines of the bays and barrier islands. This paper discusses fast finite-difference methods for irregular grids and a method for automating grid construction.

9:15 am AOS-13 Density Instabilities in the Main Thermocline. F. OSTAPOFF and S. WORTHEM, NOAA/AOML/SAIL, 15 Rickenbacker Cswy., Miami, FL 33149. Some 200 density profiles were obtained east of the Bahamas in November 1977. Special techniques were employed to obtain vertical resolutions in temperature and conductivity of better than 1 centimeter. It will be shown that the main thermocline structure is characterized by "layers" and "sheets" (Woods, 1968). The density signature of the sheets suggests that these instabilities are subject to "billowing" due to Kelvin-Helmholtz shear instability (Thorpe, 1977) covering about 10% of the vertical column in the thermocline. A conceptional model will be presented explaining the space-time evolution of a typical thermocline structure.

9:30 am Discussion

9:45 am BREAK

10:00 am NUMERICAL AND THEORETICAL MODELING IN TROPICAL METEOROLOGY

HUGH WILLOUGHBY, National Hurricane and Experimental Meteorology Laboratory, NOAA, Miami, presiding

10:00 am AOS-14 The Role of Nonlinearities in the Development of Easterly Waves in an Inhomogeneous Environment. LLOYD J. SHAPIRO, NOAA/National Hurricane and Experimental Meteorology Laboratory, Coral Gables, Florida 33124. In order to better understand the development of tropical easterly waves into tropical storms, idealized numerical experiments have been made of the nonlinear evolution of a barotropic Rossby wave. The simulations are designed to isolate and clarify the role of advective nonlinearities in the development process. The inhomogeneous basic state consists of a uniform easterly zonal flow together with a steady vorticity source distribution that maintains an isolated vortex. The Rossby wave develops due to interaction with the basic flow. Due to nonlinear vorticity advection, waves with a northwest-southeast tilt develop significantly more than those with a northeast-southwest tilt. The role of nonlinearities in enhancing development is discussed. The results will be related to the observed development of tropical easterly waves.

10:15 am AOS-15 The Effect of Predicted Surface Temperature and Cumulus Convection on the Florida Sea Breeze. JAMES M. GROSS, National Hurricane and Experimental Meteorology Laboratory/NOAA, Coral Gables, Florida 33124. In preparation to do three-dimensional simulations of the Florida sea breeze, some preliminary experiments were performed with a two-dimensional version of the model. These experiments were used to determine the effects of using a prediction equation for surface temperature and cumulus parameterization. The results indicate that better simulations of the sea breeze are possible when these effects are taken into consideration.

10:30 am AOS-16 The Initialization of a Mesoscale Hurricane Model with Real Data for Hurricane Eloise (1975). MICHAEL FIORINO, National Hurricane and Experimental Meteorology Laboratory/NOAA, Coral Gables, Florida 33124. A three-dimensional, fine-mesh tropical cyclone model has been initialized with data from the operational analysis of the National Meteorological Center for Hurricane Eloise 0000 GMT 21 September to 0000 GMT 22 September of 1975. Several modifications were made to the data set to insure a realistic specification of the boundary-layer winds, moisture, and the storm vortex-steering flow interaction. The impact of satellite estimates of surface winds, rainfall rates, and dynamic initialization by "nudging" on model predictive skill was assessed. Track forecasts were generally good. Dynamic initialization helped to develop mesoscale hurricane features in the rainfall pattern and prevented the erroneous weakening of the storm in the early portion of the forecast cycle. While satellite-sensed surface winds had little effect on model results, the rainfall data significantly upgraded the intensity prediction.

10:45 am AOS-17 Meteorological Factors in the COMSTAR Satellite Beacon Experiment* D. DAVIDSON, D. D. TANG, GTE Laboratories, Inc., Waltham, MA 02154, and S. C. BLOCH, University of South Florida, Tampa, FL 33620. Results of the continuing COMSTAR satellite beacon experiment will be presented with particular emphasis on meteorological effects in the diversity solution to the problem of maintaining reliable space-earth communications. In 1977 three receiving terminals were established in the Tampa area in order to study the propagation of the 19- and 29-GHz signals from the beacons aboard COMSTARS D-1, D-2, and D-3, the last of which was successfully launched on June 29, 1978. The Tampa triad, located in a region of rainfall which is very intense in summer, is a natural environmental laboratory for this study which involves scattering of electromagnetic waves from rain drops.

*Research supported by U. S. Army Research Office, GTE Laboratories, Inc., and GTE Satellite Corp.

11:00 am AOS-18 A New Three-Dimensional Hurricane Model. ROBERT W. JONES, National Hurricane and Experimental Meteorology Laboratory/NOAA, Coral Gables, Florida 33124. Recent results are given of simulations of a mature hurricane by a 12-layer, three-dimensional, nested grid hurricane model. This model is unique because the latent heating to drive the hurricane is by the resolvable scales of motion in contrast to parameterized cumulus heating. This model has a liquid water budget with rain and elementary cloud physics included.

11:15 am Discussion

11:30 am **Business Meeting of the Atmospheric and Oceanographic Sciences Section. Primera Casa 211.**

Friday 1:00 pm Anthenium 100 **Annual Business Meeting of the Academy**

Friday 2:00 pm Primera Casa 211

HURRICANE WARNING, FORECASTING, AND PREPAREDNESS

JOHN HOPE, National Hurricane Center, NOAA, Miami, presiding

2:00 pm AOS-17 Regression Estimation of the Probability of Tropical Cyclone Recurvature. PRESTON W. LEFTWICH, JR., NOAA, NWS, National Hurricane Center, PO Box 8286, Coral Gables, FL 33124. Recurvature of tropical cyclones often poses critical forecast problems. To provide an aid in early identification of such situations, regression equations which estimate the probability of recurvature of Atlantic tropical cyclones were developed. The Regression Estimation of Event Probability (REEP) technique was applied for forecast periods of 36 and 72 hours. Predictors include latitude, longitude, day number, maximum sustained wind, and speed and direction of motion. Developmental procedures and results of tests on independent cases from the 1978 Atlantic tropical cyclone season will be discussed.

2:30 pm AOS-18 On the Use of Objective Guidance in the Prediction of Tropical Cyclone Motion. CHARLES J. NEUMANN, NOAA National Hurricane Center, Coral Gables, FL 33124. The output from a number of objective models are routinely made available to the operational hurricane forecaster preparatory to the issuance of tropical cyclone advisories. Both statistical and dynamical as well as the combined statistical-dynamical models, the latter using the output from a numerical model in a statistical prediction framework, are used. This paper reviews these various models and comments on their overall utility from the point-of-view of timeliness, economy and accuracy. It is shown that in areas with adequate tropospheric data coverage, the purely dynamical and the statistical-dynamical models typically outperform the purely statistical models. However, in areas of inadequate data coverage where analysis is highly uncertain, the simpler statistical models typically out-perform the more sophisticated models. Since the various tropical cyclone basins will continue to be characterized by both data-rich and data-poor areas, both statistical and dynamical models will be needed to satisfy the needs of the forecaster.

3:00 pm BREAK

3:15 pm AOS-19 The Use of Hurricane Statistics in Hurricane Preparedness. PAUL J. HEBERT, NOAA, National Weather Service, National Hurricane Center, P. O. Box 248286, Coral Gables, FL 33124. Raw statistics on the temporal and spatial frequency of hurricanes and their associated deaths and damages can be misleading. Lists of such statistics have been compiled for the United States. These lists reveal much useful information after various stratifications have been made. Examples of this usefulness are presented for application to a broad spectrum of hurricane preparedness ranging from building risk to disaster mitigation.

3:45 pm AOS-20 On the Accuracy of Hurricane Track Forecasts. CHARLES J. NEUMANN AND JOSEPH M. PELISSIER, National Hurricane Center, P.O. Box 8286, Coral Gables, FL 33124. Trends in the accuracy of tropical cyclone track forecasts during the past twenty-three years are examined. Accuracy is measured in terms of mean annual forecast errors. Such errors are found to be functions of several factors besides "skill". Although errors statistics show large year-to-year fluctuations, the long term trend is characterized by significant improvement during the period 1959-1966 and a leveling-off period in recent years. The period of improvement coincided with the development of objective analyses and forecast models and improvement in observing systems, including the advent of weather satellites. Reasons for lack of continued improvement are more subtle, but the effects of such factors as inadequate middle level steering information are assessed. Current hurricane prediction research topics are discussed.

Saturday 9:00 am Primera Casa 211

Session A: CUMULUS RESEARCH IN FLORIDA

ROBERT SAX, National Hurricane and Experimental Meteorology Laboratory, NOAA, Miami, presiding

9:00 am AOS-21 The Florida Area Cumulus Experiment. ROBERT I. SAX, National Hurricane and Experimental Meteorology Laboratory, P. O. Box 248265, Coral Gables, Florida, 33124. A cumulus modification experiment aimed at understanding atmospheric convective processes with a view towards increasing rainfall has been carried out in South Florida since 1970. Results of the first (exploratory) phase (1970-1976) of the program indicate a strong probability that rainfall within the 13000 km^2 target area has been increased through the seeding of cumulus clouds on days selected for experimentation. A confirmatory phase of the program is currently underway with the objective of verifying the rainfall results. A description of the physical hypothesis, methodology, analytical procedures and results will be provided. An overview of cumulus research carried out within the scope of the overall program will also be provided with an emphasis on studies describing characteristics of the South Florida cloud condensation nucleus (CCN) aerosol.

9:15 am AOS-22 Patterns of Florida Summertime Convection. VICTOR WIGGERT and GLORIA LOCKETT, National Hurricane and Experimental Meteorology Laboratory, P. O. Box 248265, Coral Gables, Florida, 33124. The weather radar at the National Hurricane Center in Miami supplies rainshower echo data over a square domain 11 x 10^4 km^2 centered on Miami. Based on a 16-day sample, echo areas, populations, volumetric rain rates and area average rain intensities are shown to vary with time, with stage in growth cycle, with merger (or lack thereof), with location (over land or water) with strength of the mean lower tropospheric wind and with motion (or stationarity) of the echoes. In general, the largest rain volumes, areas, and average intensities tend to be from echoes which are merged, or over land, or stationary, or embedded in light winds. There usually are more unmerged than merged echoes. Diurnal variation of average area and population are greater for over land than over water echoes. Average rain intensity of growing echoes exceeds that of dying echoes of the same size.

9:30 am AOS-23 The Lightning Hazard in Florida. MICHAEL W. MAIER, National Hurricane and Experimental Meteorology Laboratory, P. O. Box 248265, Coral Gables, Florida, 33124. During the period 1959 to 1976 lightning was responsible for a reported 192 deaths and 453 injuries in the state of Florida. During that same period hurricanes and tornadoes combined were responsible for 86 deaths in Florida, less than half the total attributed to lightning. These casualty statistics combined with a reported 5.4 million dollars of property damage in Florida during the same period clearly indicate lightning is the state's leading natural hazard. This paper shall present results of an analysis of 456 lightning fatality, injury and damage reports contained in the monthly severe weather summary Storm Data. Temporal and spatial patterns of lightning deaths and damage are examined and correlated with population distribution and growth patterns as well as observed thunderstorm and cloud-to-ground lightning frequencies.

9:45 am BREAK

10:00 am AOS-24 Atmospheric and Hydrological Response to the South Florida Surface Moisture Distribution. PATRICK T. GANNON, SR. AND ORESTES MAYO, National Hurricane and Experimental Meteorology Laboratory, P. O. Box 248265, Coral Gables, Florida, 33124. Initial surface conditions are sought for a three-dimensional numerical model simulation of the sea breeze of August 19, 1975. Within each 11 km x 11 km grid square over the South Florida domain, weighting factors were determined for land, water, soil type, vegatation and cultural features. For permeable land surfaces, a soil moisture program calculates drainage evapotranspiration and reverse water flux to estimate surface soil moisture profiles. Evapotranspiration is estimated from consideration of cloud cover as seen on satellite imagery, wind run analyses and pan evaporation observations. Five sources of rainfall data are exploited for daily rain input. Surprisingly large spatial and temporal variations in soil moisture content have interesting meteorological consequences. Cultural development has created large climatological anomalies in sensible and latent heat fluxes.

10:15 am AOS-25 The June 15, 1973 Tornado in the FACE Network. RONALD L. HOLLE and MICHAEL W. MAIER, National Hurricane and Experimental Meteorology Laboratory, P. O. Box 248265, Coral Gables, Florida, 33124. A tornado was observed within a NOAA research data network south of Lake Okeechobee on June 15, 1973. Study of the surface wind and rainfall station records shows that outdrafts can be tracked from two thunderstorms 25 km away from the eventual tornado site. The outdrafts met, formed a new cloud line, and a tornado dropped from the growing cloud line for about 10 minutes. The tornado is described in terms of photographs, wind, radar, and rainfall fields. In particular, this fairly typical summer tornado in Florida formed in an environment of local forcing, no shear, weak winds and neutral stability. These conditions are similar to those during waterspout formation situations in Florida, but very different from the typical mid-latitude tornado environment. This tornado study is apparently the first where such a storm passed through a dense surface data network in the tropics or subtropics.

10:30 am AOS-26 A Geographic Approach to the Estimation of Evapotranspiration in Southwest Florida Water Management District. CECIL E. PALMER, Southwest Florida Water Management District, 5060 U. S. Highway 41 South, Brooksville, Florida 33512. Four evapotranpiration (Et) estimating models (Penman - 1948, Blaney-Criddle - 1962, Christiansen - 1966, and Thornthwaite - 1948) were evaluated in terms of suitability to the area and data availability. The District was divided into one kilometer square cells, and climatic, soil type and land use information assigned to each cell. Soil Conservation Service runoff curves were used to estimate the percentage of monthly rainfall lost by direct runoff. Potential and actual evapotranspiration were estimated for each cell and output as a computer-generated map. Average Et values for larger areas can develop by aggregating cells within the delimited area. There is reasonable correspondence between estimated Et using Thornthwaite and observed rainfall and runoff data.

Saturday 9:00 am Primera Casa 212

Session B: GENERAL OCEANOGRAPHY

DONALD ATWOOD, Atlantic Oceanographic and Meteorological Laboratories, NOAA, Miami, presiding

9:00 am AOS-27 Identification and Characterization of Hard Bottom Areas on the Georgia-South Carolina Outer Continental Shelf. DAVID A. GETTLESON, Continental Shelf Associates, Inc., P. O. Box 3609, Tequesta, Florida 33458. Geophysical instrumentation, which included a side scan sonar, subbottom profiler and a precision fathometer, was tested for its efficacy in mapping hard bottom areas within four oil and gas lease blocks on the outer continental shelf off Georgia and South Carolina. The identified hard bottom areas were observed with a towed underwater television/still camera system and sampled with both biological and rock dredges. The identified biological assemblages associated with the hard bottom areas are described and discussed in terms of environmental variables.

9:15 am AOS-28 Results of a Monitoring Program for Exploratory Drilling Operations Near the East Flower Garden Bank, Gulf of Mexico. DAVID A. GETTLESON and RUSSELL E. PUTT, Continental Shelf Associates, Inc., P. O. Box 3609, Tequesta, Florida 33458. The monitoring program consisted of (1) defining the spatial distribution of discharged drilling fluids and cuttings relative to the drillsite through water and sediment sampling, sediment traps, and current meters; and (2) assessing the apparent health of predominant reef-building corals in the Coral Reef Zone of the East Flower Garden Bank before, during and after drilling operations through visual observations and photo documentation at a site located 4.32 nautical miles from the drillsite. Plume studies and benthic sampling results demonstrated that detectable quantities of the drilling fluids were distributed to a maximum distance of between 500 and 1000 meters from the drillsite by a directionally complex, low velocity water current. The results of the Coral Reef Zone observations and photographic documentation indicated that the drilling operations had no apparent effect on the monitored corals.

9:30 am AOS-29 Discovery and Geochemistry of a Major Subsurface Oil Layer in the Tropical North Atlantic. GEORGE R. HARVEY AND ADOLPHO REQUEJO, Ocean Chemistry Laboratory, NOAA, 15 Rickenbacker Causeway, Miami, FL 33149. A 100m thick layer of water containing 10mg/l of weathered crude oil was discovered east of the Lesser Antilles at a subsurface depth of 200m. The full dimensions of the layer are unknown but at least 0.5 millions tons of oil is present. In addition to the oil, the unique array of fatty acids and sterols associated with the layer is suggestive of a resident microbial population. We estimate from the degree of weathering of the parafinic and aromatic hydrocarbon fractions that the oil has been in the sea for 1-2 years. Theories on the source of this oily layer will be discussed.

9:45 am BREAK

10:00 am AOS-30 Problems Associated with Measuring Primary Productivity in the Open Ocean. PETER ORTNER, Ocean Chemistry Laboratory, NOAA, 15 Rickenbacker Causeway, Miami, FL 33149. To measure primary productivity biological oceanographers have typically conducted ^{14}C-uptake experiments modeled upon dark/light bottle oxygen evolution experiments. A significant underestimate may be intrinsic to open ocean estimates generated in this fashion. Experimental artifacts result from following the recommended (Strickland and Parsons) analytical procedures and subsequent calculations. Confounding effects include: trace metal poisoning, heterotrophic uptake, cell leakage and carbonate disequilibria. Procedures remedying these artifacts are discussed and some new approaches are adumbrated.

10:15 am AOS-31 Characteristic of a Submarine Geothermal Spring on the West Florida Shelf. K. A. FANNING, P. R. BETZER, R. H. BYRNE, J. A. BRELAND AND R. R. JOLLEY, University of South Florida, 830 First Street, South, St. Petersburg, FL 33701. The physical, chemical, geological and biological aspects of a submarine geothermal spring on the West Florida Continental Shelf were examined. Flow rate measurements from a major discharge orifice at Mud Hole Submarine Spring (MHSS) indicate that the flow rate of this spring is greater than 2.3×10^6 l/day, and that the discharge rate is apparently influenced by tidal fluctuations. Transmissometry studies of the prominent turbidity plume at the spring show that the plume originates very near a major discharge vent although the discharge itself is initially clear. Although water discharges from the vent at about 36°C, the water temperature of turbid surface water is often less than for surrounding surface water. Undiluted water from the discharge has a salinity averaging 34.9 °/oo, fresher than surrounding waters. It is depleted in Mg^{2+} and is considerably enriched in Ca^{2+}. The discharge water has a very low concentration of dissolved oxygen and significantly lowered pH and alkalinity. Some inorganic nutrients (nitrate, ammonia and phosphate) are present at very low concentrations. Petrographic analyses revealed an unusual abundance of semi-opaque, rounded, amorphous appearing tan-colored particles 0.05 mm to 0.2 mm in size within the turbidity plume. Benthic epifauna and nekton appear considerably enriched in the spring area. Both MHSS and a second spring which has been discovered, Steward Spring, have associated with them one or more large loggerhead sea turtles.

10:30 am AOS-32 Trace Metal Geochemistry of Florida Gulf Coast Sediments. JOHN H. TREFRY, Dept.of Oceanography, Florida Institute of Technology, Melbourne, FL 32901 and PETER H. FELDHAUSEN, Dames and Moore, 7101 Wisconsin Ave.,Washington, DC 20014. Total and leachable Ba,Cd,Cr,Cu,Fe,Ni,Pb,V and Zn in more than 400 sediment samples from the Florida Gulf Coast provide insight to the provenance and distribution of these metals. Using trend surface analysis, total metal concentrations show a pattern of increasing levels offshore and to the west. Independent variables responsible for this trend are sediment clays and organic carbon. Leachable metal concentrations from a 1 N HNO_3 treatment show a trend of increasing V,Fe,Zn and Pb to the west, Cu and Ni to the southwest and Cd,Ba and Cr to the south, the southward trend coincident with increased $CaCO_3$. A third data set, percent metal leached, shows near complete metal removal from the carbonate-rich central shelf with lower percent removal from nearshore non-carbonate sands and outer shelf, clay-containing sediments, thereby indicating areas and degrees of metal availability. Statistical ordination shows five distinct trace metal regions and several modes of metal accumulation.

BIOLOGICAL SCIENCES SECTION

(jointly with the AGRICULTURAL SCIENCES SECTION)

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Primera Casa 213

Session A: FISH BIOLOGY

WILLIAM S. ALEVIZON, Florida Institute of Technology, presiding

9:00 am BSS-1 Simulated Effect of a Fish Trap on Reef Fish. JAMES M. GROSS AND P. SCHROEDER, South Florida Environmental Research Foundation, 11550 S.W. 108 Ct., Miami, FL 33176. Some controversy surrounds the use of fish traps on Florida reefs. In order to examine their effects a simple numerical model was designed. The model assumes that reef fish can be divided into two classes, catchable and uncatchable. The reef has a carrying capacity and recruitment rate for each class. Entrapment is a function of the number of catchable fish and the carrying capacity of the trap. Preliminary results are obtained for a single trap which is pulled periodically, lost indefinitely, and lost but opened after a long period of time.

9:15 am BSS-2 An experimental comparison of reef fish community structure on Florida and Australian model reefs. JAMES A. BOHNSACK, Department of Biology, University of Miami, Coral Gables, FL 33124. Six model reefs were monitored in Florida over a period of 41 months. Census results were compared to published results from eight similar reefs constructed at similar latitude on One Tree Island Reef, Australia. Similar values found for Florida (F) and Australian (A) reefs were: total number of observed species (89 F vs. 85 A), total number of families (31 F vs. 31 A), species per residency category (55 F vs. 58 A residents, 26 F vs. 22 A visitors, 8 F vs. 5 A transients), and mean number of individuals per monthly census ($\bar{X}$ = 65.0, s^2 = 824 F vs. $\bar{X}$ = 86.7, s^2 = 2000 A). Despite a 50% larger Australian species pool (517 vs. 800), Florida reefs had significantly more species per monthly census ($\bar{X}$ = 17.1, s^2 = 12.4 vs. $\bar{X}$ = 12.8, s^2 = 4.5) ($p < 0.01$). Environmental disturbance, via more extreme water temperatures in Florida, may allow greater species packing in Florida, consistant with the intermediate disturbance hypothesis. Supported by NSF, N.H.M.I., and the University of Miami.

9:30 am BSS-3 Fish Density as a Function of Reef Size. SCOTT P. BANNEROT, Dept. of Biology, University of Miami, Coral Gables, FL 33124. A random visual technique is used to assess diurnal density of coral reef fishes on a series of five isolated patch reefs off Newfound Harbor Keys, Monroe County, Florida. Species are divided according to diel activity pattern and the densities of the two groups are compared to reef size. Diurnally inactive species density showed a significant inverse relation to reef size, while diurnally active species density showed a direct relation to reef size. Greater diversity and abundance of microhabitats on larger reefs may cause higher diurnally active fish density. It is suggested that diurnally inactive fish density is related to the ratio of reef area to nearby foraging area, which is lower on smaller reefs. Within reef density variation is higher for diurnally inactive species due to the patchy distribution of large resting schools.

9:45 am BSS-4 A Description of the Fish Assemblage Associated with a Calcium Carbonate Reef off the Florida Keys. DOUGLAS E. COLTON AND W. S. ALEVIZON, Florida Institute of Technology, Melbourne, Fl 32901. The composition of the fish assemblage associated with a calcium carbonate reef located off Plantation Key, Florida was investigated over an 11 month period and compared with a hard coral reef fish assemblage in the immediate area. Fish species were censused through use of timed visual observations made by a SCUBA diver. To obtain an indication of dominant species by day and night, species were ranked according to order of sighting. The fish assemblage associated with the calcium carbonate reef was found to be similar in species composition and richness to that of the nearby coral reef. However, the two assemblages differed considerably both by day and night with regard to the dominant species active at those times and the relative abundances of the component species.

10:00 am BREAK

10:15 am BSS-5 Seasonal abundance, growth and reproduction of fishes caught by seining in McKay Bay, Tampa Bay System, FL. RAYMOND A. SCHLUETER AND W. WAYNE PRICE, University of Tampa, Tampa, FL 33606. Thirty species of fish (14,297 specimens) were caught by seining from May 1977 to August 1978 in 24 collecting trips. Large numbers of species and individuals were present from May through July. Lowest number of individuals was in late August and September. Lowest diversity was in January and February. These changes were apparently related to seasonal changes in water temperature and/or seasonal migrations. Seasonal growth can be demonstrated for Lagodon rhomboides, Leiostomus xanthurus, Mugil cephalus, and Pogonias cromis. Reproductive data is given for Fundulus similis, F. grandis, Cyprinodon variegatus, and Menidia beryllina. These species have a protracted spawning season. Most spawning occurred in spring, early summer, and to a lesser degree in late fall.

10:30 am BSS-6 Reclassification of the Teleostean Fishes Related to The Echeneidae. LOUIS E. FISHER,JR. Florida Atlantic University, Boca Raton, Fl. 33431. Monotypic classifications, when retained at the family level, often lead to confusion in attempts to construct phylogenies or to infer relationships between higher or lower taxa. To a certain degree this problem is evident in past considerations of Cobia (Rachycentron canadus) and the Remoras (Echeneidae). An examination of the behavior and a re-examination of the morphology and osteology of Cobia and the Remoras was conducted. Photographs of the fossil remora Opistomyzon glaronensis from the Upper Eocene of Switzerland were examined and compared to Cobia and extant Remora species. Based on these comparative findings it is suggested that all three taxa be reclassified at the subfamily rank in the family Echeneidae.

Friday 11:00 am Primera Casa 213 Annual Business Meeting of the Biological Sciences Section.

Friday 11:00 am Primera Casa 214 Annual Business Meeting of the Agricultural Sciences Section.

Friday 9:00 am Primera Casa 214

Session B: ANIMAL PHYSIOLOGY AND BEHAVIOR: I.

FRANK E. FRIEDL, University of South Florida, presiding

9:00 am BSS-7 Feeding Biology of Some Florida Sacoglossans. KATHE R. JENSEN, Dept. Biol. Sci., Florida Inst. Techn., Melbourne, FL. 32901. Most sacoglossans feed on the cell sap of siphonalean green algae, but some have very different diets. Elysia evelinae feeds on the cell sap of Isthmia, a chainforming diatom. Its radular teeth have thick borders and tip. Elysia serca feeds on Halodule wrightii, making a zig-zag pattern of emptied cells where it has been feeding. Its teeth are identical to those of E. clena, with which it is probably synonymous, and with those of E. catulus, which feeds on Zostera marina. The radula and alimentary system clearly shows that the primitive Ascobulla ulla is a sacoglossan. It feeds on several species of Caulerpa. The process of feeding in Oxynoe n. sp. and O. antillarum is very complicated. Two enormous muscular bulges attached to the anterior end of the pharynx are everted when feeding begins. They completely surround a Caulerpa filament, which is pulled into the mouth, slit open by the radula, and the cell sap sucked out. Mourgona germaeinae feeds on Cymopolia barbata. It has extremely long barbed teeth, which fits into the holes in the algal "skeleton".

9:15 am BSS-8 Characteristics associated with chloroplast symbiosis in ascoglossan molluscs. K.B.CLARK, H.M.STIRTS, And A. GOETZFRIED, Florida Institute of Technology. Three families of Ascoglossa are presently known to contain species that retain functional chloroplasts from algal foods. Pericardial veins and extensively ramified digestive gland diverticula are found in most plastid-retentive species, suggesting that the families Volvatellidae and Juliidae may contain plastid-retentive species. Plastid retention is correlated with tropical distribution, stable food resources, and extended embryonic development. The functionality of symbiotic plastids bears no direct relationship to retention time, but is influenced by temperature and light intensity. Plastid symbiosis appears to represent one characteristic of a broad set of adaptations that stabilize ascoglossan populations.

9:30 am BSS-9 Behavioral Adaptations of Symbiotically Autotrophic Ascoglossa to Light. S. WEAVER AND K. B. CLARK, Dept. of Biological Sciences, Florida Institute of Technology, Melbourne, Fl 32901. This study examined preferences to light quantity and quality of several species of Ascoglossa to determine if species that retain symbiotic chloroplasts show behavioral adaptations which could enhance photosynthesis. Observed were Costasiella lilianae and Elysia tuca, both chloroplast retainers, and Oxynoe antillarum, a non-retainer. When allowed to choose between darkness and light of various intensities, Oxynoe avoided light, Costasiella were strongly attracted to light of all intensities, and Elysia were attracted to light at lower intensities but avoided higher intensities. When exposed to light of different colors, Oxynoe showed no significant preferences, Costasiella preferred shorter wavelengths of light, and Elysia preferred longer. Thus, chloroplast retaining species exhibited behavioral preferences to light intensity and wavelength while non-retaining species did not. Light preferences may reflect a balance between photosynthetic benefit and predator avoidance.

9:45 am BSS-10 Growth rings in the ossicles of Nidorellia armata (Asteroidea: Oreasteridae). JOHN M. LAWRENCE, University of South Florida, Tampa, FL 33620. Terminal ossicles of Nidorellia armata collected from the intertidal zone at Panama City, Panama, show growth rings similar to those reported for the plates of echinoids. The bases for the deposition of the growth rings is not known. I thank Dr. Gordon Hendler for his assistance in collection.

10:00 am BREAK

10:15 am BSS-11 Hermaphroditism in the starfish Luidia clathrata (Say) (Echinodermata: Platyasterida). PAULA F. DEHN. Univ. of South Florida, Tampa, FL 33620. Normally the sexes of Luidia clathrata are separate. The numerous gonads per ray are arborescent sac-like structures that are lined with germinal cells. The gametes arise adjacent to the basal lamina. The ovaries give rise to oocytes which grow and fill the lumen of the unspawned ovary. The testes give rise to spermatogonia, which give rise to spermatocytes, spermatids, and mature sperm which fill the lumen of the unspawned testis. In the hermaphroditic gonad, each acinus gives rise to both oocytes and sperm. Both oocytes and sperm arise from the same area along the basal lamina. In some acini oocytes dominate while in others sperm are predominant. In acini which contain large numbers of both gametes the sperm completely encircle the oocytes, which seemingly is an efficient packing arrangement. Hermaphroditism is not usual. This report is of a single incident of a hermaphroditic individual in more than 1200 individuals examined during the reproductive seasons of 1974-1978.

10:30 am BSS-12 Respiratory electron transport activity during larval development of Lytechinus variegatus (Echinodermata: Echinoidea). LARRY R. MCEDWARD, Univ. of South Florida, Tampa, FL 33620. The energetic metabolism during larval development was estimated by measuring the respiratory electron transport activity. The mean activities (ug at O/h/mg protein) for five stages were: blastula, 2.51; gastrula, 2.03; prism, 2.14; two-arm pluteus, 2.86; four-arm pluteus, 1.13. The mean specific activity of the four-arm pluteus was significantly lower than that of the two-arm pluteus and the blastula. All other comparisons between means were not significant (Student-Newman-Keuls multiple range test, $p < 0.05$). The results suggest that the known increase in oxygen utilization by larvae between hatching of the blastula and development of the pluteus is due to an increase in the amount of metabolically active tissue in the larva rather than to an increase in specific electron transport activity.

Friday 11:00 am Primera Casa 213 Annual Business Meeting of the Biological Sciences Section.

Friday 11:00 am Primera Casa 214 Annual Business Meeting of the Agricultural Sciences Section.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

Friday 2:30 pm Primera Casa 213

Session A: MARINE ECOLOGY

ERNEST D. ESTEVEZ, New College of the University of South Florida, presiding

2:30 pm BSS-13 Recolonization of Intertidal Infauna Following Different Frequencies and Areas of Small-Scale Disturbance. C.E. PROFFITT, J.L. SIMON, S. VEST AND S. SZEDLMAYER, Department of Biology, University of South Florida, Tampa, FL 33620. Experimental Sites were disturbed by removal of various numbers of 10 cm diameter cores at different frequencies to simulate non-selective predation. While infaunal species richness in control areas declined, increasing frequency of disturbance led to elevated numbers of species over two weeks. Total densities in control sites increased over week one and decreased over week two. At any one sampling time, greater frequencies of disturbance tended to result in higher densities. Increasing area of disturbance yielded lower species richness and total density after two weeks than in controls or any other treatment. There was greater within site species similarity in disturbed plots relative to controls, suggesting disturbance may be permitting co-habitation over smaller areas than occurs in undisturbed sites.

2:45 pm BSS-14 The relationship between sediment characteristics and the distribution of Luidia clathrata (Say) (Echinodermata: Asteroidea). THOMAS S. KLINGER, Univ. of South Florida, Tampa, FL 33620. The density and distribution of Luidia clathrata in Charlotte Harbor, Florida show no significant correlation with the grain size or the amino acid, carbohydrate, and organic levels of the sediment. It is concluded that variations in the substratum are generally too minute to significantly affect the distribution of L. clathrata.

3:00 pm BSS-15 A Computer Simulation Model of Heavy Metal Cycling in the Turtlegrass (Thalassia) Community. PETER SCHROEDER AND A. THORHAUG, South Florida Environmental Research Foundation, 11550 SW 108 Ct., Miami, FL 33176, and Florida International University, Miami, FL 33199. An eight compartment mathematical model of heavy metal cycling in turtlegrass flats has been written in BASIC and simulated on a microcomputer. Coefficients of the model were based on experiments using radionuclides in microcosms held at different temperatures and salinities. Simulations are presented of heavy metal uptake and release from biological compartments when long-term low-level releases and short-term pulses are introduced to the environment.

3:15 pm BSS-16 Oil and Mangrove Forests: The Aftermath of the Howard Starr Oil Spill. ROY R. LEWIS, III, Mangrove Systems, Inc., 5700 Memorial Hwy., 202-D, Tampa, FL 33615. On the morning of October 5, 1978, the M/V Howard Starr discharged 150,000 liters of oil (80% bunker c, 20% diesel) into Hillsborough Bay, Florida. Much of the oil contaminated mangrove forests in Hillsborough Bay and localized invertebrate mortalities (Melongena corona, Laeonereis culveri) were observed within 72 hours of the spill. Death of oiled mangroves did not begin until 3 weeks after the spill and are continuing. A joint investigation of the spill has been undertaken by the Hillsborough County Environmental Protection Commission and the author. The investigation will continue for 12 months and will include vertical false color infrared photography of the oiled forests at 6 month intervals. The results to date are discussed in relation to other oil spills in mangrove forests in Puerto Rico and the U.S. Virgin Islands.

3:30 pm BREAK

3:45 pm BSS-17 Manatee (Trichechus manatus) Mortalities in Flood Control Structures in South Florida. SANDRA K. BARRETT, RSMAS, 4600 Rickenbacker Cswy, Miami, Fl 33149. A study is being conducted of the relationship between manatee mortalities and automatic flood control structures in Southeast Florida. From 4/74 to 12/78, 18 of 84 deaths were attributed to this cause, and this is probably an underestimate of the total. Behavioral observations at structures where animals have been repeatedly killed are providing information to clarify specific causes of death and to propose preventative measures. At one dam, 68 sightings have been made in 105.8 hours of observation in 1978. Animals approach the dam closely and spend considerable time there. Manatees are seen more below the dam than above, and the data suggests a diurnal pattern (p .01) of occurence. Causes of death are crushing, drowning and separation of mother and young. Deaths may be decreased by structures for preventing animals from passing upstream through the dam and by dam operation changes. This source of mortality is easier to control than boat kills, so should receive serious attention.

4:00 pm BSS-18 Patterns of Sea Turtle Mortality on the East-Central Florida Coast, 1977-78. L. M. EHRHART, Dept. of Biological Sciences, Univ. of Central Florida, Box 25000, Orlando, FL 32816. Significant numbers of dead Atlantic loggerhead turtles (Caretta caretta) began to appear on Brevard and Volusia County beaches in November and December, 1977, when at least 34 carcasses stranded. The observed mortality rate subsided to approximately one per week from January to September, 1978. In late September and early October massive mortality was observed. Records of 84 carcass strandings, mostly from within the city limits of Cocoa Beach, were cataloged in a ten-day period. Only one green turtle (Chelonia mydas) carcass was reported; in June, 1978. Causes of the mortality remain obscure.
Research supported by NASA Contract No. NAS 10-8986.

4:15 pm BSS-45 Restoration of Impacted Florida Estuaries. ANITRA THORHAUG, Florida International University, Tamiami Campus, Miami, FL 33149. Many of the major nearshore bodies of water have been badly impacted by man's activity and expansion during the last 50 years. Juvenile or nursery stages of commercial and sports fisheries organisms are thus removed from the nearshore waters. In north Biscayne Bay, damages since 1896 have resulted in denudation of the dominant vegetation. Three meetings of community leaders concluded that restoration was not only feasible but a high priority. The first two major plantings, after a series of test plots showing feasibility, were done summer 1978. 40,000 Thalassia testudinum seedlings were put in each of two sites with 4,000 plugs of Halodule wrightii. The Halodule wrightii grew vigorously in all sites, as did Thalassia, with blades up to 18 cm, 4 roots per plant up to cm two months after planting.
The support of the Dade County Water and Sewer Authority and the Dade Seaport is gratefully acknowledged.

4:30 pm BSS-46 Pilinia earleae n. sp. from the Florida Gulf coast. SUSAN B. GALLAGHER and HAROLD J. HUMM, Department of Biology, Eckerd College, St. Petersburg, FL 33711 and Department of Marine Science, University of South Florida, St. Petersburg, FL 33701. Pilinia earleae (Chlorophyta, Chaetophorales, Chroolepidaceae) was found in the Tampa Bay area of the Florida west coast in October, 1976, on the tunic of an ascidian, later on dead mollusc shells, a nylon fishing line, plastic strips, and as an epiphyte of Gracilaria foliifera, a red alga. It is described on the basis of abundant material from the natural environment and laboratory cultures. The type locality is the southernmost known for the genus in the western north Atlantic ocean.

Friday 2:30 pm Primera Casa 214

Session B: ANIMAL PHYSIOLOGY AND BEHAVIOR: II.

STEPHEN W. CARNEY, Connell, Metcalf, and Eddy, presiding

2:30 pm BSS-19 Patterns of Ossification in the Embryonic Chick's Columella. S. A. BOHMER AND G. M. COHEN. Florida Institute of Technology, Melbourne, Fl 32901. During embryonic and fetal development, the chick's columella (auditory ossicle) transforms from cartilage to ossified bone. Until stage 40 (14th day) the columella consists largely of hyaline cartilage. Then a zone of endochondral hypertrophication, the precursor of osseous tissue, appears immediately distal to the footplate and is bordered distally and proximally by zones of proliferating cartilage. The hypertrophication extends proximally into the footplate and distally along the shaft. The osseous tissue forms vascularized sinuses centrally, which as red marrow serve a hemopoietic function in the adult, and extends through the extracolumella. By comparison, the extracolumella, which is attached to the tympanum distally and the columella proximally, remains cartilaginous in the adult. Specimens were decalcified and embedded in paraffin; sections were selectively stained to reveal cell and tissue types.

2:45 pm BSS-20 Cardiac Glycoside Storage in Two Species of Moths Occuring in Florida. DAVID W. BLACK, South Florida Environmental Research Foundation, 11550 Southwest 108 Ct., Miami, FL 33156. A colorimetric assay based on 2,2',4,4'-tetranitrodiphenyl was used to determine cardiac glycoside levels in adults of three species of moths that feed as larvae on the exotic ornamental shrub Nerium oleander L. Syntomeida epilais Walk. (Ctenuchidae) and Empyreuma pugione L. (Ctenuchidae) were found to contain concentrations of cardiac glycosides greater than 10^{-5} moles per gram dry weight. Such concentrations could afford protection against predation by birds. Composia fidelissima Bates (Pericopidae) lacked detectable cardiac glycosides when reared on N. oleander. S. epilais was discovered to be feeding in nature on a native vine, Urechites lutea (L.) Britt., which contains cardiac glycosides. When reared on this native foodplant, the moths contain high concentrations of cardiac glycosides.

3:00 pm BSS-21 Growth of Crocodile Hatchlings in South Florida Canals of Varying Salinities. STEPHEN W. CARNEY, Connell Metcalf & Eddy, 1320 So. Dixie Highway, Coral Gables, Florida 33134. Growth parameters of crocodile hatchlings (Crocodylus acutus) have been measured for five months in a group of canals in south Florida. During this period the average salinities in these canals ranged from 2.4 ppt to 37.7 ppt. The relatively constant growth rates apparently are not affected by the wide variation in ambient salinity. The monitoring of these animals is continuing.

3:15 pm BSS-22 Physiological and Behavioral Responses to Social Stress in the Bonnethead Shark Sphyrna tiburo. L. DRAPER, A. BEULIG AND J. DALEZMAN, New College of USF, Sarasota, FL 33580. Alterations in the behavior of sharks have been considered an indication of stress in previous work. In this study, physiological change was investigated as a possible measure of stress and compared with behavioral alterations We observed the effects of group size on swimming speed and blood composition. Bonnetheads were captured by gillnet, acclimated for 2 weeks, then confined in tanks as 6 isolates, 2 groups of 3, and a group of 6. Blood samples were collected at capture, prior to grouping, and after the six day experimental period. Behavior indices were recorded 4 times daily for one-hour periods. Behavioral results indicate that isolation is the most stressful condition. Isolation showed highest average swimming speed and greatest frequency of "climbing". Physiological indicators showed a significant group effect. Hematocrit decreased in the isolates and group of six. The physiological measures corroborate the behavioral measures and reveal a significant effect of group size on stress in the Bonnethead shark.

3:30 pm BREAK

3:45 pm BSS-23 Behavioral Patterns of an Island-bound Colony of Lemur catta: A Preliminary Study. BARBARA E. ROTHSTEIN, Crandon Park Zoo, Key Biscayne, FL 33149. The behavioral repertoire of a quasi-wild zoo colony of the ring-tailed lemur, Lemur catta, is being catalogued. The members of the colony show definite, predictable social patterns. Food sources provided by the zoo are only partially utilized. The lemurs supplement this food with island vegetation. Food habits are being studied by field observations and fecal analysis. Activity patterns show a modified crepuscular pattern.

The author thanks the administrators and staff of the Crandon Park Zoo for their support and encouragemnet.

4:00 pm BSS-24 A Method for Determination of Mutant Allelic Gene Frequencies for Felis catus. ANDREW S. MOUNT AND STEPHEN MONALOY, University of Tampa, Box 1396, Tampa, FL 33606. The gene frequencies for five mutant alleles were observed and calculated for a population of domestic cats in Burlington County, New Jersey. The study, due to small sample size, made comparison to other populations unwarranted. However, all observed alleles were found to be in concordance with previous published data. A comprehensive and effective method of diagnosis and determination of mutant allelic frequencies was developed for the research.

Saturday 8:30 am Primera Casa 213

Session A: PLANT BIOLOGY

SHEILA D. BRACK-HANES, Eckerd College, presiding

8:30 am AGS-1 Yield and water use of selected vegetable crops with seep and drip irrigation. A. A. CSIZINSZKY, Agricultural Research & Education Center, 5007-60th St E, Bradenton, FL 33508. Experiments were conducted in the spring of 1978 to compare the effect of seep and drip irrigation on the yield of broccoli, B. oleracea var. italica cv. Green Comet Hybrid; sweet corn, Z. mays cv. Silver Queen and zucchini squash, C. pepo cv. Seneca. Fertilizer rates were 15.37 kg of 18-0-25 and 5.53 kg of superphosphate per 100 row m in both irrigation systems. During their respective growing seasons broccoli received 759 l of water per m^2 in seep and 227 l per m^2 in drip irrigation, sweet corn 1,025 l per m^2 and 357 l per m^2 and zucchini 1,131 l per m^2 and 361 l per m^2. Yields of sweet corn and zucchini were not significantly different. Broccoli had a significantly higher yield per plant and yield per m^2 of bed surface with seep irrigation. On a per kg of yield basis the following amount of water was used: broccoli 2,020 l in seep and 720 l in drip irrigation, sweet corn 959 l and 259 l, zucchini 251 l and 60 l, respectively.

8:45 am BSS-25 Notes on Chapmannia floridana Torrey & Gray (Fabaceae). ELIANE M. NORMAN, Dept. of Biology, Stetson University, DeLand, Fl 32720; CHARLES R. GUNN, U.S.D.A., Plant Taxonomy Laboratory, Beltsville, Md 20705; AND J. STUART LASSETER, Dept. of Biology, Eastern Kentucky University, Richmond, Ky 40475. Chapmannia Torrey and Gray, a monotypic legume endemic to Florida is shown to have only perfect flowers, rather than sterile and fertile ones attributed to the genus by most authors for the past one hundred and forty years. The species will be described and illustrated, with accompanying notes on its habitat, distribution, reproductive biology, cytology and phylogeny.

9:00 am BSS-26 Further investigations on the distribution of Stylosanthes hamata L. (Taub.) in Florida. JOHN B. BROLMANN, Agricultural Research Center, P. O. Box 248, Fort Pierce, Florida 33450. Stylosanthes hamata, a tropical legume was found further north in Florida than previously reported. Ecotypes of different morphology and with different chromosome number were found at various sites as far north as Stuart. Two ecotypes grew well on flatwood soils at Fort Pierce. Most ecotypes grew on dune soils and have potential in preventing erosion in endangered areas.

9:15 am BSS-27 Effect of Light Intensity on Growth of Baldcypress Seedlings. JOAN A. BROWDER, B. MURPHY, AND P. SCHROEDER, South Florida Environmental Research Foundation, 11550 SW 108 Ct., Miami, FL 33176. A study of baldcypress seedling growth rates under different conditions of light intensity was performed to gain insight into the role of this species in succession in se US swamp forests. One hundred seedlings averaging 12.22cm in height from cotyledon at beginning of experiment were separated into five different groups and exposed to 28, 32, 45, 80, and 100% natural sunlight (NS) respectively for 92 days. Maximum average height increases were achieved at 28 and 32% NS. Maximum average diameter and biomass increases occurred at 80% NS. Greatest difference between treatment groups was seen in biomass increase, which was 7.7X estimated original biomass at 28% NS and 11.6X estimated original biomass at 80% NS. Results suggested that baldcypress is a "pioneer climax" species, which is a species that will enter a stand in early successional stages but will reproduce in its own shade.

9:30 am BSS-28 The Effects of Riboflavin Addition on the Light-Induced Germination of Lettuce Seeds(Lactuca sativa var. Grand Rapids) RAY MILLER, Florida Atlantic University, Dept. of Biological Sciences, Boca Raton, FL 33432. Light sensitive lettuce seeds were incubated on Whatman #1 filter paper wetted with various concentrations of riboflavin and exposed to various dosages of blue, red, or far-red light or placed in darkness. Increasing concentrations of riboflavin and blue light dosage resulted in decreased germination. Inhibition effects associated with riboflavin were overcome, to a marked degree, by increasing dosages of red light. Possible explanations are discussed.

9:45 am BSS-29 A new potential plant pest, exotic Rhodomyrtus tomentosa (Ait.) Hassk. TAYLOR R. ALEXANDER, 6900 S.W. 73 Court, Miami, FL 33143. Rhodomyrtus tomentosa, locally called Downy Rose Myrtle, was reportedly introduced as a landscape plant to the Naples, FL area by Dr. Henry Nehrling, who started his horticultural garden there in 1917. In the past several years the plant has undergone a population explosion into the natural plant communities near Naples. Its invasion potential in subtropical Florida appears to be comparable to that of Schinus terebinthifolius (Brazilian pepper) and Melaleuca quinquenervia (cajeput). The extent of the invasion will be discussed.

10:00 am BSS-30 Suitability among 5 native or naturalized host plants as potential refugia of citrus blackfly populations in southern Florida. BRYAN STEINBERG, University of Florida ARC, 3205 SW 70 Avenue, Ft. Lauderdale, Florida 33314. I studied the survivorship of populations of the citrus blackfly on 5 species of native or naturalized plants (Myrsine guianensis, Ardisia escallonioides, Ardisia solanacea, Schinus terebinthifolius, Zanthoxylum fagara)in groups with and without a citrus tree. Plant groups without a citrus tree were unable to support citrus blackfly beyond 3 generations while those with a citrus tree were able to do so for at least 5 generations. Poor ovipositional attractiveness and low survival of immature citrus blackfly on the native or naturalized plants are responsible for the results. It appears that citrus blackfly will be able to sustain populations on native or naturalized plants for only 3 generations unless infested by a citrus tree nearby.

Saturday 9:00 am Primera Casa 214

Session B: LIMNOLOGY AND WETLANDS ECOLOGY

RICHARD L. TURNER, Florida Institute of Technology, presiding

9:00 am BSS-31 An Ecosystematic Analysis of Bruner's Sink, Osceola Co., Fla. ROBIN B. HUCK, P.O. Box 2152, Satellite Beach, FL 32937. Bruner's Sink, a cypress dome on the periphery of Jane Green Swamp in central Florida, is dominated in the canopy by Taxodium ascendens with an average dbh of 1 M and height of 48.8 M. In the subcanopy Magnolia virginiana and Acer rubrum have the highest importance values while the shrub layer is light but notable for the presence of Rhapidophyllum hystrix, a threatened species on the Endangered and Threatened Plant List, U.S. Dept. of Int. The inventory of vascular plants totals 62 species, 13 of which are terrestial ferns which dominate the herb layer. The discovery of this remnant stand, believed to be virgin, suggests that under certain nutrient and moisture conditions, without fire, cypress domes can develop into more complex layered communities than are usually seen in the surrounding pinelands and that T. ascendens can reach considerable size.

9:15 am BSS-32 Restoration and Revegetation of Exploratory Oil Well Sites in the Wetlands of South Florida. KEVIN L. ERWIN, Florida Department of Environmental Regulation, 2180 West First St., Suite 401, Ft. Myers, Florida, 33901. Restoration Techniques and subsequent revegetation are described for 3 abandoned oil well sites located within the Lake Trafford/Corkscrew Marsh, Big Cypress Swamp, and Pumpkin Bay/Ten Thousand Islands. Drilling site and access road restoration is a permit condition required of all wetland facilities, by the Department of Environmental Regulation and the Big Cypress Advisory Committee, to reduce the long term adverse impacts on water quality and natural resources. Generally, the natural revegetation of each site by graminoids and herbs was in an advanced stage within 18 months of completed site restoration. The limiting factor controlling the degree of successful revegetation is that the natural ground elevation be restored with a level contour.

9:30 am BSS-33 Littoral Benthic Macroinvertebrates of Lake Tarpon. LEONARD F. BARTOS, Southwest Florida Water Management District, 5060 U. S. Highway 41 South, Brooksville, FL 33512. A four year study to investigate the effects of lake level fluctuation on the limnology of Lake Tarpon included an analysis of littoral zone benthic macroinvertebrates. No significant changes where attributable to the fluctuating water levels. A significant change in the benthos did occur from the introduction of Corbicula manilensis in 1975. An estuarine isopod (Munna sp.) was collected sporadically. Distinct vertical distribution patterns within the littoral zone were exhibited by the major benthic organisms.

9:45 am BSS-34 Factors affecting the vertical migration of zooplankton in Lake Conway, Orlando, Florida. COMP, GARY S., AND THOMAS L. CRISMAN. Department of Environmental Engineering Sciences, University of Florida, Gainesville, 32611. The diel migration patterns of zooplankton were investigated between December 1977 and November 1978. Monthly samples were collected at 1 m depth intervals 7 times over a 24 hour period. Upward migration began at sunset and continued through midnight, when the zooplankton were evenly distributed throughout the water column. Vertical migration was most pronounced during periods of lake stratification. Migration appeared linked to water temperature, dissolved oxygen, degree of stratification and food particle size and density.

10:00 am BSS-35 Preliminary observations on the impact of acid precipitation on the biota of Florida lakes. SCHULZE, RANDY L., AND THOMAS L. CRISMAN. Department of Environmental Engineering Sciences, University of Florida, Gainesville, 32611. Chlorophyll, phytoplankton, zooplankton, and benthic invertebrates were sampled quarterly in 20 lakes (pH range 4.5-6.8) in northern and central Florida as part of a continuing project investigating the effect of acid precipitation on the chemistry and biology of Florida lakes. Of particular interest was the effect of a regional decline in pH on the biotic species composition, community structure and overall productivity of Florida lakes. The results of these investigations will be useful in predicting the response of lacustrine ecosystems to a further reduction in the pH of precipitation in the future.

10:15 am BSS-36 The Association of Chydorids (Cladocera) and Other Zooplankton with Macrophytic Plants in the Littoral Zone of a Freshwater Lake. RHONDA K. EVANS, 1163 38th Street, Sarasota, Florida 33580. The abundance and composition of zooplankton associated with four types of macrophytic plants (Najas flexilis, Ceratophyllum demersum, Potamogeton zosteriformis/P. pectinatus, and Chara sp.) are compared in order to gain an understanding of the total and relative abundances of organisms and to determine the similarities and density relationships between each community. Special attention has been paid to the species composition of the Chydoridae (Cladocera).

10:30 am BREAK

10:45 am BSS-37 Lake Freshening and Fluctuation and Their Effects on the Vegetation of Lake Tarpon, Pinellas Co. T.F. ROCHOW, L.F. BARTOS AND W.D. COURSER, Southwest Florida Water Management District, 5060 U.S. Hwy. 41 S, Brooksville, FL 33512. Freshening began on Lake Tarpon in 1969 after its estuarine connection was cut off. In 1972 a five-year lake level fluctuation and drawdown schedule was implemented. Biologists have completed 5 years of sampling vegetation and various water parameters. Eelgrass and overall vegetational coverage peaked soon after the study began presumably because of reduced salinity. Afterwards water hyacinths greatly proliferated probably as a result of lake drawdown and the freshening trend; vegetational diversity also peaked at drawdown. For 2 1/2 years after peaking, vegetational cover dropped continuously to less than half its previous value. During the last six months of the study, vegetational coverage turned sharply upward primarily because of vigorous new eelgrass growth caused by an increase in water transparency.

11:00 am BSS-38 A Limnological Survey of Dade County Lakes. ROBERT L. POPE AND PETER B. SCHROEDER, South Florida Environmental Research Foundation, 11550 S.W. 108 Ct., Miami, FL 33176. In 1969, a physical-chemical survey was made of 124 Dade County rockpit lakes. In 1976, 72 of the same lakes were resampled. The purpose was to provide baseline data for future studies on the change of quality of these lakes. Parameters measured included alkalinity, Cl^-, Ca^{++}, Mg^{++}, Na^+, K^+, $SO_4^=$, total hardness, alkalinity, conductivity, percent shoreline development, and age. Nitrite and Nitrate were included in the 1976 sampling program. Data are presented on the mean and range for each parameter. Standard statistical methods were applied to determine correlations between parameters. Although mean values were higher in 1976, they are generally within the range of annual variation expected. However, some lakes do show a marked change in character. In addition, comparisons are made with selected lakes in north-central Florida.

11:15 am BSS-39 A Cluster Analysis Comparison of Dade County Rockpit Lakes of 1969 and 1976. PETER SCHROEDER AND R. POPE, South Florida Environmental Research Foundation, 11550 SW 108 Ct., Miami, FL 33176. Various chemical and physical measurements were made on 124 Dade County rockpit lakes during September 1969 by a volunteer team of graduate students at the Department of Biology, University of Miami. Many of the same parameters were measured in 72 of the same lakes in September 1976 by a volunteer team from the Biology Department, Miami-Dade Community College South. In addition to standard statistical comparisons, the 1969 and 1976 data from the same lakes were subjected to a multi-dimensional hyperspace distance program, which clustered the lakes into groups and identified specific lakes as being representative. In combination with the other types of statistical analysis, the clustering of the lakes indicated long-term trends in lake water quality in Dade County.

Saturday 10:30 am Primera Casa 213

Session C: TERRESTRIAL ECOLOGY

TAYLOR R. ALEXANDER, University of Miami, presiding

10:30 am BSS-40 A successional Survey of the Fire Climax Communities of Myakka River State Park. LINDA L. MYTINGER, Environmental Studies Program, New College, University of South Florida, Sarasota, FL 33580. Recovery rates of pine and scrub flatwoods and palmetto prairie communities within the south Florida park were studied in post fire time intervals of 1, 3, and 5 or more years. Two dimensional representations of the data collected, through the use of both transect and nested quadrat sampling methods, showed number of individuals, their height, width, and spacial distribution, and species diversity. Comparisons of species diversity, within and between community response, disturbance intensity and frequency led to the conclusion that increased species diversity was a consequence of continually changing conditions, e.g. fire. The "classical" concept of a climax community as an area which maintains high species diversity as a result of equilibrium conditions is discussed.

10:45 am BSS-41 Changes in vegetation following short-term perturbations. RONALD H. HOFSTETTER AND TAYLOR R. ALEXANDER, Department of Biology, University of Miami, Coral Gables, FL 33124. The nature of the changes in vegetation in several natural plant communities following short-term impacts, e.g. fires in the early 1970's and the freeze of January 1977 in southern Florida are described. The role of such changes in determining the present and future nature of natural communities is discussed.

11:00 am BSS-42 Tropical Hardwood Hammocks of the Big Cypress National Preserve. DAVID W BLACK AND SALLY BLACK, South Florida Environmental Research Foundation, 11550 Southwest 108 Ct., Miami, FL 33156. In the course of obtaining baseline information for long term vegetation studies of plots in the Big Cypress National Preserve twenty tropical hardwood hammocks were visited and studies. Information was gathered on tree species present, relative frequencies, and maximum sizes observed. This study produced range extensions for several tree species and documented the locations of many valuable hammocks in the newly established preserve. Damage to hammocks was observed to be the result of fires and the activities of hunters and indians.

11:15 am BSS-43 The Utilization of Melaleuca quinquenervia Hammocks by Native South Florida Small Mammals and Description of Their Population Dynamics. WITOLD OSTRENKO, B. ROTHSTEIN and F. MAZZOTTI, Museum of Science, 3280 South Miami Avenue, Miami, FL 33129. Five different melaleuca habitats were trapped: (1) mature forest-like melaleuca stand, (2) denser, younger trees, (3) dense saplings, (4) open canopy-mixed graminoid community, (5) graminoid community. Peromyscus gossypinus occured most often (2.3/ha) in the mature melaleuca forest and were never found in dense saplings. Sigmodon hispidus was found only in the open canopy (109/ha) and graminoid community (80/ha). Oryzomys palustris, the rice rat, was found in small numbers (49/ha) in each of the habitats and was most active in the wet season, while Sigmodon and Peromyscus went regionally extinct and reappeared during the dry season. Food selection by Peromyscus and Sigmodon was studied, using various parts of melaleuca and associated plant species. A total of 21 animal species have been found in association with habitat (1), including 16 vertebrate and 5 invertebrate species.

11:30 am BSS-44 Computer Simulation of a Heron Colony and its Invasion by Cattle Egrets. JOAN A. BROWDER AND P. SCHROEDER, South Florida Environmental Research Foundation, 11550 SW 108 Ct., Miami, FL 33176. A computer model simulates nesting success, emigration, and population expansion of a heron colony in which number of birds is limited by the carrying capacity of the feeding area. Nesting success in the model is affected by general mortality and predation from the edge of the colony. Predation is treated as an exponential function of the ratio of the circumference of the colony to its area. Emigration is a function of population size relative to carrying capacity. The model is extended to demonstrate the evolutionary advantage of mixed colonies of species that do not compete for the same food source by simulating the invasion of a native heron colony by Cattle Egrets. The model predicts that the invasion of small colonies of native herons by Cattle Egrets will increase the dispersion rate of native heron fledglings.

11:45 am AGS-2 Biomass Energy from Eucalyptus grandis and Melaleuca quinquenervia in South Florida. THOMAS F. GEARY AND JOSEPH R. SAUCIER, USDA Forest Service, Southeastern Forest Experiment Station, Box 938, Lehigh Acres, FL 33936. In south Florida, E. grandis, an Australian tree, grows rapidly in plantations (6.7 oven dry metric tons/ha/yr is typical). M. quinquenervia, another Australian tree, invades wetlands--naturally regenerating stands may become abundant. These trees could be a substitute fuel for imported oil. However, bulk wood is costly to transport, and local boilers cannot burn it directly. Pyrolysis converts wood into clean burning fuels--charcoal, oil, and gas. Charcoal and oil are easy to transport and store. Charcoal can be pulverized and slurried with oil for use in oil burners. The gas must be used on the production site. The Georgia Institute of Technology, under a U.S. Forest Service contract, pyrolyzed the two species in a pilot plant. Seventy percent of the input E. grandis energy was recovered as charcoal and oil, and 21% as volatile oil and gas; 74% of M. quinquenervia energy went into charcoal and oil, and 18% into volatile oil and gas.

ENGINEERING SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Primera Casa 244

DAVID R. JENKINS, Center for Building Technology, NEL, and University of Central Florida, Orlando, presiding

9:00 am ES-1 **REDUCTION PROCESS of HEMATITE (RED OCHRE) with CHARCOAL. FRANCIS J. LECZNAR, 6341 S.W. 10 St. POMPANO, Fl 33068. The ratio of influence of such factors as temperature, porosity and the time of reduction of soft hematite, reduced with charcoal to magnetite has been established : the time is directly proportional to the radius of the grain and inversely to the temperature and porosity. The depth of the reduced layer increases with decrease in the radius of grain. The reduced volume is proportional to the surface area of the grain. Phenomena of the topochemical reactions of cylindrical samples are thusly explained : it seems that the oxygen ions are attractively running along the straight lines during the oxidation of Fe to FeO with simultaneous reduction of Fe_2O_3 to Fe_3O_4.**

9:15 am ES-2 Methanol Combustion Utilizing Electrostatic Atomization. S. C. KRANC, College of Engineering, University of South Florida, Tampa, FL 33620. Methanol is frequently suggested as an attractive and viable alternate fuel. Experiments have been conducted to demonstrate that methanol can be successfully atomized and mixed with air prior to combustion by electrostatic disruption of the liquid fuel. This is accomplised by using a high voltage (10-20 KVDC) field at a fine nozzle. Two types of burners have been developed. In one the air is naturally aspirated from the side and in the second the spray is injected into a fast stream and stabilized by a bluff body. The performance of each is discussed and some measurements of burner characteristics are reported.

9:30 am ES-3 The Economics of Automated Energy Management Systems of State buildings in Florida. ROBERT D. DOERING AND YASSER A. HOSNI, College of Engineering, Univ. of Central Florida, Orlando, Box 25000, Fl. 32816. This paper presents the results of a study sponsored by the Florida State Energy Office to investigate the feasibility of retrofit installation of Energy Management Systems in all State bldgs.

Initially all buildings were categorized by major functional area, Universities Community Colleges, Office Buildings, Health and Rehabilitative Services and Correctional Institutions. All buildings were then successively screened to identify the most promising candidates for EMS. Evaluation criteria included profile of energy usage, physical suitability of facilities for installation of EMS and life cycle cost of proposed installations. The primary screening analysis was on the basis of economics. To be recommended a candidate project had to have an LCC payback period of less than the estimated life of the facility. The LCC model incorporated projected escalation of fuel cost, inflation factors and interest rate. A sensitivity analysis was performed to identify the most critical variables in the economic analysis

9:45 am ES-4 Energy Conservation Through Landscaping: A Case Study. DANNY PARKER, MONA SULLIVAN AND JOHN H. PARKER, Physical Science Dept., Florida International University, Miami, FL 33199. Air conditioning is now the largest single end-use of energy in Florida residences. The reduction in energy used for air conditioning that can result from maximally efficient landscaping has been investigated. This study has examined alternate vegetative landscape designs which (1) modify microclimates through evapotranspiration and optimal shade patterns, (2) minimize air infiltration, and (3) minimize indirect energy inputs of fertilizers, pesticides and water. These design concepts have been applied in the landscaping of a mobile home in South Florida. A detailed energy analysis of the mobile home was conducted before and after the landscaping utilizing infrared thermography, temperature and head-load profiles, and electrical consumption patterns in order to quantify the reduction in energy consumed in air conditioning. The study indicates that precision landscaping can be a cost-effective energy conservation measure.

10:00 am ES-5 Is Advanced Technology a Problem Solver or a Problem Creator? FLORA C. WANG, Center for Wetlands, University of Florida, Gainesville, FL 32611. There is much concern in the world today with the evaluation of environmental, economical, and ecological impacts in engineering planning of public works. A real typical case is the Aswan High Dam of the Egyptian Nile, a modern engineering wonder embodying the best engineering planning, design and construction. More importantly, the dam fills a vital need of 35 million people. Viewed from ecological aspects, the High Dam is a mixed blessing. Of the dam's three primary goals: irrigation, hydropower and flood protection, only the last has been met. The dam has robbed Egypt of 50 million-tons of rich fertile silt deposited annually by Nile floods. Since the Nile no longer flushes clean, there is an increase in snail-carried disease, biharzia. Also, sardines, formerly found in the Mediterranean shoals at the Nile's mouth have migrated to deeper waters due to the loss of flood-borne nutrition. Many expected and unexpected problems exist; therefore, has adequate progress been made when we are now facing more complex problems created by our high technology?

10:15 am BREAK

10:30 am ES-6 Effluent Irrigation of Corn at Two Row Spacings. A. R. OVERMAN, Agricultural Engineering Department, University of Florida, Gainesville, FL 32611. Corn (Zea mays L.) was grown for silage at row spacings of 36 in. (0.90 m) and 18 in. (0.45 m) on Lakeland fine sand using secondary municipal effluent. Irrigation rates were 2 in./week to 8 in./week (50 mm/week to 200 mm/week). Yields and nutrient uptake increased with application rate, while dry matter content and nutrient content remained essentially constant. Dry matter yields were about the same for the two row spacings, while nutrient uptake was slightly higher for the narrow rows. Agreement was observed between these results and from 1972 using a different variety at the same site.

10:45 am ES-7 Stress Intensities of Dental Blade Implants by Scattered Light Photoelasticity. David R. Jenkins, College of Engineering, University of Central Florida, Orlando, Fl. 32816. Thomas E. Gordon Jr., D.D.S., 550 Bumby Ave., Orlando, Fl. 32801. Results from scattered light photoelastic stress determinations for titanium blade implants in simulated supporting peridontal structures are reported. Maximum principal stress differences for three blade designs are compared. Implants embedded in ployester resin were subjected to both direct and angle loading and regions of large principal stress difference identified. The technique is proposed as a method for comparing and evaluating, in a prelimary way, various blade configurations since designs which induce large local stress might be expected to loosen as the peridontal materials responds to the elevated stresses.

11:00 am ES-8 Microprocessor Controlled Automation of the Winkler Titration. J. S. BRUSHWOOD AND J. A. LLEWELLYN, University of South Florida, College of Engineering, Energy Conversion and Mechanical Design Department, Tampa, FL 33620. The most demanding step in the standard Winkler method for determination of dissolved oxygen is probably the titration. This procedure requires skill in normal laboratory conditions and can present a challenge to the analyst in a seaborne environment. As the first step in development of a totally automated system, we have developed a microprocessor controlled titration apparatus. The endpoint is sensed amperometrically and titration controlled by an automated microburette. Strategies for data logging and data manipulation processes, including smoothing and endpoint decision techniques, will be presented. Results from different algorithmic approaches are tested and compared. Possible extensions to electrolytic reagent generation will also be discussed.

11:15 am ES-9 The Utilization of Stepper Motors in Microcomputer Controlled Applications. R. J. DIAZ, D. O. HAMLIN, AND J. A. LLEWELLYN, University of South Florida, College of Engineering, Energy Conversion and Mechanical Design Department, Tampa FL 33620. The stepper motor is inherently well suited for microcomputer controlled applications due to its discrete method of operation. This paper will follow the development of a microprocessor controlled precision injection device which utilizes stepper motors as the prime movers. The motor selection parameters, performance characteristics, and software and hardware requirements will be examined.

11:30 am ES-10 Performance of a Computer Controlled Microgasometric System. W. J PRUDENTE AND J. A. LLEWELLYN, University of South Florida, College of Engineering, Energy Conversion and Mechanical Design Department, Tampa, FL 33620. A microgasometric apparatus presents a convenient and highly sensitive way of studying the oxidation of hydrocarbons. This paper will discuss the analysis and performance of a computer controlled system which has been designed to facilitate the evaluation of catalysts for hydrocarbon oxidation. Sensitivity analysis and data on comparable manual and automatic systems measurements will be presented together with error budget evaluations.

Friday 11:45 am Business Meeting of the Engineering Section

Note: The following two papers were late and will be given at the close of the Business Meeting or as replacements as time permits.

ES-11 Community Level Water Management Planning Tool. MICHAEL I. MUIGA, Assistant Professor of Engineering, University of Central Florida, CEES Department, Orlando, FL 32816. Increasing urbanization can have great effect on water quality and quantity in a community. Many decisions are made regarding water management without involvement of the community concerned. Policies and decision making must be improved to achieve more effect so water management at community level if chronic and acute risk of water quality and quantity is to be prevented. There is therefore need to develop methodologies and alternatives which integrate socio-economic, environmental, technological and other related community factors in the water management strategies at the community level. A water management tool for decision makers at community level is the discussion of this paper.

ES-12 Community Health Analysis for Less Developed Countries. MICHAEL I. MUIGA, Assistant Professor of Engineering, University of Central Florida, Orlando, FL 32816. Frequently sanitary engineers, public health administrators and health planners from Developed Countries (DC's) are called upon to serve as consultants in Less Developed Countries (LDC's). Analyzing and developing community managerial health alternatives is not an easy task for LDC's due to the shortage of historical data. Hence, it is necessary to stratify the available community socio-economic and other related components to provide data for developing community health planning tool. This planning tool does not replace the engineer or health planner but rather it allows consultants performing service in LDC's to concentrate their analysis and experience on the identified community health analysis alternatives in the most effective way. The approach in this paper is an aid to planners and engineers in using a system approach in identifying all the major alternatives in community health analysis in LDC's.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

ENVIRONMENTAL CHEMISTRY SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Thursday 9:00 pm ACADEMY SOCIAL HOUR Anthenium Walkway

ALEXANDER PADVA, Environmental Quality Laboratory, Inc., Port Charlotte, presiding

Friday 9:00 am Owa Ehan 101

9:00 ECS-1 Seasonal Occurrence of Trace Metals in the Miami River and Surrounding Shallow Aquifer. FRED W. CURTIS, JR., Drinking Water Quality Research Center, Florida International University, Tamiami Trail, Miami, FL 33199. Water samples were collected from the Miami River and adjacent test wells of varying depth and distance from the river. Analysis was performed using atomic absorption spectrophotometry. The sampling and analysis were conducted monthly from September 1978 through February 1979, which included portions of both the wet and dry seasons locally. Levels of trace metals found under differing hydrologic conditions offer some measure of aquifer-surface water interaction.

9:20 ECS-2 Lake Tarpon: Quantitative prediction of time necessary to achieve potability. P.M. DOORIS AND L.F. BARTOS. Southwest Florida Water Management District, 5060 U.S. Hwy. 41 So. Brooksville, Fl. 33512. The equations of Lerman and Brunskill describing ion fluxes between lake sediment and water were adapted for use in the Lake Tarpon system. Provisional water and chloride budgets were prepared. Estimates were made of the time required for the sediment-dependent chloride concentration of lake water to achieve a mean of 200 mg/l, well within the quality criteria for potable water.

9:40 ECS-3 Oxygen Consumption by Iron-Organic Matter Interactions in Colored Waters of Florida. Carl J. Miles, Black Hall, University of Florida, Gainesville, FL 32611. Natural colored waters from various Florida sites were collected to study a metal-organic interaction believed to be responsible for low dissolved oxygen concentrations in humic colored surface waters. Oxygen concentration was measured periodically on samples incubated in the light and dark by the Winkler titration. Oxygen consumption rates to 1.1×10^{-6} mole/hr in the light were observed. Factors increasing this rate were increasing iron concentration, pH, or light intensity. Model organic compounds resembling natural organics were selected and oxygen consumption rates measured in iron spiked solutions. Carboxylic and some amino acids showed significant rates in light incubated samples. Esterification of the carboxylic groups in natural organics reduced the oxygen consumption rate. Reduction and oxidation of iron was observed in the presence of various model and natural organics and reduction was accelerated by irradiation with light. A possible overall reaction scheme is discussed.

10:00 ECS-4 Molecular Size Correlation of Natural Organics with Heavy Metals and Precursors of Halogenated Methyl Groups. JALIL FOUROOZI, W.H. ANDERSON, AND JAMES S. TAYLOR, University of Central Florida, CEES Department, Orlando, FL 32816. Natural occuring organics present in Lake Washington, a potable water source for approximately 125,000, were fractionated in molecular size distributions of 10^3, 10^4, 2.5×10^4, 10^5 and 10^6. Each of these fractionations was analyzed for color & TTHM precursors using a 48 hour contact time and heavy metal concentrations before and after treatment by magnesium coagulation. Preliminary results indicate that all color is produced by fractions with molecular sizes of 25,000 or greater. Magnesium coagulation removed 75-80% of the initial color and 75-80% of the organic carbon. This research was supported by the Engineering Industrial Experiment Station, College of Engineering, University of Central Florida.

10:20 am BREAK

10:30 am Business meeting of the Environmental Chemistry Section jointly with the Environmental Affairs Committee.

11:00 ECS-5 Emanating Power of Phosphate Materials*. BRUCE J. BUTLER, University of Florida, Gainesville, FL, 32611. In past years, a great deal of research has gone into the possible radiological hazards of phosphate mining operations. The gas, radon-222, is a potential radiological airborne hazard and is generated by radium-226 found in phosphate ore. Emanation power is that fraction of the trapped radon which escapes from the particles. Determining the emanating power of a particular material is the first parameter used in predicting the radon concentration in nearby air. The parameters which determine the emanating power are radium concentration and particle size. The land types currently under investigation are clays, debris, sand tailings and overburden. Man-made materials include slag and gypsum. All of these have been investigated. An average experimental value of emanating power can be assigned to only the man-altered materials--clays, sand tailings and debris.

*Work supported by the Florida Phosphate Council.

11:20 ECS-6 A Model of Rn-222 and Its Long-lived Daughter Isotope, Pb-210, Transport in the Troposphere. HOWARD MOORE, Florida International University, Miami, FL 33199. Published attempts to use radon and radon daughter concentration data to calculate the mean residence time of aerosols in the atmosphere have depended on the particular pair of isotopes used. Estimates vary from 1 day to 1 month. A two dimensional model which allows concentrations of these isotopes in the troposphere is presented. The model indicates a mean tropospheric aerosol residence time of approximately 4 days.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

2:00 ECS-7 Responses of Chlorella and Selenastrum to Urban Runoff in Lake Eola. HARVEY H. HARPER, YOUSEF A. YOUSEF, AND MARTIN P. WANIELISTA, Department of Civil Engineering and Environmental Sciences, University of Central Florida, Orlando, Florida 32816. The U.S. EPA sponsored a research project to determine Lake Eola impacts of pollutants in stormwater runoff. Periodical water samples are being collected from various locations in the lake, mixed and filtered through 0.45 μ millipore filters for limiting nutrient studies. Various concentrations of N, P, Fe were added and the change in chlorophyll "a" using in vivo florescence techniques are measured. Also, algal production in mixtures of stormwater and lake water at various ratios are being studied. Unialgal species of green algae Chlorella and Selenastrum are used.

Initial results indicate that phosphorus seems to be the limiting nutrient. Also, stormwater added to lake water in a ratio up to 1:3, would significantly increase the productivity. Higher concentrations of stormwater would inhibit the algal production. The impact of base flow and stormwater runoff from storm drains on various algal species will be investigated.

2:20 ECS-8 Affinity of Roadside Soils for Lead, Zinc, and Chromium. JOHN H. BELL AND MARTIN P. WANIELISTA, University of Central Florida, CEES Department, P.O. Box 25,000; Orlando, FL 32816. The purpose of this paper is to evaluate the ability of highway soils to retain lead, zinc and chromium and to document some of the soil properties and reactions which are responsible for this ability. This was done by laboratory analysis of "in-situ" soils from the right-of-way area of 5 Central Florida highways. The samples were analyzed for pH, cation exchange capacity, organic matter content, grain size, and concentration of lead, zinc, and chromium. Samples were fractionated by density for metal analysis revealing the importance of soil components and/or heavy metal interactions. Metal retention was improved in areas where organic matter was present and overland flow was allowed.

2:40 ECS - 9 A Kinetic Model of Phosphorus Exchange in a Batch Reactor. A. R. OVERMAN AND R. L. CHU, Agricultural Engineering Department, University of Florida, Gainesville, FL 32611. A model was developed which included Langmuir absorption coupled with a first order chemical reaction. The system fitted within the framework of heterogeneous catalysis. Steady state experiments in a batch reactor were described very well by Langmuir-Hirshelwood kinetics. The maximum rate of reaction showed a linear correlation with the amount of soil in the reactor.

3:00 ECS-10 Column Chromatography of Icthyotoxins Obtained from Gymnodinium breve Extracts. MICHAEL G. HEYL, Mote Marine Laboratory, 1600 City Island Park, Sarasota, Fl. 33577. For many years researchers have been using chromatographic techniques to isolate toxic components from G. breve extracts. At least a dozen different purification schemes have been published in the last 10 years, although the majority of workers have adopted an initial chloroform or diethylether extraction. Recent work in our lab compared nine solvents and three common column chromatography supports for the relative elution efficiency of toxins contained in the crude chloroform extract. Results discussed herein indicate that the toxins are very polar in nature, suggesting a reevaluation of extraction techniques may be in order. Several alternatives to chloroform or diethyl ether extraction will be discussed.

3:20 BREAK

3:30 ECS-11 Agricultural Sources of Nonpoint Pollution on Coastal Plain Soils. A. B. BOTTCHER AND L. B. BALDWIN, Dept. of Agricultural Engineering, University of Florida, Gainesville, FL 32611. A review of studies which described the impact of animal density, fertilization, irrigation and other agricultural practices on stream water quality was made. Major problem areas were identified and abatement procedures discussed.

3:50 ECS-12 Residues of the Pesticides Acephate and Methamidophos used for Insect Control in Southern Florida. G.E. FITZPATRICK, University of Florida Agricultural Research Center, 3205 SW 70 Ave., Ft. Lauderdale, FL. 33314. Pesticide levels in dooryard Citrus spp. foliage attributable to the State-Federal citrus blackfly program were evaluated in 2 line transects, each 1.8 KM in length, in Pompano Beach, FL. A total of 18 trees in the 2 transects were sampled at 2-week intervals before, during, and after the pesticide application period. Samples were analyzed by temperature-programmed gas chromatography. Within one day after a single application residues as high as 302.5 ppm acephate and 15.8 ppm methamidophos were detected. However, there was rapid disappearance of the 2 toxicants from the foliage. Residues ranged at or below 1 ppm for both compounds within 30 days after the last of a series of 3 treatments.

4:10 ECS-13 Heavy Metal Concentration in mid-Biscayne Bay Sediments. ROBERT M. JUDGE AND FRED C. CURTIS, School of Technology, Florida International University, Tamiami Trail, Miami, FL 33199. Sediment samples were collected from the mid-bay area and tested for the heavy metals cadmium, lead, mercury and zinc. In addition, 9 samples were collected along the Intracoastal Waterway from the northern to the southern end of the bay. The concentration of metals showed no significant difference between the northern and southern samples. The data collected do not support a currently popular belief that the north bay is highly polluted by man's activities while the south bay is unpolluted and in a virtually natural state.

GEOLOGY AND HYDROLOGY SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Primera Casa 246

HYDROLOGY

WALTER SCHMIDT, Florida Bureau of Geology, Tallahassee, presiding

9:00 am GHS-1 Implementation of the President's Water Policy Initiatives Thomas J. Buchanan, U.S. Geological Survey, 441 National Center, Reston, Virginia 22092. President Carter announced his water-policy initiatives on June 6, 1978. They include improved planning and efficient management of Federal water-resources programs, a new national emphasis on water conservation, enhanced Federal/State cooperation in water policy and in planning, and increased attention to environmental quality. As a result of Presidential directives, 19 interagency task forces have been set up to provide a mechanism for implementation of the water-policy initiatives under the Secretary of the Interior. The task forces are addressing improvements to the principles and standards for water-resources planning, project review, water conservation, technical assistance, water rights, non-structural flood control, flood-plain management, ground-water supply, and instream flow. Implementation is planned as an open process which actively seeks and effectively uses State and public participation.

9:15 am GHS-2 Marsh Area Effect on Water Budget Computation in Lake Okeechobee. S. F. SHIH, University of Florida, Agricultural Research and Education Center, Belle Glade, FL 33430. Lake Okeechobee in Florida is the second largest fresh water lake in the United States. This lake is a main source of water supply to south Florida. Unfortunately, the volume of lake storage seems questionable. According to the records shown in the Corps of Engineers' water budget computation, the lake has indicated a deviation of accumulated three and a half feet of storage as compared to the record of storage based on the recorded stage changes during the period 1972-74. Consequently, a study was initiated to investigate the possible errors involved. Two methods were used to compute the water balance for the lake. Method 1 is a simple arithmetical technique, and method 2 is a Thiessen polygon procedure. Two cases of with and without considering the marsh area within the lake were compared in each method. The results showed that the methods 1 and 2 did not give significant difference, but the case with marsh area consideration can reduce the error about 50 percent.

9:30 am GHS-3 Agricultural Irrigation Water Use During Drought Periods in the Suwannee River Water Management District. RICHARD J. MUSGROVE and JOHN L. SHOEMYEN, Suwannee River Water Management District, P. O. Drawer K, White Springs, FL 32096. The Suwannee River Water Management District, located in northern Florida, experienced droughts during 1977 and 1978. Little or no rainfall occurred during critical plant growth periods. Data collected through a complete field survey in 1978 revealed sharp increases in irrigation water use due to high pumpage rates and an influx of new systems. Some 225 of the 930 systems in the District were installed during the 1977-1978 period. Comparisions of evapotranspiration rates by several methods indicate water consumption rates that approach 100% for irrigated row crops. Irrigation system efficiencies show additional losses. Random sampling techniques will be used to monitor the growth in irrigation. Crop water demand models for the District are being developed.

9:45 am GHS-4 Analytical Techniques for Estimating Evapo-transpiration from Melaleuca quinquenervia Stands. STEVE WOODALL, U.S. Forest Service, Forest Resources Lab., P.O. Box 938, Lehigh Acres, FL 33936. Estimates of evapo-transpiration based on diurnal fluctuations of groundwater in single observation wells are discussed in relation to atmospheric parameters, foliar canopy characteristics, and areal hydrology. Comparisons between melaleuca and other vegetation types are presented. Emphasis is given to the dangers of extrapolating from seedling lysimeters, and to the site requirements for a definitive quantitative study. (Financial assistance for this work from the Florida Division of Forestry's melaleuca research program is acknowledged.)

10:00 am BREAK

10:15 am GHS-5 An Evaluation of a Spray Irrigation Site, Tampa, Florida. JON E. SHAW AND SAM B. UPCHURCH, University of South Florida, Tampa, Florida 33620. A 93 acre spray irrigation field in Tampa, FL receives chlorinated secondary effluent at the rate of approximately 2.2 mgd. Poorly organized waste plumes have developed within the site due to the heterogeneity of the regolith. The heterogeneity results from irregular karst features, changes in grain size and permeability, changes in adsorptive capacity, and soil plugging by Al and Fe hydroxides. Two dimensional cross sections show chlorides to have a maximum amount of dispersal, nitrates a minimal amount, and phosphate a minimal amount of movement. These ions continue to increase in concentration as plugging occurs.

10:30 am GHS-6 An Electrical Resistivity Study to Locate the Saltwater-Freshwater Interface in Coastal Citrus County, Florida. JUDY D. FRETWELL, U. S. Geological Survey, Suite B-5, 4710 Eisenhower Blvd., Tampa, FL 33614. Vertical electrical soundings were made in the gulf coast area of Citrus County, Fla., to locate the saltwater-freshwater interface and to determine the feasibility of using this method to locate future chloride monitor-well sites. The results also provide a baseline from which future movement of the interface can be determined. Four geoelectric layers dominate the study area. Three are associated with stratigraphic layers while the fourth corresponds to a zone of highly conductive saline water. Sites closest to the Gulf showed fewer geoelectric layers due to shallow saline water. Results of the resistivity study correlated well with geohydrologic data. Depths to the interface, based on resistivity measurements at sounding sites, were found to be similar to those depths obtained by applying the Ghyben-Herzberg principle at nearby sites. On the basis of this study, electrical resistivity could provide a guide for the placement of future monitor wells.

10:45 am GHS-7 Variation in pH of Ground-Water Samples Collected with Centrifugal and Peristaltic Pumps. MARIO FERNANDEZ, JR., U. S. Geological Survey, Suite B-5, 4710 Eisenhower Blvd., Tampa, Fla., 33614. The effects of sampling techniques on the hydrogen-ion concentration (pH) in ground-water samples were compared with those of samples collected with a centrifugal pump and those from a portable peristaltic pump. Most pH measurements of samples collected with the centrifugal pump were 0.1 to 0.8 pH units greater than those collected with the peristaltic pump. The differences are probably due to degassing of samples when the centrifugal pump is used. Thus, values of ground-water pH obtained with a peristaltic pump are considered more reliable.

11:00 am GHS-8 Mapping the upper surface of the Floridan aquifer-Northwest Florida. THOMAS KWADER, Northwest Florida Water Management District, Route 1, Box 3100, Havana, FL 32333. The Floridan aquifer is the main source of water for industrial, agricultural, municipal, and domestic supplies in northwest Florida. A map depicting the upper surface of the aquifer for northwest Florida has recently been completed. In this area the aquifer consists of an off lap of tertiary limestones and dolomites ranging in age from middle Eocene to Pliocene (deposited 45 to 1.5 million years ago), and the overlying permeable sediments of younger ages which are in contact with the carbonate rocks. Most of the data used were obtained from well cuttings and cores described and filed at the Florida Bureau of Geology. Lithologic descriptions also were correlated with numerous borehole geophysical logs on file at the Northwest Florida Water Management District and the United States Geological Survey. Over 600 data points were contoured in the final map with the aid of the U. S. Geological Survey 2-D Cal-Comp contouring program.

11:30 am Business Meeting of the Geology and Hydrology Section

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

Friday 2:00 pm Primera Casa 246

GEOLOGY

SAMUEL B. UPCHURCH, Geology Dept., University of South Florida, presiding

2:00 pm GHS-9 Biotic and Abiotic Parameters Affecting Diversity in Modern and Ancient Benthic Diatom Assemblages of Florida. DAVID DEFELICE, Dept. Geology, FSU, Tallahassee, FL 32306, & GEORGE LYNTS, Dept. Geology, Duke Univ., Durham, N.C.27708. Study of benthic diatom communities in Florida Bay reveals that diversity in living diatom populations is a function of several biotic and abiotic parameters. Among the most important of these parameters is substrate, light quality, sediment particle size, and distance from land. Examination of a core recovered from Florida Bay shows that although diatoms are quite common in surface sediment, they are absent immediately below the surface horizon, leaving sponge spicules as the only siliceous biogenic components in the sediment. Florida Bay, as a shallow water carbonate environment, is extremely undersaturated with respect to silica in the water column and at the sediment-water interface. It is believed that diatoms dissolve almost immediately after death, allowing for quick recycling and reutilization of silica in a silica starved environment. Rapid dissolution and recycling would subsequently impede any accumulation of dissolved silica in interstitial pore waters.

2:15 pm GHS-10 Stratigraphy and Paleogeography of the Neogene in Bay County, Florida. MURLENE WIGGS, Dept. of Geology, FSU, Tallahassee, FL 32306, and WALTER SCHMIDT, Florida Bureau of Geology, 903 W. Tennessee St., Tallahassee, FL 32304. Bay County is located in the south central part of the Florida panhandle. Paleoenvironmentally, Bay County represents a transition zone between the shallow marine sediments exposed in the northern part of the county, and the deeper marine carbonates present along the coast. In addition, the Tertiary section expands and plunges eastward toward the Apalachicola Embayment. Previous studies in Walton County (west of Bay County) have shown that the Alum Bluff and Choctawhatchee Stages and the Jackson Bluff Formation grade contemporaneously downdip into a sequence of Neogene carbonates called the Coastal Group. Recent examination of well cuttings and cores has revealed that this is also true in Bay County. The presence of a prolific microfauna (mostly foraminifera) within the Coastal Group enables the time of deposition of these units to be established as Upper Miocene-Lower Pliocene. It also aids in the correlation of these formations with others in the Florida panhandle.

2:30 pm GHS-11 Paleoecology of the Prinecrest Sand Member, Upper Tamiami Formation, Sarasota County, Florida. RICHARD L. HUMMELL AND TAYLOR V. MAYOU, University of South Florida, Tampa, FL 33620. Paleoecologic studies of the Pinecrest Sand Member at Warren Brothers Newburn Road Shell Pit, Sarasota, indicates a shift from a cold water to a warm water fauna during Pinecrest time. The Pinecrest Sand are characteristically a grey, unconsolidated, locally fossiliferous, clayey sand. In the study area, the unit represents intertidal and near shore deposition within a broad barrier island-estuary complex. Mixed fossil communities preserved in the south wall of the pit have been transported locally, however the vertical sequence of fossils indicates a shift from a cold water to a warm water fauna. About 1/4 mile north, newly exposed areas within the pit contains in-place communities, mainly Ostrea haitensis biostromes and a Vermicularia woodringi reef. These in-situ communities show the same general faunal shift as seen in the south wall by transported fossils.

2:45 pm GHS-12

Future Oil Potential of the Lower Cretaceous Sunniland Formation in South Florida. A. V. Applegate, F. A. Pontigo, Jr., and J. H. Rooke, 903 West Tennessee Street, Tallahassee, Florida 32304. The south Florida basin from which hydrocarbon is produced out of the Sunniland Formation, is relatively unexplored compared to the other producing areas in the continental United States. In the period from 1943 through 1977, 161 wildcats were drilled to the Sunniland Formation or deeper resulting in the discovery of ten oil fields with original oil in place that the productive trend is restricted to a narrow belt trending NW-SE from Collier to Dade counties. In general, the hydrocarbon generating potential of the Sunniland Formation grades from poor in the updip (NE) wells to very good to excellent in the dowdip (SW) wells.

3:00 pm BREAK

3:15 pm GHS-13 Tufa Deposits in Warm Mineral Springs, Florida, (archeological site 8So19). HARVEY I. SCHNEIDER, Dept. of Geology, Florida State University, Tallahassee, FL 32306, W.A. COCKRELL, and LARRY MURPHY, Underwater Archeological Research Section, Dept. of State, Tallahassee, FL 32304. Samples of tufa were collected from underwater sink deposits in Warm Mineral Springs and examined for mineralogy, trace elements, mineral fabric. The tufa grows in three different habits; nodular, stalagtitic, and fibrous-branching. Tufa is presently precipitating in the salty water (total dissolved solids=18,400 ppm) which is saturated with $CaCO_3$. The three habits are composed of calcite, however, solid solution is present only in the stalagtitic and fibrous-branching forms. X-ray fluorescence analyses for Fe, Zn, Sr, Mn, and Mg indicate an increase in concentration for the three habits with increased surface area from nodular to stalagtitic to fibrous-branching. The increase in element concentration is due to surface adsorption. Calcite optic axis orientations are perpendicular to growth directions in all samples.

3:30 pm GHS-14 Asteroid Occurrences in Tertiary Limestones of Florida. TAYLOR V. MAYOU AND RICHARD L. HUMMELL, University of South Florida, Tampa, FL 33620. Asteroids are relatively rare in the fossil record, largely because their skeletons consist of loose plates which normally disarticulate and scatter with death. Although starfish are not commonly preserved intact, isolated plates are probably abundant. Few occurrences of asteroid plates have been reported, because they are commonly overlooked or if recognized receive little attention. Isolated plates are normally insufficient for identification of asteroid species, however with additional work they are potentially useful as taxonomic and stratigraphic tools. Preliminary studies of Tertiary limestones in Florida have shown that isolated asteroid plates are common to locally abundant. Two families of asteroids are represented in the fossils collected: the Astropectinidae of the Order Paxillosida, and the Goniasteridae of the Order Valvatida.

3:45 pm GHS-15 Textural and Mineralogical Development of "Box-work" Geodes from Tampa Bay. R. N. STROM, S. B. UPCHURCH, AND ABRAHAM ROSENZWEIG, University of South Florida, SCA 203, Tampa, FL 33620. Recent dredging in Tampa Harbor has excavated many examples of "box-work" like geodes. Each "box" or compartment contains a highly individualistic mineral assembage indicating semi-closed environments in each. Examination of the textures on the box interiors and the mineral-fillings shows multiple stages in the development of these geodes. Some unusual textural and mineralogical relationships and the developmental sequence found are used to interprete the evolution of pore waters in argillaceous carbonate rocks.

4:00 pm GHS-16 Geomorphic History of a Barrier Island Chain, Southwest Florida. JUDSON HARVEY, New College Environmental Studies Program, 5700 Tamiami Trail, Sarasota, FL 33580. A combination of photo-interpretive and quantitative methods were used to determine the extent of geomorphological change, over a 100 year period, for the Charlotte Harbor Barrier Chain (Lee Co.). A sand budget was constructed for this coastline using bathymetric survey techniques. The volume of deposition nearly balanced that of erosion within the survey area, suggesting that the sand supply is local and not replenished from offshore or longshore sources. A historic trend of erosion was evident for the beaches. Shoreline changes were examined and found to be in pattern with the morphology and dynamics of associated tidal inlets.Short term erosion-accretion sequences on the beaches and the evolution of a rhythmic shore geometry are related to inlet processes such as shoaling, wave shadowing and sand by-passing. This study was supported by the Environmental Confederation of Southwest Florida.

MEDICAL SCIENCES SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosensteil School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Thursday 9:00 pm ACADEMY SOCIAL HOUR Anthenium Walkway

Friday 9:30 am Owa Ehan 102

ROSEANN S. WHITE, University of Central Florida, Orlando, presiding.

9:30 MSS-1 Inhibition of Viral Tumorigenesis by Retinoic Acid Analog. JACK W. FRANKEL, College of Medicine, University of South Florida, Tampa, FL 33612, HARVEY V. SAMIS, VA Medical Center, Bay Pines, FL 33504, E. JAMES HORTON, National Biologicals, Inc., Clearwater, FL 33632. Several retinoids (analogs of vitamin A) exert therapeutic effects on chemical carcinogen induced benign and malignant epithelial tumors of mice, and prevent growth of transplantable tumors in rats and mice. We now report inhibition of a viral induced tumor by an aromatic analog of retinoic acid. In a representative experiment, newborn hamsters were inoculated subcutaneously with a strain (S-R) of avian Rous sarcoma virus (RSV). R-S RSV produces tumors in hamsters under this circumstance. At weaning, half of the animals (controls) were inoculated intraperitoneally with diluent (peanut oil); the others with the diluent plus retinoid. One hundred twelve days later, 83 percent of controls exhibited palpable and/or visible tumors, and no tumors occured in any hamster treated with the retinoid. Serological responses characteristic of R-S RSV tumorigenesis were not detected in sera from non-tumor bearing animals in either group.

9:50 MSS-2 Differential Clotting Responses of Rabbits to Injections of Homogenates from Wild-type and Tumorous-head Drosophilia melanogaster. David W. Washington and A. B. Cox, Department of Biological Sciences, University of Central Florida, Orlando, Florida 32816. Two groups of New Zealand white rabbits were injected with homogenates from Tumorous-head (Tuh) and Wild-type (WT) Drosophila melanogaster. A third group was used as a saline injected control. Blood collected in both acute and chronic studies was subjected to various hematological and post mortem studies. The Tuh injected group showed a five-fold increase in thrombocytes (blood platelets) over the controls and a four-fold increase over the wild-type group. Reduced clotting times were noted from acute to chronic studies in both tumorous and wild-type studies; however, the magnitude of change between the two groups was insignificant. The authors conclude that the reduced clotting times reported in tumorous-head injected rabbits represent a decrease in bleeding time. This was caused by the more effective plugging of the damaged vessel by the increased number of platelets.

10:10 MSS-3 Development of a Radioimmunoassay for the Detection of Poliovirus in Water. SHERIL K. CHARBA, R.J. WODZINSKI, and M.J. SWEENEY, Department of Biological Sciences, University of Central Florida, Orlando, Florida 32816. An indirect, solid phase radioimmunoassay (RIA) is being developed for poliovirus I (PVI). Antisera to PVI has been prepared in New Zealand white rabbits and high-titered, high avidity equine antisera to rabbit globulins has been prepared, pooled, fractionated, and frozen. Horse anti-rabbit immunoglobulins have been radioactively labeled by a modification of the Bolton-Hunter method at various levels of ^{125}I substitution. Polyvinyl microtiter wells have been coated with varying quantities of PVI and experiments to decrease non-specific adsorption have been performed. Preliminary data indicate that this system does quantitatively detect the presence of poliovirus, and further experiments are being conducted to increase the sensitivity of the assay.

10:30 Business Meeting of the Medical Sciences Section.

10:45 OTHER CONTRIBUTED PAPERS

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

PHYSICAL SCIENCES SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Primera Casa 247

EDWIN F. STROTHER, Florida Institute of Technology, presiding

9:00 am PSS-1 Verification of Rapid-Test Method for Solar Collector Evaluation. H. S. ROBERTSON and RUSSELL PATERA, Department of Physics, University of Miami, Coral Gables, Florida 33124. We have examined experimentally the suggestion that the direct evaluation of the two parameters that appear in the efficiency formula for solar collectors could yield an accurate representation of collector performance over a wide range of operating conditions. If the parameters were independent of temperature, they could be determined with just two sets of measurements. In practice, it was found that both parameters are slightly temperature dependent, and some scatter of data seems common. We therefore recommend that each parameter be determined by four sets of measurements, distributed over the expected operating range of the collector, and that the results be expressed as linearly varying functions of the input temperature. Results show that the formulas so developed yield output temperatures and efficiencies in excellent agreement with experimental results.

9:15 am PSS-2 Factor Analysis Applications in ESCA. R. A. GILBERT, J. A. LLEWELLYN AND W. E. SWARTZ, JR., University of South Florida, College of Engineering, Energy Conversion and Mechanical Design Department and Department of Chemistry, Tampa, FL 33620. Factor Analysis is a statistical technique that provides a relatively rapid means for determining if there are two or more components in an ESCA peak. Deconvolution of ESCA spectra provides valuable information about the chemical environment of the surface being analyzed. The principle component method is outlined together with the deconvolution procedure and applications to aluminium, aluminium oxide and other systems are discussed.

9:30 am PSS-3 Secondary Bifurcations Near Multiple Eigenvalues. MANUEL A. HUERTA, Department of Physics, University of Miami, Coral Gables, Florida 33124. A method is presented to calculate the time dependent solutions of a class of nonlinear equations in the neighborhood of a degenerate critical point. Secondary bifurcations are shown to occur along paths in this neighborhood.

9:45 am PSS-4 A Near Total Internal Reflection Acousto-Optic Hydrophone, K.J. SWANSON, J.A. MEYERS, University of Central Florida, Department of Physics, Orlando, Florida 32816. An acousto-optic modulator "sonar-hydrophone" has been designed upon the principle of near total internal optical reflection. The optical intensity of a beam of 6800 Å light is modulated at the interfaces of a plexiglass block and the surrounding H_2O. A rough prototype has been built. Its design and the performance characteristics will be discussed. This work is supported by the Naval Research Laboratory Underwater Sound Reference Division, Orlando, Florida.

10:00 am PSS-5 Plasma Density Measurements Made Using an Active Microwave System. WILLIAM F. MOORE, Department of Physics, University of Miami, Coral Gables, Florida 33124. A heterodyned delay line oscillator for measuring plasma densities is described and contrasted with other microwave diagnostic techniques. Microwave reflections near the plasma are enhanced by a Fabry-Perot resonator. Density measurement results will be discussed.

10:15 am PSS-6 Pulse Propagation in Dispersive, Absorptive Media: Correlation Properties*. S. C. BLOCH, M. R. ROE, R. M. WITENHAFER, and J. WOLFOWITZ, University of South Florida, Tampa, FL 33620. Information transmission in dispersive, absorptive media is of considerable practical, as well as theoretical, importance; propagation of short pulses with broad spectra through atmospheric turbulence, intense rainfall, and the ionosphere are examples of the former. Results of a comparison of propagation-delay definitions for severely distorted pulses are presented, and correlation properties of pulses in the whistler mode are discussed for five propagation parameters as four are held constant and one varies, sequentially.

*Research supported by U. S. Army Research Office, GTE Laboratories, Inc. and GTE Satellite Corp.

10:30 am Business Meeting of the Physical Sciences Section

10:45 am BREAK

Friday 11:00 am Primera Casa 247

ALEX G. SMITH, University of Florida, presiding

11:00 am PSS-7 The Diffuse Reflectance of the Ocean: The Theory of Its Augmentation by Chlorophyll a Fluorescence at 685 nm. HOWARD R. GORDON, Department of Physics, University of Miami, Coral Gables, Florida 33124. The radiative transfer equation is modified to include the effect of fluorescent substances, and solved in the quasi-single scattering approximation for a homogeneous ocean containing fluorescent particles with wavelength independent quantum efficiency and a gaussian shaped emission line. The results are applied to the in vivo fluorescence of chlorophyll a (in phytoplankton) in the ocean to determine if the observed quantum efficiencies are large enough to explain the enhancement of the ocean's diffuse reflectance near 685 nm in chlorophyll rich waters without resorting to anomalous dispersion. The computations indicate that the required efficiencies are sufficiently low to account completely for the enhanced reflectance. The validity of the theory is further demonstrated by deriving values for the upwelling irradiance attenuation coefficient at 685 nm which are in close agreement with the observations.

11:15 am PSS-8 Bifurcation and stability of a model chemical reactor. JAMES C. NEARING, Department of Physics, University of Miami, Coral Gables, Florida 33124. A model chemical system, the "Brussellator," is examined and its equilibria discussed. The presence of structured solutions of small amplitude is verified by a numerical scheme. (These agree with those found by a standard analytical method.) The large scale solutions whose presence is indicated in an analytic bifurcation scheme due to Goldstein, Huerta, and Nearing are also found, and are in good agreement with the analytic method.

11:30 am PSS-9 Noise Analysis of Radon Flux in Florida*. MEHDI ARABZADEGAN, University of Florida, Gainesville, FL, 32611. Radon Flux at the University has been measured at weekly intervals for over two years. Due to the white noise or random variations which exist in these data, the periodic components, if any, cannot be readily identified. This white noise can be eliminated by autocorrelation of these data. The autocorrelation function is an extension of the concept of a mean square value over an interval of time. If the radon flux has a periodic component, its autocorrelation function is also a periodic function with the same period as the flux. If this periodic nature is observed, Fourier series analysis will then be used to identify the significant temporal variations. This method will be applied to data obtained at four sampling locations in Florida.

*Work supported by the Florida Phosphate Council.

11:45 am PSS-10 UV Photoabsorption Cross Section Measurements of Molecules Important to Stratospheric Ozone Chemistry. E. F. STROTHER, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, Florida 32901. The breakdown of many chloro- and flurocarbons in the upper atmosphere by photodissociation provides a source of halogen atoms which are capable of catlytically destroying stratospheric ozone. Significant photodissociation can occur over the wavelength interval from 1800 to 2400 Å. Measured absorption cross sections for several molecules will be presented as a function of wavelength in the vacuum UV region. The photon counting system used in this work will be described and the experimental techniques discussed.

This work was conducted at the NASA Environmental Project Office, Johnson Space Center, Houston, TX.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

Friday 2:00 pm Primera Casa 247

EDWIN F. STROTHER, Florida Institute of Technology, presiding

2:00 pm PSS-11 Investigations of Bifurcation Phenomena in Plasmas with Stationary Striations. J.F. MAGNAN and WILLIAM B. PARDO, Department of Physics, University of Miami, Coral Gables, Florida 33124.

The formation of stationary striations in radio-frequency-excited inert gas plasmas with zero D.C. magnetic field has theoretically been found to depend on various bifurcation parameters which can be experimentally controlled.* Experiments with the plasmas have shown several bifurcation phenomena. Results of experimental investigations are presented.

* R.A. Goldstein, M.A. Huerta and J.C. Nearing, Phys. Fluids (to be published).

2:15 pm PSS-12 Satellite Observations of Auroral Electrons and Protons During Geomagnetically Quiet Times. JAMES R. SHARBER, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, Florida 32901. Preliminary results of an analysis of ISIS-2 auroral particle data reveals that during quiet times in the pre-midnight magnetic local time sector low-energy (5 eV to 13 keV) electrons and protons are observed at approximately the same latitudes, typically from $\simeq 68^{0}$ up to $\simeq 80^{0}$ invariant latitude on the nightside. The variation of energy and intensity with latitude for both electrons and protons and other features characteristic of the precipitation will be presented. Results show that although the proton average energy is 5 or 6 times that of the electrons, the protons are much less intense and contribute only about 10%of the particle energy into the auroral atmosphere.

Research supported by NSF Grant ATM77-15257 and Air Force Grant AFOSR 78-3625.

2:45 pm PSS-13 Particle Precipitation Patterns Before and After Auroral Substorms. MARK SISTILLI, JAMES R. SHARBER, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, Florida 32901. Using low energy (5 eV to 13 keV) electrons and proton data from the ISIS-2 earth-orbiting satellite a comparison was made of auroral particle precipitation patterns before and after several geomagnetic substorms. With substorms onset there is a general equatorward shift of auroral particle distributions as well as an increase in the particle energies. The data also indicates that polar cap particle precipitation, often observed during the quiet time before the substorm, subsides markedly with substorm onset. Finally, these observations partially confirm theoretical predictions of particle acceleration mechanisms in the Earth's magnetotail.

Research supported by NSF Grant ATM77-15257 and Air force Grant AFOSR 78-3625.

3:00 pm PSS-14 Geometric Derivation of the Orbit Equation. RUSSELL PATERA, Department of Physics, University of Miami, Coral Gables, Florida 33124. The problem of a particle interacting with a $1/r^2$ central force field is solved. The momentum charge of a particle moving in such a force field is independent of $|\vec{r}|$. This leads to a very simple expression for the momentum charge in the scattering process. The scattering problem reduces to solving an algebraic equation. The results apply to both attractive and repulsive central forces. The results of the repulsive force case is used to obtain a more general Coulomb scattering formula and the shielded Coulomb cross section. The results for the attractive force case is used to obtain the analytical solution of the particle's path where the initial conditions are incorporated into the result.

3:15 pm PSS-15 Theory of Combined Synchrotron, Cerenkov, and Transition Radiation. WU-YANG TSAI, Physics Department, University of Miami, Coral Gables, Florida. 33124. Even though synchrotron, Cerenkov, and transition radiation are well known and have been extensively studied in the past, the importance of their combined effects has not been recognized until recently by Tsai and his collaborators. Here we will like to discuss some of the new features emerging from the interference among these radiation processes, as well as their applications to plasma physics, astrophysics, and high energy physics.

3:30 pm PSS-16 An Explanation - Demonstration of the Green Flash. JOSEPH G. HIRSCHBERG, Laboratory of Optics and Astrophysics of the Department of Physics, University of Miami, Coral Gables, Florida 33124.

Florida, with its unparalleled (in the contiguous 48 states) water boundary, affords an excellent opportunity to view one of nature's most beautiful sights, the Green Flash. The mechanism of this phenomenon, popular in the public imagination since the publication of Jules Verne's romance, will be described. The Green Flash will also be demonstrated in the lecture hall, using an optical model for the atmosphere.

THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS-FLORIDA SECTION

Saturday 9:00 am Primera Casa 247

WILLIAM M. MCCORD, Valencia Community College, presiding

9:00 am - 11:30 am Selected papers to be announced.

11:30 am The Recent New York Meeting of AAPT. STANLEY S. BALLARD, University of Florida. Highlights are presented of the joint annual AAPT-APS meeting held in New York on Saturday through Thursday, 27 January - 1 February, 1979. Special attention is given to items of interest to members of the regional sections.

12:00 n - 1:30 pm Luncheon

1:30 pm - 2:30 pm Meeting of AAPT officers with South Florida Physics teachers for final planning of April meeting

SCIENCE TEACHING SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Primera Casa 249

WITOLD OSTRENKO, Museum of Science, Miami, presiding

9:00 am STS-1 Science Teaching, An Answer to Unbalanced Curricula. LEONARD J. GREENFIELD AND MARGOT SILVERMAN, Autosynthesis, Inc., 5600 SW 86 St., Miami, Fla. 33143. Using the scientific method and grade-level mathematics, and drawing heavily on the natural sciences, students are taught to unify the subject material they receive in class in the arts and humanities, social sciences, and sciences. In addition, they identify themselves and plan for their future. Field trips to selected places enable them to observe, measure, draw conconclusions, and to create pathways for investigation into areas that interest them. Case histories are drawn from 2nd and 3rd grade mixed classes and from smaller groups of 5th graders. Suggetions are made for all grade levels.

9:20 am STS-2 Academic Field Training by Total Immersion. J.J. STIPP AND F. NAGLE Dept. of Geology, University of Miami, Miami, FL 33124. In 1975 we initiated an experimental undergraduate Geological field course to Guatemala. It differed from courses offered elsewhere in that although shorter, it was about twice the level of intensity, scope and participatory requirements. From the first day of orientation until the final exam 4-weeks later there is essentially continuous involvement in all aspects of geology on a 12-16 hr/day schedule physically moving over most of the country. Training also includes: useful survival (tropical health and politics); organization and logistics, individual and team special assignments with on-site oral presentation by students; and constant participation. Emphasis is on the basics of outcrop observation, interpretation, idea defence, and finally collation to an overall analysis of the country. Mental and emotional rest are simultaneously provided by the variety of languages, cultures, and the spectacular examples of geological phenomena. The concept and application of the course has each year proven to be extremely effective, both in the high degree of subject understanding and its retention.

9:40 am STS-3 The Museum as an Extension of the Classroom. JUNE M. DRUMMOND Museum of Science Inc., 3280 South Miami Avenue, Miami, FL 33129. Museums have the opportunity to support teachers because of their specialist instructors and additional resources. At present four different activities for teachers and their classes are offered: 1. Guided Tours. 2. A "Discovery Room" for "hands on" experiences. 3. "Explorations" - instruction in school or at the museum developed around a requested topic. 4. "Florida Adventures" where our instructor meets the class in the field. Saturday and vacation classes also reinforce and complement school lessons.

10:00 am BREAK

10:20 am STS-4 The Science Fair - A Learning Experience. CHARLES WORTHINGTON, Museum of Science, 3280 South Miami Avenue, Miami, FL 33129. Science fairs are based on sound educational principles. The opportunity for expressing a student's creativity as an independent investigator is enhanced through this experience. A completed project serves as an introduction into organized research, motivates those seeking careers in science, and provides opportunities for peer acceptance. Winning a science fair is not as important from an educator's point of view as having students involved in the process of planning a project, practicing the scientific method and producing a final product. Science fairs at the school, county, state and international levels are means of receiving recognition for individual achievement in science.

10:40 am STS-5 Outreach Traveler Program in Broward County, KATHY LEGG AND FLORENCE B. PRICE, Discovery Center, 231 S.W. 2nd Avenue, Ft. Laud., Fla. 33301. The Discovery Center is a participatory science and art museum. During the Spring of 1978, the Discovery Center implemented an Outreach Traveler Program in elementary schools for the purpose of extending our participatory learning experience. The Outreach Traveler Program is presented as an in-school "field trip" for 2 or 3 days. Our staff trains volunteers selected by the hosting school to assist in presenting the program to the children. Focusing on the areas of chemistry, physics, nature studies and art, we offer each student four hours of "hands on" participation. This year we are committed to 15 schools providing approximately 32,000 contact hours for the students of Broward County.

11:00 am STS-6 Dade County Public School Outreach Program from the Museum of Science. HARRY RYTTENBERG, Museum of Science Inc., 3280 South Miami Avenue, Miami, FL 33129. Inaugurated in 1963, this program was designed to have a dual purpose; to take museum artifacts to children who could not come to the museum and to have a qualified science teacher available to visit schools. School demonstrations last about 45 minutes and cover such topics as basic electronics, magnetism, and gyroscopes and also use live and mounted animals. This program has been so successful that there are now two full-time Dade County Museum Liaison Teachers working out of the Museum of Science reaching approximately 50 thousand children in the public school system each year.

11:20 am Business Meeting of the Science Teaching Section

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

SOCIAL SCIENCES SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 9:00 am Owa Ehan 105

DAVID H. VANDERCAR, University of South Florida, presiding

9:00 am SSS-1 Cynicism Among Police in New York and Jerusalem. SUZANNE FLEMING, School of Criminology, Florida State University, Tallahassee, Fla. 23204. In 1967, Niederhoffer hypothesised that socialization in the police milieu produces a character trait he called cynicism. He supported his hypothesis by applying a cynicism scale to a sample of New York Police. This study hypothesised that the same development would occur in a similar work environment. A scale was developed and applied to a sample of Israeli police. The hypothesis was supported, indicating that similar police milieux will produce similar types of socialization, cultural differences notwithstanding.

9:15 am SSS-2 Loci of Focus in the Visual Scanning of Human Faces. S.W. JANIK, M.L. GOLDBERG AND A.R. WELLENS, Dept. of Psychology, University of Miami, Coral Gables, FL 33124. An experiment was conducted to test the assumption that people tend to focus upon the eyes of another when looking in the direction of a person's face, rather than upon other areas. Male subjects were shown a series of 4 color and 4 black and white photographic slides during a social impression-formation task. Each slide presented a head and shoulders full face view of either a man or a woman expressing a positive or negative emotion. Each subject viewed the slides while fitted within a Polymetric Eye Movement Recorder. Videotapes were made of each subject's visual focus during his inspection of each slide. Independent ratings by two judges indicated that subjects spent approximately 40% of their looking time focused upon the eye region of facial photographs, with each of the remaining parts of the face being looked at less. This result adds support to the notion that the eye region represents a prime area of visual interest. In addition, subjects' tendency to look at the left or right side of the facial stimuli was analyzed.

9:30 am SSS-3 Older People's Attitude Toward Community Development. WEN-FU SHIH, Florida Atlantic University, Boca Raton, Florida 33432. A survey to determine the attitudes of the residents to community development was conducted by City of Boca Raton, Florida, during March and April, 1978. The questionnaire was divided into (a) current services and characteristics, (b) type of future development, (c) citizen participation and (d) demographic information. The purpose of this research is to compare the attitudes of retired and non-retired residents toward community development. The data showed that the retired people are more active in voting and other citizen participation than non-retired people. Moreover, the retired people seem more satisfied with the community services.

9:45 am SSS-4 Individual Differences in Physiological and Verbal Responses during Exposure to Violent Film Content. D.H. VANDERCAR And H.G. KARL, Dept. of Psychology, Univ. of South Florida, Tampa, FL 33620. The physiological and behavioral effects of exposure to filmed violence has recently attracted a great deal of attention. In the present study physioloical response measures were recorded from six groups of six subjects as they viewed the feature film Straw Dogs. Of principle interest was the degree of correspondence between self-report and physiological measures of arousal. A significant negative correlation ($r = -.86$) was found between self-report of emotional state and skin conductance level. The degree of reported emotional arousal and the level of skin conductance were found to be highly related to a subject's intellectual preference toward verbal vs non-verbal information processing.

10:00 am SSS-5 A 23 Year History of a Multi-handicapped Life. J. SCHEUERLE, Dept. of Communicology, University of South Florida, Tampa, Fl. 33620. Joyce was the younger of two siblings with congenital arthrogryposis multiplex syndrome. Medical prognosis gave her a life expectancy of less than 21 years with 15 of those in a wheelchair. In addition to the cripling physical deformity, the child was unable to communicate intelligibly. In a Miami elementary school she was judged incompetent and placed in special education classes until she was 16 years old. Allowed to make her own decision to move into a regular high school, Joyce's life belatedly began a more nearly normal course. She stubornly refused a wheelchair in favor of crutches, and drove herself to chronic fatigue and ill health in pursuit of an education. In spite of a hearing loss and cleft palate she finished a baccalaureate degree and is now employed and self-maintaining. Slides and audio tapes illustrate the developmental sequence.

10:15 am BREAK

10:30 am SSS-6 Processing Partial Orders. S. A. WARNER AND R. A. GRIGGS, Dept. of Psychology, University of Florida, Gainesville, FL 32611. The constructivist theory of memory assumes that linguistic input is not passively received but is actively transformed into a more general holistic representation. A chief supporting line of research concerns the processing of order relations defined by transitive operators. Even though only adjacent relations are presented during acquisition, the farther apart two terms are on the judged dimension, the faster the comparison can be made. An integrated representation with spacing of terms along a mental continuum by either analog or linear transformations is implied. Studies examining complex partial orders in which indeterminate relations exist have not found normal distance effects. Two experiments investigating the role of several factors on the processing of partial orders were conducted. Results support the constructivist theory but indicate the importance of various scanning strategies with larger, complex structures. A predisposition to incorrectly form complete orders from incomplete information was also observed.

10:45 am SSS-7 Changes in Level of Expectation as an Under-Recognized Explanatory and Integrative Concept. WILLIAM R. BROWN, Department of Sociology, University of Central Florida, Orlando, FL 32816. The concept of "level of expectation" is shown to have far more explanatory power regarding attitude formation, attitude change, and social behavior than has been generally recognized. Through viewing changes in one's level of expectation as part of a central process, it is shown that a number of theoretical constructs and explanations can be integrated and understood in a larger frame of reference. For example, such well know constructs as "relative deprivation ," "the law of supply and demand," and "generation gap" are synthesized when viewed as spin offs involving changes in levels of expectation. A schematic model is overviewed that allows the on-going social process of changes of level of expectation to be related to attitude change as well as to overt behavior.

11:00 am SSS-8 Recovery of the Ancient Maya Weather Cycles. CHARLES H. LACOMBE, Sociology/Anthropology Dept., Florida International University, Miami, Fl. 33199. Modern technology has not yet produced a reliable system for long range forecasting, due largely to lack of climatic data over a period of centuries on which continuity to modern times can be based. The Maya had the capability of recording shifts in weather patterns from at least 300 A.D. to 900 A.D., and developed cyclical almanacs for this period that are included in their hieroglyphic codices. This study of the weather almanacs in the codices presents evidence that the Maya perfected a long range forecasting system based on a chronological association of floods, droughts, storms and favorable weather, with concurrent events in their Venus and eclipse calendars. The research indicates that this technique enabled the Maya to regularize highly irregular weather patterns into predictable cycles by inter-relating them with the fixed time frames of the Venus and eclipse calendars that are given in the codices.

11:15 am SSS-9 The Perception of Natural Hazards: A Case Study. BARBARA STABIN, New College Environmental Studies Program, 5700 North Tamiami Trail, Sarasota, FL 33580. In assessing the accuracy of individual's appraisal of natural hazards researchers have tended to identify magnitude and frequency of the hazard as the crucial variables for testing. In this study the complexity of the hurricane hazard suggested other physical descriptors of the event (duration of danger, speed of onset, areal extent and type of physical damage, temporal spacing) might be used to understand individual appraisal of personal vulnerability. On an outline map of the Sarasota area respondents were asked to describe local physical impacts of a category five (Saffir-Simpson scale) hurricane. Findings indicate that this type of graphic supplement to questionnaires may provide unique insights for natural hazards researchers. The graphic study was integrated into a larger questionnaire project conducted by Dr. Charlene C. Levy, Division of Social Sciences, New College of U. S. F. with funding from the Sarasota County office of the Comprehensive Employment and Training Act.

Friday 11:30 am Owa Ehan 105 Business Meeting of the Social Sciences Section

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

URBAN AND REGIONAL PLANNING SECTION

Thursday 7:30 pm Anthenium 100 GENERAL SESSION: The Academy Lecture. Dr. WAYNE D. BOCK, University of Miami, Rosenstiel School of Marine and Atmospheric Science. The Environmental Aspects of Offshore Drilling on the Florida Shelf.

Friday 1:00 pm Anthenium 100 Annual Business Meeting of the Academy

Friday 2:00 pm Owa Ehan 105

MARK STERN, University of Central Florida, presiding

2:00 pm URS-1 Urban Growth and Florida's Politics, 1948-1978. MARK STERN, Department of Political Science, University of Central Florida, Orlando, FL 32816. An analysis of statewide electoral patterns in Florida is undertaken with emphasis on Presidential elections. Patterns of Democratic and Republican general election and primary election results are correlated with geographic and socioeconomic characteristics of the state during the 1948-1978 period. Continuities and discontinuities in voting patterns are examined as they relate to shifts in the SES characteristics of the population, with special emphasis on changing patterns of urban/metropolitan voting behavior.

2:20 pm URS-2 Personality Traits, Political Issues, Issue Types, and Belief Systems. WILLIAM S. MADDOX and ANTHONY NARDELLA, University of Central Florida, Orlando, Fl 32816. This exploratory project was designed to test the relationship between selected personality traits and political attitudes at three levels. With a sample of 200 Southern college students, we examined correlations between scales of personal control, personal trust, self-esteem and attitudes at the individual issues level, issue type level, and belief system level. We found selected and moderate correlations between personality traits and individual issue positions, similar relationships between personality and types of issue attitudes, and only a slight relationship between personality and the belief system we labelled "libertarian."

2:40 pm URS-3 **Barrier Islands of Florida: An Assessment for Planning and Management. DINESH C. SHARMA, National Science Foundation Resident, 1630 Park Ave., Ft. Myers, FL 33901. Narrow strips of sand in front of gently sloping coasts are barrier islands. They protect the mainland, bays, and estuaries from ocean waves and storms. There are about 283 barrier islands in the U.S., of which 80 are in Florida. Incompatible urbanization of these islands, some of it facilitated with government subsidies, is closing public access to the islands and beaches, endangering lives and property, and is adversely affecting the natural functioning of island resources. A multi-media public education program is developed which describes the extent and nature of the barrier islands of the U.S. and Florida; major problems and issues affecting the island resources; innovative local, State, and Federal programs for wise use and conservation of the islands; and available resources for technical assistance for local communities. This project is funded by the National Science Foundation, the Conservation Foundation, the Office of Coastal Zone Management, the U.S. Department of the Interior, and the Barrier Islands Coalition.**

3:00 pm URS-4 County Revenue Projections as a Function of Socio-Economic Change A Canonical Correlational Approach. HAROLD F. HILL, JR., Orange County Planning Department, Orlando, Fl. and ROGER HANDBERG, University of Central Florida, Orlando, Florida 32816. Previous studies attempting to relate county revenue source funding levels to measurable socio-economic trends within the community have not proved especially enlightening. The vast majority of these studies have relied on multiple regression analysis to assess the relationships between overall funding levels as a singular dependent variable and a set of socio-economic variables as independent variables or predictors. This study attempts to take this methodology one step further by assessing the relationship between a set of revenue variables and a set of local socio-economic and demographic variables. Canonical correlation analysis is used to measure these relationships and form a base from which to project future revenue levels based on the canonical relationships established in the historical data.

3:30 pm Owa Ehan 105 **Business Meeting of the Urban and Regional Planning Section**