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TRANSACTIONS OF THE
**Illinois State
Academy of Science**
Supplement to Volume 82

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**82nd Annual Meeting
October 20-21, 1989**

**LOYOLA UNIVERSITY
Chicago, Illinois**

\$2.00

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PROGRAM AND ABSTRACTS
OF THE
ILLINOIS STATE ACADEMY OF SCIENCE
82ND ANNUAL MEETING

THEME:
CONSERVATION AND THE FUTURE OF HUMANITY

LOYOLA UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS

OCTOBER 20 - 21, 1989

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OFFICE OF THE MAYOR
CITY OF CHICAGO

RICHARD M. DALEY
MAYOR

October, 1989

To the Attendees of the Illinois State
Academy of Science Annual Meeting

Dear Friends:

As Mayor of the City of Chicago, it is indeed a pleasure to welcome you to Chicago for the Illinois State Academy of Science Annual Meeting.

We are delighted that you have chosen Chicago for your meeting site and wholeheartedly support your commitment to science.

We invite you to explore and discover Chicago's diversity of culture, languages and people. I am confident that your visit will be rewarding and memorable, for we are a city that opens its arms with hospitality and friendship.

Again, we welcome you to Chicago and hope that you enjoy your stay.

Sincerely,

Mayor

LOYOLA UNIVERSITY OF CHICAGO



OFFICE OF THE PRESIDENT

*Water Tower Campus * 820 North Michigan Avenue, Chicago, Illinois * (312) 670-2820*

September 1, 1989

Dear Fellow Illinoisans,

As president of Loyola University, I extend a sincere welcome to the members of the Illinois State Academy of Science for your Annual Meeting. We are proud and pleased to host your gathering at our Lake Shore Campus, the oldest and most scenic of our four campuses.

Proud, because you honor us by your presence. The state of Illinois has a long and distinguished tradition in scientific research. You bring with you the many accomplishments of your laboratories and institutions, and enrich the spirit of scientific inquiry for us.

We are pleased, because science education is critically important. As we look toward the 1990s, your success as teachers and researchers will have a great influence on how we manage the millennium that is just around the corner.

May your meeting be as lively, as challenging, and as engaging as it is important for the future of Illinois.

Cordially yours,

A handwritten signature in dark ink, appearing to read 'R. Baumhart S.J.'. The signature is fluid and cursive, with a prominent initial 'R' and a long, sweeping tail that ends in a small flourish.

Raymond Baumhart, S.J.

Welcome to Loyola University of Chicago
Lake Shore Campus

Dear Members of the Illinois State Academy of Science:

As Vice President of ISAS and Chairperson of the Annual Meeting of 1989, I wish to welcome you to the Lake Shore Campus of Loyola University, Chicago. I sincerely hope that you will enjoy your visit to Chicago and will academically benefit from the paper sessions, keynote address, symposium and the special seminar presentations. I, along with my Steering Committee members, have tried to make the best possible arrangements for you.

All the arrangements for the meeting were made possible by the encouragement and financial support received from Loyola University.

The administrators to whom I am highly thankful are:

Dr. Raymond Baumhart, S.J. — President
 Dr. Ronald E. Walker ----- Executive Vice President
 Dr. Alice B. Hayes ----- Vice President for Academic Affairs
 Dr. James L. Wisner ----- Dean of the College of Arts and Sciences.

Further, success in making the arrangements has been made possible with the valuable and timely help received from all the Steering Committee members whose contribution is highly appreciated.

Dr. Fred Breitbeill, Professor of Chemistry, DePaul University
 Dr. William Cordes, Assistant Professor of Biology, Loyola University of Chicago
 Dr. Thomas H. Donnelly, Professor of Chemistry, Mundelein College
 Dr. Robert W. Hamilton, Professor of Biology, Loyola University of Chicago
 Dr. Bruno Jaselskis, Professor Chemistry, Loyola University of Chicago
 Dr. Warren Jones, Assistant Professor of Biology, Loyola University of Chicago
 Ms. Carol Lewandowski, Laboratory Manager, University of Illinois, Chicago
 Dr. Edward Palincsar, Professor of Biology, Loyola University of Chicago
 Dr. Clyde Robbins, Associate Professor of Biology, Loyola University of Chicago
 Dr. Jan Savitz, Professor of Biology, Loyola University of Chicago
 Dr. David Tribble, Assistant Professor of Physics, Loyola University of Chicago
 Dr. Nancy Tuchman, Assistant Professor of Biology, Loyola University of Chicago
 Dr. Frederick H. Wezeman, Chairman and Professor of Biology, Loyola University of Chicago
 Dr. Robert Wolff, Professor of Biology, Trinity Christian College, Palos Heights, Illinois.

Sincere thanks are also due to Mrs. Evelyn Harris, Mrs. Phyllis Paulo and Mrs. Laurie Bucholz for their help in typing and mailing out information, and to Ms. Joyce Knight, Co-ordinator, Registration and Records, for her help in the reservation of class rooms for paper sessions. Finally, I wish to thank my wife, Dr. Gurmeet K. Dhaliwal, Professor of Biology, City Colleges of Chicago, and our daughters Roopinder and Deepinder for their invaluable help and support in the planning and organization of this meeting.

Sincerely yours,



Amrik S. Dhaliwal, Ph.D.
Professor of Biology

ASD/lb

THE ILLINOIS STATE ACADEMY OF SCIENCE WISHES TO THANK THE FOLLOWING PEOPLE AND ORGANIZATIONS FOR CONTRIBUTING FUNDS FOR THE 1989 ANNUAL MEETING.

LOYOLA UNIVERSITY OF CHICAGO

ABBOTT LABORATORIES

COMMONWEALTH EDISON

BAXTER HEALTHCARE CORPORATION

ILLINOIS DEPARTMENT OF CONSERVATION

ILLINOIS NATURAL HISTORY SURVEY

FIELD MUSEUM OF NATURAL HISTORY

NATURE CONSERVANCY - ILLINOIS CHAPTER

CENTER FOR FAMILY CONSERVATION

MR. JEDEDIAH PRATT

MR. LANDIS PRATT

MS. STEPHANIE J. FERRERA

ILLINOIS STATE ACADEMY OF SCIENCE

82nd ANNUAL MEETING

LOYOLA UNIVERSITY OF CHICAGO
LAKE SHORE CAMPUS
CHICAGO, ILLINOIS

OCTOBER 20-21, 1989

REGISTRATION

Participants are urged to pre-register for the ISAS Annual Meeting by returning the enclosed Registration Form with a payment of \$15.00 to the Treasurer. The deadline for receipt of pre-registration is Friday, October 13, 1989. Luncheon and dinner tickets should be reserved when you pre-register and will be issued at the Registration Desk along with your name tag; tickets will not be mailed. The Registration Desk will be located in Room 147 of Damen Hall.

On-site registration will be conducted during the meeting. On-site registration fee is \$20.00 for regular members of the Academy.

Participants must register and have their ISAS name tag before they can participate in the ISAS meeting activities.

ACCOMMODATIONS

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HOTELS AND MOTELS WITHIN A 15 MINUTE DRIVE OF THE LAKE SHORE CAMPUS OF LOYOLA UNIVERSITY OF CHICAGO

(When making reservations indicate that you will be attending the ISAS Annual Meeting hosted by Loyola University)

All of these hotels and motels have restaurant facilities.

*Northshore Hilton
9599 Skokie Boulevard
Skokie, IL 60077
(312) 679-7000
Single \$59.99, Double \$59.00

* Shuttle provided to Loyola from this Hotel

*Holiday Inn
1501 Sherman Street
Evanston, IL 60201
(312) 491-6400
Single \$70.00, Double \$75.00, Triple \$83.00

Holiday Inn Northshore
5300 Touhy Avenue
Chicago, IL 60640
(312) 679-8900
Single \$74.00, Double \$81.00

Lincolnwood Hyatt
4500 Touhy Avenue
Lincolnwood, IL
(312) 677-1234
Single \$90.00, Double \$99.00

*Orrington Hotel
1710 Orrington Avenue
Evanston, IL 60201
(312) 866-8700
Single \$75.00, Double \$85.00

Tropicana Motel
5440 North Sheridan Road
Chicago, IL 60640
(312) 275-2700
Single \$33.00, Double \$39.00

*ISAS recommends these hotels for ISAS participants. They are close and convenient to travel to Loyola University Lake Shore Campus.

You must confirm your reservation by October 1 at the Holiday Inn and Northshore Hilton and by October 6, 1989 at the Orrington Hotel in order to be sure that you have a place to stay while attending the ISAS meeting. After these dates the rooms reserved for ISAS participants will be released to the public. In all other hotels and motels listed on this sheet, reservations are made on first-come first-serve basis.

PARKING

Parking spaces are available on a first come basis on Friday in various parking lots on the campus or at St. Ignatius Church near the campus. Signs will direct the ISAS participants to these areas. Parking will be available on campus on Saturday in Parking Lot No. 2 by the side of Halas Sports Center. Please obtain a parking sticker from the Registration Desk in Damen Hall, Room 147.

FOOD

Loyola University of Chicago cafeteria in Mertz Hall will be open for ISAS participants. A list of several restaurants that are fairly walkable in distance will be available at the Registration Desk in Damen Hall, Room 147.

ISAS LUNCHEON

The ISAS Luncheon has been arranged on Friday, October 20, 1989 at 12:00 Noon to 1:00 p.m. in the State Room, Mertz Hall. Seating capacity is limited, so please purchase your tickets during pre-registration. The luncheon will be a buffet and will cost \$10.00 per person. Lunch menu includes: Tossed Salad with dressing, Sliced Roast Beef au jus, French-style Green Beans, Escalloped Potatoes, Rolls and Butter, Dessert, Coffee and Tea.

ISAS DINNER

The ISAS Dinner will be held on Friday, October 20, 1989 in the State Room, Mertz Hall. Seating capacity is limited, so please purchase your tickets when you pre-register. The cost of the dinner is \$14.00 per person. Dinner menu includes: London Broil, Broccoli Spears, Tossed Vegetable Salad, Stuffed Potatoe, Rolls and Butter, Dessert, Coffee and Tea.

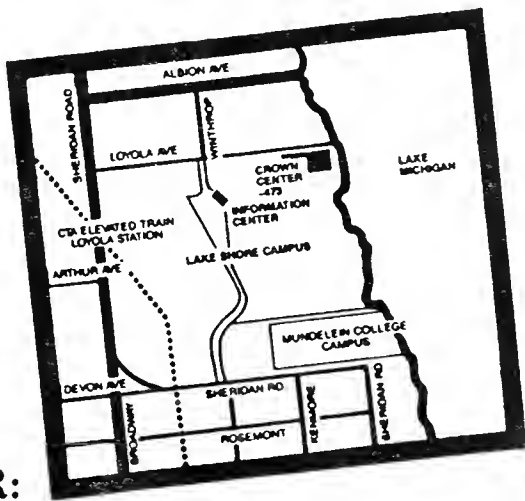
Getting to Loyola

BY PUBLIC TRANSPORTATION:

Rapid Transit: Loyola's Lake Shore Campus is served by the Howard/Jackson elevated line of the CTA. Take either an "A" or "B" train, get off at the "Loyola" stop, and walk across Sheridan Road onto the campus.

Bus: Buses serving the Lake Shore Campus include the #151 Sheridan Rd., #36 Broadway, #155 Devon, and the #147 Outer Drive Express.

For more information regarding public transportation, including travel from Union Station and O'Hare and Midway Airports, please call the Regional Transportation Authority (RTA) at 1-(800) 972-7000.



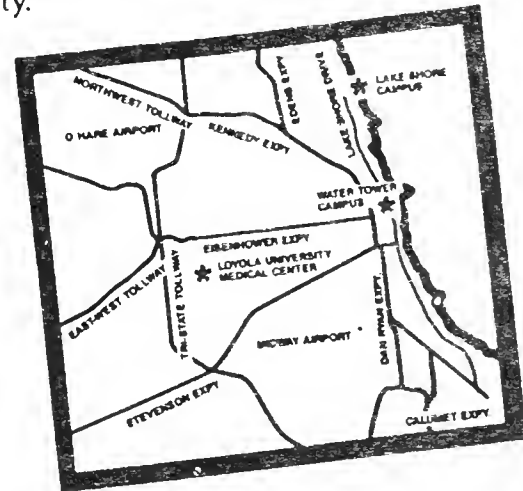
BY CAR:

From the north: Follow Sheridan Road south to Loyola. OR take the Tri-State Tollway (I-294) or the Edens Expressway (I-94) to Touhy Avenue. Go east on Touhy to Sheridan Road and continue south to Loyola Ave. Turn left (east) on Loyola Ave. and drive one block to Winthrop Ave. and turn right (south).

From Rockford, O'Hare Airport, and northwest: Follow Devon Ave. east to Broadway Ave. Proceed through the intersection and under the viaduct. Turn left onto Loyola's campus immediately after the viaduct. OR if starting from beyond the city limits, take I-90 (the Northwest Tollway) to Cumberland Ave., which is just east of the airport. Go north to Devon Ave. Follow Devon Ave. as indicated above.

From Aurora and west: Take the East-West Tollway (I-88) east until it merges into the Eisenhower Expressway (I-290). Continue on the Eisenhower until it ends at Congress St. Follow Congress to Columbus Dr. and turn left (north) onto Columbus. Follow Columbus Dr. to the first light which will be Jackson Blvd. Turn right and proceed to Lake Shore Drive and follow it until it ends at Sheridan Rd. Turn right (north) onto Sheridan Rd. and proceed one mile to the University.

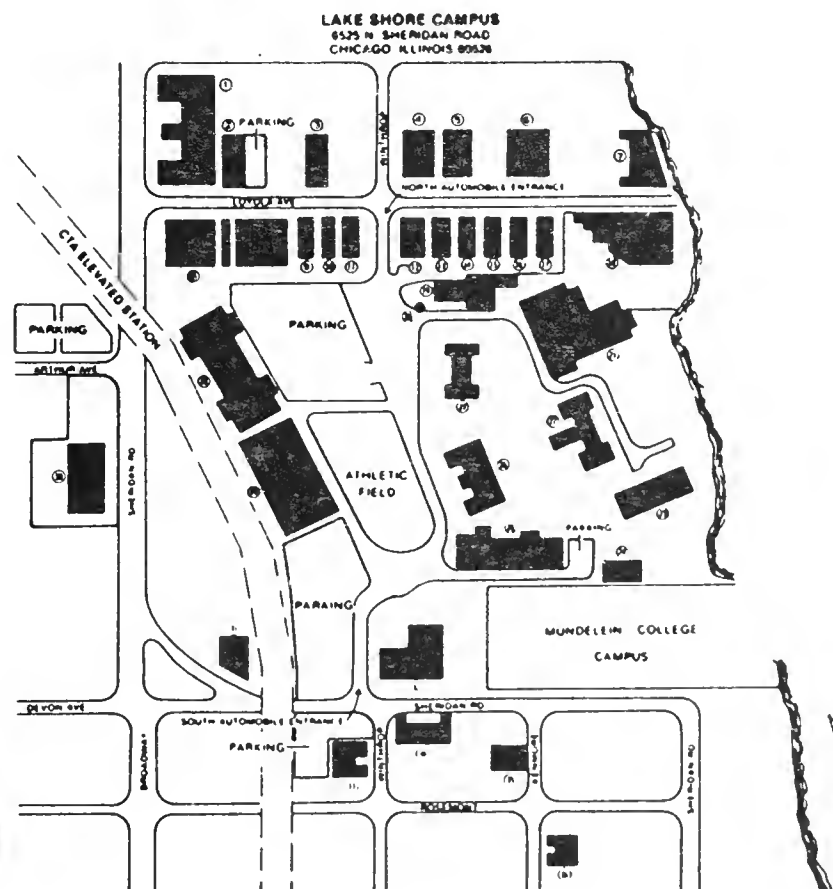
From Joliet and southwest: Take the Stevenson Expressway (I-55) to Lake Shore Drive. Follow Lake Shore Drive north until it ends. Turn right (north) on Sheridan Rd. and proceed for one mile to the University.



From the south and southeast: Follow Lake Shore Drive north until it ends. Turn right (north) at Sheridan Rd. and continue to Loyola. OR take the Dan Ryan Expressway (I-94) to the "22nd Street/Lake Shore Drive" exit. Follow Lake Shore Drive north until it ends. Turn right (north) at Sheridan Rd. and continue for one mile to Loyola.

From Midway Airport: Exit left (north) from the airport onto Cicero Ave. Continue on Cicero to the Stevenson Expressway (I-55) to Lake Shore Drive. Follow Lake Shore Drive north until it ends. Turn right (north) on Sheridan Rd. and proceed for one mile to the University.

Welcome



CANCELLATION POLICY

A full refund will be made if you cancel your participation in the ISAS Annual Meeting by Noon, October 14, 1989.

SPOUSE'S ACTIVITIES

No organized activities are planned for the meeting, but there are a number of sites of interest that may be visited. Information on tours of the city will be available at the Registration Desk in Damen Hall, Room 147.

SIGHTSEEING IN CHICAGO

The following is a list of places that you might find interesting and worthwhile to visit. You will receive a packet which will have complete and detailed information on many attractions of Chicago.

Chicago Board of Trade
 Chicago Mercantile Exchange
 "The Magnificent Mile" - Internationally-known shops including Water Tower Place
 Adler Planetarium
 Art Institute of Chicago
 Field Museum of Natural History
 Museum of Science and Industry
 John G. Shedd Aquarium - Museum of freshwater and marine life
 John Hancock Center - One of Chicago's tallest sky scrapers
 Sears Tower - Tallest building in the world
 American Sightseeing Chicago - Daily bus tours
 Mercury, Chicago's Skyline Cruiseline - Boat tours
 Comiskey Park - Home of the Chicago White Sox
 Soldier Field - Home of the Chicago Bears
 Wrigley Field - Home of the Chicago Cubs
 Brookfield Zoo
 Botanic Gardens of the Chicago Horticultural Society
 Lincoln Park Zoo

A Symposium on "Food for the Future: Fish". The symposium is sponsored by the Illinois-Indiana Sea Grant Program.

FOOD FOR THE FUTURE: FISH
Damen Hall 10th Flr. Hussey Lounge.
Friday, October 20, 1989

- 9:00 - 9:15 Introduction.
J. Savitz.
Loyola University of Chicago,
Chicago, Illinois.
- 9:15 - 9:45 Aquaculture - Past, Present and Future.
Roy Heidinger.
Southern Illinois University,
Carbondale, Illinois.
- 9:45 - 10:15 Stress, the Key to Fish Health.
Rod Horner.
Illinois Department of Conservation,
Manito, Illinois.
- 10:15 - 10:45 Riding Down the Slope of Organic Contaminant
Concentrations in Great Lakes Fish: Where is the
Bottom?
Paul Bertram and David DeVault.
U.S. EPA Great Lakes National Program Office,
Chicago, Illinois.
- 10:45 - 11:15 Clearing Up the Confusion about the Lake Michigan
Sportfish Consumption Advisory.
Christine H. Pennisi.
Illinois-Indiana Sea Grant Program
Oak Brook, Illinois.
- 11:15 - 11:45 Panel Discussion and Questions.

ABSTRACTS

Aquaculture - Past, Present and Future. Roy Heidinger.
Southern Illinois University. Carbondale, Illinois.

A number of economic factors indicate that aquaculture will have a profound impact on food production internationally, nationally and locally into the foreseeable future. Domestic consumption of fisheries products is increasing at a rate exceeding 5% annually, largely due to changes in American dietary habits. However, the majority (60%) of domestic supply is satisfied through importation, making imports of fisheries products the fourth leading contributor to the national balance of trade deficit (behind oil products, automobiles, and electronic components). This places an unnecessary burden on the economy, but at the same time, provides a proven market for domestically produced aquaculture products.

Stress, the Key to Fish Health. Rod Horner. Illinois Department of Conservation. Manito, Illinois.

The author discusses the key role that stress plays in the development of disease in cool and warmwater cultured fish. Also addressed is the use of chemotherapy as a crutch and the use of disease agents as clinical signs of problems rather than as primary causes of disease.

Riding Down the Slope of Organic Contaminant Concentrations in Great Lakes Fish: Where is the Bottom? Paul Bertram and David DeVault. U.S. EPA Great Lakes National Program Office, Chicago, Illinois.

Concentrations of PCBs, DDT and Dieldrin in whole lake trout from southeastern Lake Michigan have declined following first order kinetics from the 1970's through 1984, but they remain greater than in trout from northeastern Lake Huron and western Lake Superior. Between 1980 and 1984, the concentration of the contaminants in coho salmon fillets from Lake Michigan and Lake Erie also exhibited a first order kinetics decline, but that trend was not continued between 1984 and 1986. Evidence from analysis of whole lake trout collected in 1984 indicates that different sources of contaminants exist that contribute PCDF's and PCDD's to the Great Lakes.

Clearing Up the Confusion about the Lake Michigan Sportfish Consumption Advisory. Christine Pennisi. Illinois-Indiana Sea Grant Program. Oak Brook, Illinois.

The National Wildlife Federation (NWF) released an "unofficial" Lake Michigan Sportfish Consumption Advisory in July 1989. Since it conflicts with the "official" advisory, the public has become confused as to what advisory to believe. Pennisi will clear up this confusion by - 1) presenting the many flaws in the NWF Advisory,. 2) by explaining the current "official" advisory, and 3) by adding some recent research findings that better illuminate the risk of consuming Lake Michigan Sportfish.

SYMPOSIUM

Friday: October 20, 1989: 3:15 p.m. - 5:15 p.m.

PERSPECTIVES AND ISSUES: VIEWING CONSERVATION FROM FOUR DIRECTIONS

A forum for academic, corporate, governmental, and activist opinions concerning conservation and our future. Audience participation is invited.

Moderator: Frederick H. Wezeman, Ph.D.
Professor and Chairman
Department of Biology
Loyola University of Chicago

SPEAKERS:

Dr. Robert Bringer, Ph.D.
Staff Vice-President
Environmental Engineering and Pollution Control Division of
3M Corporation
St. Paul, Minnesota

Dr. Robert P. Bringer is Staff Vice President, Environmental Engineering and Pollution Control, for the 3M Company located in St. Paul, Minnesota. He is responsible for the global environmental activities of this \$10 billion sales, multinational company. Dr. Bringer received his Ph.D. and B.S. degrees in Chemical Engineering from Purdue University. Most of his career has been spent in research and development functions. He was named to his current position in 1984 and has been active in several trade and professional organizations. He currently serves as Chairman of the Solid and Hazardous Waste Task Group, National Association of Manufacturers, is a Director of the Air and Waste Management Association, and is Vice Chairman of the Corporate Conservation Council of the National Wildlife Association.

Ms. Pat Costner
Research Director
National Source Reduction Campaign
Greenpeace, USA
P.O. Box 548
Eureka Springs, Arkansas 72632

Ms. Costner has been an environmental advocate for more than a decade. Before her involvement with Greenpeace she was a research chemist for Shell Oil Company and Syntex Corporation. She is the author of the book "We All Live Downstream" which traced the attitudes, practices, and problems evolving from our reliance on water resources for removal and transport of waste.

John Ebinger, Ph.D.
Professor of Botany
Eastern Illinois University

Dr. Ebinger is Professor of Botany at Eastern Illinois University. Dr. Ebinger is a Fellow of the Illinois State Academy of Science, a member of the Illinois Endangered Species Protection Board, and a past member of the Illinois Nature Preserves Commission. His interests focus on the conservation of species diversity and the maintenance of endangered species habitats. Dr. Ebinger received the Ph.D. degree in botany from Yale University.

Mr. David Orr
Alderman, 49th Ward
Vice-Mayor
City of Chicago

Mr. Orr was elected to the Chicago City Council in 1979 and serves as Vice-Mayor. He acted as Interim Mayor after the death of Mayor Harold Washington in 1987. Mr. Orr is active nationally as a member of the National League of Cities, and has received awards from the National Organization for Women, the Chicago Peace Council, Housing Opportunities for Women, the Independent Voters of Illinois, and many others. Mr. Orr received his B.A. from Simpson College, the M.S. degree from Case Western Reserve University, and was Assistant Professor of History and Urban Affairs at Mundelein College prior to his election as Alderman.

Illinois State Academy of Science
82ND ANNUAL MEETING
at
LOYOLA UNIVERSITY OF CHICAGO
Lake Shore Campus
Chicago, Illinois
October 20-21, 1989

GENERAL SESSION:

“THE CLOUDED CRYSTAL BALL:
HOW TO BECOME FAMOUS BY BEING WRONG IN SCIENCE”

A guided tour through some of the galleries of science to administer a few black eyes to great, and lesser, scientists who made monumental misjudgments of the value of novel, unconventional ideas.

SPEAKER:

Dr. Irving M. Klotz
Morrison Professor of Chemistry
Northwestern University

Vita: Dr. Klotz

Professor Klotz is Emeritus Morrison Professor of Chemistry at Northwestern University and Winzler Professor of Biochemistry at the University of Illinois College of Medicine. He is a member of the National Academy of Sciences, has served seven editorial boards, chaired the Biophysics and Biophysical Chemistry Study Section of NIH, and has held seventeen named lectureships during his distinguished career. He received his Ph.D. from the University of Chicago.

SEMINAR

LOYOLA UNIVERSITY OF CHICAGO
6525 North Sheridan Road
Chicago, Illinois

Saturday: October 21, 1989: 1:30 P.M. - 2:30 P.M.

Human Values and Biodiversity

SPEAKER:

Dr. Edward O. Wilson
Baird Professor of Science
Harvard University
Cambridge, Massachusetts

Dr. Wilson received his Ph.D. from Harvard University in 1958. He is also a recipient of honorary degrees of Doctor of Philosophy from Duke University and at least from five other universities. Dr. Wilson also received several medals and prizes such as National Medal of Science, the Leidy Medal, the Carr Medal, the Smithsonian National Zoological Park Medal, the Pulitzer Prize for non-fiction and the Tyler Prize in ecology. He is the author and co-author of several articles and books on diversity of life systematics, ecology and sociobiology.

Dr. Wilson is a member of the National Academy of Science, Guggenheim Foundation, National Research Council, Board of Directors of the World Wild Life Fund; Fellow of the American Academy of Arts and Sciences, American Philosophical Society, German Academy of Science and Society of Fellows (Harvard University). He is a consultant to Time, National Geographic, and Nova on the Public Broadcasting Corporation (science-orientated material for television).

Authors of some books state Dr. Wilson will be known as the "Darwin of this Century". Others state, "What Einstein is to relativity, Bell to telephone, Wilson is to Sociobiology."

Held in conjunction with the Illinois State Academy of Science Annual Meeting.

SUMMARY OF EVENTS

FRIDAY, October 20, 1989

8:30 a.m. - 4:00 p.m.	Registration - Damen Hall, Room 147
9:00 a.m. - 11:45 a.m.	Paper Sessions* (See Program)
12:00 Noon - 1:00 p.m.	Luncheon Buffet - Mertz Hall, State Room
1:15 p.m. - 3:00 p.m.	Paper Sessions* (See Program)
3:15 p.m. - 5:15 p.m.	Symposium - Edward Crown Center for the Humanities <u>Speakers:</u> Dr. Robert P. Bringer, Ms. Pat Costner Dr. John E. Ebinger Mr. David Orr <u>"Perspectives and Issues: Viewing Conservation from Four Directions"</u>
5:15 p.m. - 6:15 p.m.	Poster Session - Edward Crown Center for the Humanities
5:30 p.m. - 6:15 p.m.	Social Hour - Edward Crown Center for the Humanities
6:30 p.m. - 7:30 p.m.	Banquet - Mertz Hall, State Room
7:30 p.m. - 8:00 p.m.	ISAS Business Meeting
8:15 p.m. - 9:15 p.m.	General Session - Open to the Public Edward Crown Center for the Humanities <u>Speaker:</u> Dr. Irving M. Klotz <u>"The Clouded Crystal Ball: How to Become Famous By Being Wrong in Science"</u>

* * * * *

SATURDAY, October 21, 1989

8:00 a.m. - 12:00 Noon	Registration - Damen Hall, Room 147
8:00 a.m. - 12:00 Noon	Paper Sessions* (See Program)
12:15 p.m. - 1:15 p.m.	Lunch Break - Buffet Lunch served in State Room, Mertz Hall
1:30 p.m. - 2:30 p.m.	Seminar - Edward Crown Center for the Humanities <u>Speaker:</u> Dr. Edward O. Wilson <u>"Biodiversity and Human Values"</u>

* * * * *

*ALL PAPER SESSIONS WILL BE HELD IN THE DAMEN HALL

AGRICULTURE DIVISION

DIVISION CHAIR:
 Teresa L. North
 Department of Agriculture
 Western Illinois University
 Macomb, IL 61455

ROOM: 1010

SESSION I - Friday, October 20

PRESIDING: Teresa L. North

TIME PAPER #

1:15 PM 1 AGRICULTURAL DEVELOPMENT POTENTIAL OF THE
 CENTRAL BRAZILIAN PLATEAU. R.N. WOLL and
Glenn Allen, N. Woll and Company Inc., San
 Jose.

BOTANY DIVISION

DIVISION CHAIR:
 Bohdan Dziadyk
 Department of Botany
 Augustana College
 Rock Island, IL 61201

ROOM: 148

SESSION II - Saturday, October 21

PRESIDING: Bohdan Dziadyk

TIME PAPER #

8:00 AM 2 TWENTY YEARS OF VEGETATIONAL CHANGE ON A
 SOUTHERN ILLINOIS BARREN. R.C. Anderson
 and J. Schwegman, Illinois State Univer-
 sity, Normal and Illinois Department of
 Conservation, Springfield.

8:15 AM 3 WOODY VEGETATION OF A MESIC SAND FOREST,
 MASON COUNTY, ILLINOIS. S.E. Jenkins and
J.E. Ebinger, Eastern Illinois University,
 Charleston.

8:30 AM 4 EFFECTS OF SEED PREDATION ON THE COMPONENTS
 OF REPRODUCTIVE YIELD OF BAPTISIA LEUCANTHA
 (FABACEAE). C.E. Petersen and K. Zaker,
 College of DuPage, Glen Ellyn.

8:45 AM 5 ECOPHYSIOLOGY OF CICHORIUM INTYBUS.
Janice Capelle and Marian Smith, Southern
 Illinois University, Edwardsville.

- 9:00 AM 6 WOODY VEGETATION OF A POST OAK FLATWOODS, EFFINGHAM COUNTY, ILLINOIS. D.L. Coates, K.J. Lyman and J.E. Ebinger, Eastern Illinois University, Charleston.
- 9:15 AM 7 THE STENOKOLEACEAE: AN ALTERNATIVE ANCESTRAL GROUP FOR LYGINOPTERID GYMNOSPERMS. Lawrence C. Matten, Southern Illinois University, Carbondale.
- 9:30 AM 8 TRANSCRIPTIONAL CONTROL OF SOYBEAN NITRATE REDUCTASE. John Smarrelli, Jr. and John J. Callaci, Loyola University, Chicago.
- 9:45 AM 9 REFINEMENT OF A BIOASSAY FOR THE SUBSTANCE THAT STIMULATES BASIDIOME FORMATION IN MYCENA CITRICOLOR (TRICHOLOMATACEAE, AGARICALES, BASIDIOMYCETES). R.A. Morgan, G.L. Warren and W.J. Sundberg, Southern Illinois University, Carbondale.
- 10:00 AM BREAK
- 10:30 AM 10 SURVIVORSHIP OF INTRODUCED PRAIRIE PLANT SPECIES IN A DEGRADED WEEDY MEADOW UNDER PLANT REMOVAL AND NON-PLANT REMOVAL CONDITIONS. R.R. Kirt and R.A. Durnberger, College of DuPage, Glen Ellyn.
- 10:45 AM 11 RIVER BIRCH FORESTS IN MASON AND CASS COUNTIES, ILLINOIS. C.A. Uhlarik and J.E. Ebinger, Eastern Illinois University, Charleston.
- 11:00 AM 12 THE INFLUENCE OF VARIED MICROBIAL SUBSTRATE CONDITIONS ON THE GROWTH AND MYCORRHIZAL COLONIZATION OF LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM). J. Meredith and R.C. Anderson, Illinois State University, Normal.
- 11:15 AM 13 COMPETITIVE ABILITY OF MUHLENBERGIA FRONDOSA, A SHADE-TOLERANT C/4 GRASS, WHEN GROWN WITH SCHIZACHYRIUM SCOPARIUM, A PRAIRIE C/4 SPECIES. Tim Clemann, Carmen Jackson and Marian Smith, Southern Illinois University, Edwardsville.
- 11:30 AM 14 SEASONAL VARIATION OF CYANIDE PRODUCTION IN THREE ILLINOIS PLANT SPECIES. L. Horton and J.E. Ebinger, Eastern Illinois University, Charleston.

11:45 AM 15 ANDROECIAL DEVELOPMENT IN SALPIGLOSSIS.
L. Ampornpan and J.E. Armstrong, Illinois
 State University, Normal.

CHEMISTRY/COLLEGIATE CHEMISTRY DIVISION

DIVISION CHAIR:
 Timothy D. Lash
 Department of Chemistry
 Illinois State University
 Normal, IL 61761

DIVISION CHAIR:
 Kurt W. Field
 Department of Chemistry
 Bradley University
 Peoria, IL 61625

SESSION I - Friday, October 20

PRESIDING: Timothy D. Lash

<u>TIME:</u>	<u>PAPER #</u>	<u>ROOM: 1009</u>
1:00 PM	16	SYNTHESIS OF PORPHYRINS WITH SIXTEEN-MEMBERED EXOCYCLIC RINGS. <u>Thomas G. Marron</u> and <u>Timothy D. Lash</u> , Illinois State University, Normal.
1:20 PM	17	CYCLOTETRAMERIZATION OF 7-HYDROXY-4,5,6,7-TETRAHYDROINDOLES: THE INFLUENCE OF BULKY 3-SUBSTITUENTS. <u>Craig M. Shiner</u> and <u>Timothy D. Lash</u> , Illinois State University, Normal.
1:40 PM	18	FRIEDEL-CRAFTS ALKYLATION - FACTORS THAT EFFECT ISOMERIZATION DURING ALKYLATION. <u>M.T. Cygan</u> , <u>J.W. Hills</u> , <u>A.D. Glover</u> , <u>K.W. Field</u> and <u>K.E. Kolb</u> , Bradley University, Peoria.
2:00 PM	19	THE CLEMMENSEN REDUCTION OF ACETOPHENONE. <u>M.F. Clifton</u> and <u>K.W. Field</u> , Bradley University, Peoria.
2:20 PM	20	A SOLVENT EFFECT IN THE REACTION OF CARBOETHOXYCARBENE WITH AN ALKANE. <u>Joe W. Arndt</u> and <u>JoAnn P. DeLuca</u> , Illinois State University, Normal.
2:40 PM	21	EFFECT OF A DIRECTING GROUP ON ADDITION OF A CARBENE TO A DOUBLE BOND: COMPARISON OF METHOXY AND METHYLTHIO GROUPS. <u>Colleen O'Rourke</u> , <u>Terry A. Young</u> and <u>JoAnn P. DeLuca</u> , Illinois State University, Normal.

SESSION II - Saturday, October 21 PRESIDING: Timothy D. Lash

<u>TIME</u>	<u>PAPER #</u>	<u>ROOM: 149</u>
8:30 AM	22	ELECTRON-NUCLEAR INTERACTIONS IN ISOTOPE EXCHANGE EQUILIBRIA. <u>Steven J. Peters</u> and <u>Gerald R. Stevenson</u> , Illinois State University, Normal.
8:50 AM	23	A MOLECULAR BLACK HOLE. <u>Kerry A. Reidy</u> and <u>Gerald R. Stevenson</u> , Illinois State University, Normal.
9:10 AM	24	HYDRATION EFFECTS ON ION-CONDUCTION IN CLAY-MODIFIED ELECTRODES. <u>S.A. Lee</u> and <u>A. Fitch</u> , Loyola University, Chicago.
9:30 AM	25	THE APPLICATION OF AN IODINE TITRATION TO THE DETERMINATION OF RARE-EARTH ARSENATE CONCENTRATION. <u>F. Henry Firsching</u> and <u>John K. Walker</u> , Southern Illinois University, Edwardsville.
9:50 AM		BREAK
10:05 AM	26	METABOLISM OF NITROXIDES BY MOUSE LYMPHOCYTES. <u>J.M. Petruszak</u> and <u>P.D. Morse, II</u> , Illinois State University, Normal.
10:25 AM	27	CONTROL OF OXYGEN CONCENTRATION FOR MEASUREMENTS OF NITROXIDE METABOLISM. <u>F.H. Russo</u> and <u>P.D. Morse, II</u> , Illinois State University, Normal.
10:45 AM	28	DETERMINATION OF ZINC IN COW HOOVES BY ATOMIC ABSORPTION SPECTROMETRY. <u>M.A. Boyko</u> , <u>F.S. Johnson</u> , <u>M.A. Jones</u> , <u>J.W. Webb</u> and <u>C.L. Moore</u> , Illinois State University, Normal.
11:05 AM	29	THE EFFECT OF AGE AND NONENZYMATIC GLYCOSYLATION ON THE RAT OPTIC NERVE MYELIN. <u>T.D. Noggle</u> , <u>M.A. Jones</u> and <u>A.S. Jacks, III</u> , Illinois State University, Normal.
11:25 AM	30	ISOLATION OF DOLICHOLS FROM RABBIT REPRODUCTIVE TISSUES. <u>S.B. Peters</u> , <u>M.J.K. Harper</u> , <u>J. Sudbury</u> and <u>M.A. Jones</u> , Illinois State University, Normal and University of Texas Health Science Center, San Antonio, TX

11:45 AM BAXTER HEALTHCARE AWARD for Best
Undergraduate Research Presentation in
Chemistry.
DIVISION BUSINESS MEETING

COMPUTER SCIENCE DIVISION

DIVISION CHAIR:
Charles E. Neblock
Department of Computer Science
Western Illinois University
Macomb, IL 61455

ROOM: 1040

SESSION I - Friday, October 20

PRESIDING: Charles Neblock

<u>TIME</u>	<u>PAPER #</u>	
11:30 AM	31	THE APPLICATION OF INTERACTIVE INTELLGENT COMPUTER AIDED INSTRUCTION TO DISTANCE EDUCATION. <u>R.N. Woll</u> , N. Woll and Company, San Jose.
11:45 AM	32	THE MACINTOSH AND THUNDERSKAN IN IMAGE PROCESSING FOR DETERMINATION OF SOYBEAN PROTEIN BODIES. <u>L.H. Tichenor</u> , <u>L.D. Love</u> and <u>S.E. Hale</u> , Western Illinois University, Macomb.
12:00 NOON		LUNCH BREAK
1:00 PM	33	GENETIC ALGORITHMS AND GAME PLAYING. <u>P.J.C. Lamont</u> , Western Illinois University, Macomb.
1:20 PM	34	THE METAKNOWLEDGE OF SYSTEM DESIGN. <u>P.J.C.</u> <u>Lamont</u> , Western Illinois University, Macomb.
1:45 PM		BUSINESS MEETING

EARTH SCIENCE DIVISION

DIVISION CHAIR:
 Paul P. Sipiara
 Department of Geology
 William Rainey Harper College
 Palatine, IL 60067

ROOM: 1011

SESSION I - Friday, October 20

PRESIDING: Paul P. Sipiara

<u>TIME</u>	<u>PAPER #</u>	
10:30 AM	35	COMPARISON BETWEEN ANTARCTIC METEORITE CONCENTRATION AND THOSE OF ROOSEVELT COUNTY, NEW MEXICO. <u>P.P. Sipiara</u> and <u>R.T. Urbanik</u> , William Rainey Harper College, Palatine.
10:45 AM	36	FIRST REPORTED OCCURRENCE OF THE MINERAL MORDENITE IN THE BLACK HILLS, SOUTH DAKOTA. <u>J.G. Kirchner</u> , Illinois State University, Normal.
11:00 AM	37	AN INVERTEBRATE MEGAFUNA FROM THE JOPPA MEMBER OF THE STE. GENEVIEVE LIMESTONE (MISSISSIPPIAN) OF SOUTHERN ILLINOIS. <u>G.H. Fraunfelter</u> , Southern Illinois University, Carbondale.
11:15 AM	38	ANALYSIS OF RADON CONCENTRATIONS AND PLEISTOCENE DEPOSITS IN ILLINOIS. <u>T.B. Hudson</u> and <u>R.S. Nelson</u> , Geological Testing Services, Towanda.
11:30 AM		LUNCH BREAK
1:15 PM	39	MODERN DEVELOPMENT OF THE ILLINOIS LAKE MICHIGAN SHORE AND ITS EFFECT ON COASTAL PROCESSES. <u>Charles Collinson</u> , Illinois State Geological Survey, Champaign.
1:30 PM	40	STUDY OF EROSION ALONG THE ILLINOIS LAKE MICHIGAN SHORELINE USING DIGITAL TECHNIQUES. <u>James R. Jennings</u> , Illinois State Geological Survey, Champaign.
1:45 PM	41	GEOMORPHIC DEVELOPMENT OF THE ILLINOIS RIVER VALLEY BETWEEN OTTAWA AND PERU, ILLINOIS. <u>R.S. Nelson</u> , Illinois State University, Normal.

2:00 PM 42 ENIGMATIC FOSSIL PLANTS FROM THE EARLY
PENNSYLVANIAN OF WESTERN ILLINOIS. Richard
L. Leary, Illinois State Museum,
Springfield.

2:15 PM BUSINESS MEETING

ENGINEERING AND TECHNOLOGY DIVISION

DIVISION CHAIR:

Robert B. Rutledge
School of Engineering
Department of Electrical Engineering
Southern Illinois University
Edwardsville, IL 62026

ROOM: 128SESSION I - Friday, October 20 PRESIDING: Robert RutledgeTIME PAPER #

2:00 PM 43 DESIGN OF LEAD COMPENSATOR FOR MINIMUM GAIN
REQUIREMENT. L. Youn and A. Godhwani,
Southern Illinois University, Edwardsville.

ENVIRONMENTAL SCIENCE DIVISION

DIVISION CHAIR:

David Shenaut
Department of Forestry
Southern Illinois University
Carbondale, IL 62901

ROOM: 730SESSION I - Friday, October 20 PRESIDING: David ShenautTIME PAPER #

1:15 PM 44 THE USE OF VERHULST-PEARL EQUATIONS IN
DETERMINING THE TOXICITY OF COPPER TO GREEN
ALGAE. E.P. Kreml, P.K. Suresh, R.B.
Brugam and F.B. Kulfinski, Southern
Illinois University, Edwardsville.

1:30 PM 45 SOIL AND WATER CONSERVATION GAMING/
SIMULATION. C.J. Midden and K.L. Stoelzle-
Midden, Southern Illinois University,
Carbondale.

1:45 PM 46 EDUCATIONAL RECYCLING EXHIBIT. K.L. Stoelzle-Midden, Southern Illinois University, Carbondale.

MEDICAL SCIENCE DIVISION

DIVISION CHAIR:
 Carol B. Lewandowski
 University of Illinois
 PCRPS - Rm. 310
 P.O. Box 6998
 Chicago, IL 60680

ROOM: 228

SESSION II- Saturday, October 21 PRESIDING:Carol Lewandowski

<u>TIME</u>	<u>PAPER #</u>	
8:30 AM	47	THE CONVERSION OF A CHRONIC CERVICITIS TO A VIRGIN-LIKE CERVIX. <u>Calvin P. Midgley</u> , Lake Villa.
8:45 AM	48	BIOCHEMICAL AND ANATOMICAL CHANGES IN RAT LIVER ON DIRECT EXPOSURE OF THE ORGAN TO ND-YAG LASER. <u>L.L. Gershbein</u> , Northwest Institute for Medical Research and Midwest Bio-Laser Institute, Chicago.
9:00 AM	49	CYTOTOXIC CONSTITUENTS OF MICHELIA FLORIBUNDA. <u>Inq-On Mondranondra</u> , <u>Agnes M. Rimando</u> , <u>Chun-tao Che</u> , <u>Harry H.S. Fong</u> and <u>Norman F. Farnsworth</u> , University of Illinois, Chicago.
9:15 AM	50	ANTIFERTILITY AND CYTOTOXICITY STUDIES OF SEDGES USED BY THE ECUADORIAN AMAZON INDIANS. <u>K.S. Lowell</u> and <u>N.R. Farnsworth</u> , University of Illinois, Chicago.
9:30 AM	51	WHY DO MEDICAL SCIENCES NEED TROPICAL RAIN FORESTS? <u>D.D. Soelarto</u> , <u>C. Gyllenhaal</u> and <u>C. Lewandowski</u> , University of Illinois, Chicago.
10:30 AM	52	EVALUATION OF FUNGICIDAL ACTIVITY BY MACROPHAGE CELL LINES DERIVED FROM IMMUNE-DEFICIENT MICE. <u>Sarah A. Kemp</u> , <u>Nancy S. Stewart</u> and <u>Dennis J. Kitz</u> , Southern Illinois University, Edwardsville.

- 10:45 AM 53 COMPARISON OF THE ENHANCEMENT OF MURINE IMMUNE RESPONSE BY ERYTHROMYCIN, TROSPECTOMYCIN, AND NORFLOXACIN. Michelle L. Landrem, Jewell A. Coulson, and Dennis J. Kitz, Southern Illinois University, Edwardsville.
- 11:00 AM 54 DETECTION OF ALKALINE PHOSPHATASE ACTIVITY IN MOUSE REPRODUCTIVE TISSUE HOMOGENATES. A. Watson and M.A. Jones, Illinois State University, Normal.
- 11:15 AM 55 ACTIVITIES OF OAT COMPARED IN MELANIN-CONTAINING AND MELANIN-FREE PIGMENT EPITHELIUM. K.O. Ratzlaff and J. Morales, Southern Illinois University, Edwardsville.
- 11:30 AM BUSINESS MEETING

MICROBIOLOGY

DIVISION CHAIR:

John J. Bozzola
Center for Electron Microscopy
Southern Illinois University
Carbondale, IL 62901

ROOM: 235SESSION II - Saturday, October 21 PRESIDING: John Bozzola

- | <u>TIME</u> | <u>PAPER #</u> | |
|-------------|----------------|---|
| 9:00 AM | 56 | INHIBITORY EFFECTS OF THE EXTRACTS OF ZINGIBER SPECIES ON THE GROWTH AND REPLICATION OF PHAGE LLP-1 IN CYANOBACTERIUM. <u>Ebby P. Jido</u> and <u>Amrik S. Dhaliwal</u> Loyola University, Chicago. |
| 9:20 AM | 57 | BIOENERGETICS OF AN ACTIVE HETEROTROPHIC NITRIFIER-DENITRIFIER. <u>D. Castignetti</u> , Loyola University, Chicago. |
| 9:40 AM | 58 | MASS ISOLATION OF CONTRACTILE STALKS FROM <u>VORTICELLA SEPULCRETI</u> . <u>E. Vacchiano</u> and <u>H.E. Buhse, Jr.</u> , University of Illinois, Chicago. |
| 10:00 AM | 59 | SEPARATION OF TWO PHAGE TYPES FROM A NATURAL <u>SALMONELLA TYPHIMURIUM</u> ISOLATE. <u>C.A. Hendrell</u> , <u>F.R. Goforth</u> and <u>P.E. Wanda</u> , Southern Illinois University, Edwardsville. |

10:20 AM 60 ULTRASTRUCTURE OF XANTHOMONAS SPECIES ASSOCIATED WITH SUDDEN DEATH DISEASE OF SOYBEANS. John J. Bozzola, Southern Illinois University, Carbondale.

10:40 AM 61 EVALUATION OF SOYBEAN EXTRACTS FOR PHYTOTOXINS IN SUDDEN DEATH DISEASE OF SOYBEANS. G.T. Evers, J. Leyden and J.J. Bozzola, Southern Illinois University, Carbondale.

11:00 AM BUSINESS MEETING

SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

DIVISION CHAIR:
 Alan M. Voelker
 Dept. of Curriculum and Instruction
 Northern Illinois University
 DeKalb, IL 60115

ROOM: 127

SESSION I - Friday, October 20 PRESIDING: Alan Voelker

<u>TIME</u>	<u>PAPER #</u>	
2:00 PM	62	CHEMISTRY RETRAINING PROGRAM FOR SECONDARY TEACHERS. <u>Frances H. Crean</u> , <u>Robert J. Van Lanen</u> and <u>Margaret Yates</u> , Saint Xavier College, Chicago.
2:15 PM	63	THE PHYSICS AND PHYSIOLOGY OF A BICYCLE RACE: THE INDIVIDUAL TIME TRIAL. <u>K. Andrew</u> , <u>B. Timson</u> and <u>Laurie Cullen</u> , Eastern Illinois University, Charleston.
2:30 PM	64	BIODIVERSITY THEORY AND APPLICATIONS: A NEW PARADIGM. <u>Joe D. Pratt</u> , Illinois Department of Conservation, Springfield.
2:45 PM		BUSINESS MEETING

ZOOLOGY DIVISION

DIVISION CHAIR:
 Dianne Jedlicka
 Department of Biological Sciences
 University of Illinois
 Chicago, IL 60680

ROOM: 659

SESSION I - Friday, October 20

PRESIDING: Dianne Jedlicka

<u>TIME</u>	<u>PAPER #</u>	
10:00 AM	65	DIFFERENCES IN TESTICULAR STEROIDS LEVELS IN MILK WITH DIFFERENT COAT COLOR PHENOTYPES. <u>A.G. Amador</u> , <u>C. Sundqvist</u> * and <u>A. Bartke</u> ,* Southern Illinois University, School of Medicine, Springfield and *Carbondale.
10:15 AM	66	MORPHOPHYSIOMETRIC ANALYSIS OF TESTICULAR CELLS FUNCTION IN HAMSTERS EXPOSED TO SHORT (SPP) OR LONG PHOTOPERIODS (LPP). <u>A.G. Amador</u> , <u>A.P. Sinha-Hikim</u> ,* <u>H.G. Klemcke</u> ,** <u>A. Bartke</u> ,* and <u>L.D. Russell</u> ,* Southern Illinois University, School of Medicine, Springfield and *Carbondale and **USDA MARC, Clay Center, NE.
10:30 AM	67	INDUCTION OF GST ACTIVITY IN AN INSECTICIDE-SENSITIVE STRAIN OF <u>MUSCA DOMESTICA</u> . <u>C.A. Berry</u> and <u>S.A. McCommas</u> , Southern Illinois University, Edwardsville.
10:45 AM		BREAK
11:00 AM	68	THYROTROPIN (TSH) STIMULATES TESTICULAR TESTOSTERONE PRODUCTION IN MICE AND RATS. <u>A.G. Amador</u> and <u>A. Bartke</u> ,* Southern Illinois University, School of Medicine, Springfield and *Carbondale.
11:15 AM	69	THE INDUCTION OF GLUTATHIONE S-TRANSFERASE ACTIVITY IN A RESISTANT STRAIN OF THE HOUSEFLY <u>MUSCA DOMESTICA</u> USING PHENOBARBITAL AND SODIUM BARBITAL. <u>E.D. Boedeker</u> and <u>S.A. McCommas</u> , Southern Illinois University, Edwardsville.

11:30 AM 70 IMMUNONEUTRALIZATION OF GNRH AND ITS EFFECTS ON MOUSE TESTICULAR FUNCTION. A.G. Amador, A. Mayerhofer,* A. Bartke,* and B.D. Schanbacher,** Southern Illinois University, School of Medicine, Springfield and *Carbondale and ** USDA MARC, Clay Center, NE.

12:00 Noon LUNCH

SESSION II - Saturday, October 21 PRESIDING: Dianne Jedlicka

<u>TIME</u>	<u>PAPER #</u>	<u>ROOM: 238</u>
10:00 AM	71	RESPONSE OF COYOTES TO AN EMERGENCE OF 13-YEAR CICADAS. <u>B.L. Cypher</u> , Southern Illinois University, Carbondale.
10:15 AM	72	THE METABOLIC RATES OF TWO SYNTOPIC ARANEID SPIDERS IN THE LATE SEASON OF ILLINOIS. <u>A.L. Markezich</u> , Black Hawk College, Moline.
10:30 AM	73	CONSERVATION STATUS OF VENEZUELAN ANNUAL KILLIFISHES. <u>J.E. Thomerson</u> and <u>D.C. Taphorn-B.</u> ,* Southern Illinois University, Edwardsville and *UNELLEZ, Guanare, Edo. Port. Venezuela.
10:45 AM		BREAK
11:00 AM	74	THE GENUS <u>TRITOMA</u> (COLEOPTERA: EROTYLIDAE) IN ILLINOIS, WITH NOTES ON THE HOST FUNGI OF THE INCLUDED SPECIES. <u>M.A. Goodrich</u> , Eastern Illinois University, Charleston.
11:15 AM	75	CHANGE IN PH AND MIDGE SPECIES IN A STRIP-MINE LAKE. <u>J.B. Stahl</u> , Southern Illinois University, Carbondale.
11:30 AM		BUSINESS MEETING

POSTER SESSION

Friday, October 20
5:15 PM - 6:15 PM

Edward Crown Center
for the Humanities

POSTER #

- 76 GROWTH AND MYCORRHIZAL COLONIZATION OF RICE (ORYZA SATIVA) UNDER VARIED INORGANIC NUTRIENT CONDITIONS. S.S. Dhillion and L.A. Ampornpan, Illinois State University, Normal.
- 77 EFFECTS OF LIGHT INTENSITIES ON LAKE MICHIGAN ALGAL COMMUNITY DEVELOPMENT. Nancy C. Tuchman, Riad E. Youssef, Randall J. Pane and Ibrahim S. Zabaneh, Loyola University, Chicago.
- 78 VESICULAR-ARBUSCULAR MYCORRHIZAL INOCULUM POTENTIAL ON BURNED AND UNBURNED SAND PRAIRIES. S.S. Dhillion and R.C. Anderson, Illinois State University, Normal.
- 79 THE FORMATION OF GLYOXYLATE FROM GLYCINE BY MELANIN Annette Baich and Jennifer Schloz, Southern Illinois University, Edwardsville.
- 80 A NEW COLLEGIATE/PROFESSIONAL FIELD SHORT COURSE ON SOILS, GEOMORPHOLOGY AND BEDROCK GEOLOGY IN WARREN CO. (WESTERN ILLINOIS). D.E. Liniger and L.A. Wiedman, Illinois Soil Conservation Service and Monmouth College, Monmouth.
- 81 A RAPID, IMPROVED METHOD FOR DETERMINING TYPE I COLLAGEN mRNA LEVELS IN INTACT HUMAN FIBROBLASTS. E. Touma and J. Doering, Loyola University, Chicago
- 82 THE DORSAL RAMUS OF THE LUMBAR LEVEL SPINAL NERVE AND THE OSSEO-FIBROUS TUNNEL THROUGH WHICH ITS MEDIAL BRANCH PASSES. C.S. Ro and W.E. Bachop, The National College of Chiropractic, Lombard.
- 83 THYROID MORPHOLOGY AND FUNCTION IN TRANSCENIC MICE EXPRESSING THE GENE FOR BOVINE GROWTH HORMONE. J. Cher, S. Easterly, A. Mayerhofer, A.G. Amador and A. Bartke, Southern Illinois University, Carbondale.
- 84 A QUINOLIZIDINE ALKALOID CONSTITUENT OF THE SEEDS OF ORMOSIA KRUGII WITH ANTI-HIV ACTIVITY. M.P. Nasution and A.D. Kinghorn, University of Illinois, Chicago.

- 85 PLATELET AGGREGATION INHIBITOR FROM TEPHROSIA SEMIGLABRA. Lydia Jonathan, Messanvi Gbeassor, Chun-tao Che, Guy C. LeBreton, Duane Venton, Harry H.S. Fong and Norman R. Farnsworth, University of Illinois, Chicago.
- 86 GALANGIN-3,7-DIMETHYL ETHER, A CYTOTOXIC FLAVONOID FROM THE STEMS OF MUNTINGIA CALABURA, COLLECTED IN THAILAND. C.M. Nshimo, A.D. Kinghorn and N.R. Farnsworth, University of Illinois, Chicago.
- 87 THE PATTERN OF RNA SYNTHESIS DURING THE FERMENTATION OF SANGUINARIA CANADENSIS TISSUE CULTURES. G. Mahady and C.Wm.W. Beecher, University of Illinois, Chicago.
- 88 IMMUNOGOLD/SILVER STAINING PROCEDURES DISPLAY DIFFERENTIAL EXPRESSION OF CARBOHYDRATES ON SERIALY TISSUE. D.L. Bishop, Evanston Hospital, Evanston.
- 89 ACTION OF DRUGS AND METABOLITES ON CYTOCHROME P-450 AND ENZYMES EMPLOYING AN IN VITRO HEPATIC 9000 X G SUPERNATANT. L.L. Gershbein and C.J. Adamczyk, Northwest Institute for Medical Research, Chicago.
- 90 CHARACTERIZATION OF THE BROWN COLORATION IN CORDYLOPHORA LACUSTRIS. Edward E. Palincsar, Warren R. Jones, Galenos J. Pilafas and Nadine F. Potempa, Loyola University, Chicago.
- 91 DIFFERENCES IN SOCIAL INTERACTION OF HAND-REARED AND PARENT-REARED CAPTIVE COTTON-TOP TAMARINS (SAGUINUS OEDIPUS). Daniel J. Meinhardt and Nancy R. Parker, Southern Illinois University, Edwardsville.
- 92 IMPACT OF MAMMALIAN DISPERSERS ON GERMINATION OF PERSIMMON SEEDS. B.L. Cypher and E.A. Cypher, Southern Illinois University, Carbondale.
- 93 AGING STUDIES OF GERBIL EMBRYO FIBROBLASTS IN VITRO. L.B. Ost and P.J. Nielsen, Western Illinois University, Macomb.
- 94 EFFECT OF TRANSGENIC HUMAN GROWTH HORMONE ON ANTIOXIDANT ENZYMES AND LIPID PEROXIDATION. E. Xia, G. Rao and A. Richardson, Illinois State University, Normal.

- 95 EFFECT OF AGE ON THE EXPRESSION OF
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- 96 ARBOREAL FORAGING BY WOODCHUCKS (MARMOTA MONAX) IN
WILL COUNTY, ILLINOIS. D.M. Jedlicka, University
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- 97 FOSSIL FAUNA OF THE GREEN RIVER FORMATION. T.C.
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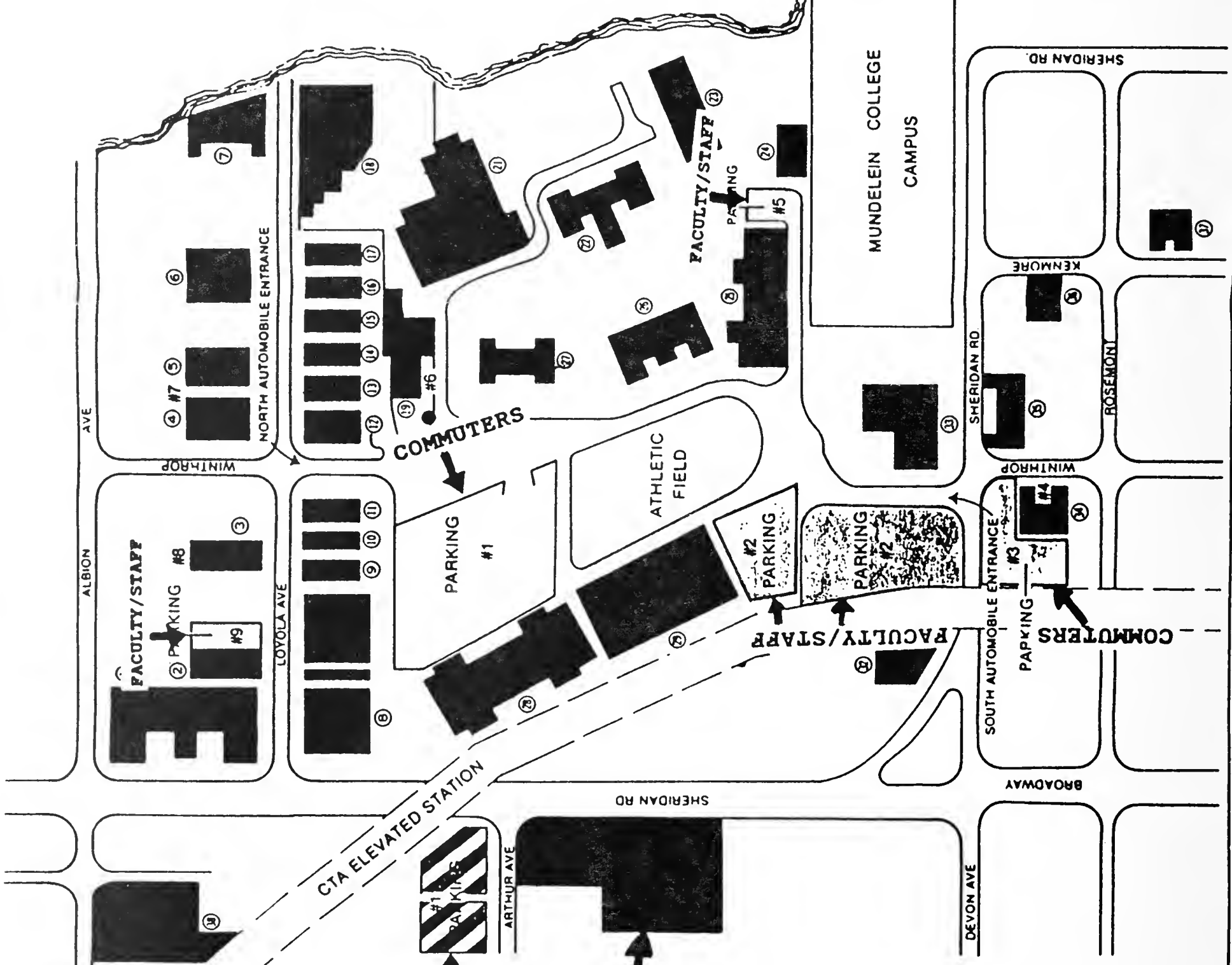
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1. Campion Hall (men's residence)
2. Assisi Center
3. Loyola Hall (women's residence)
4. 1058-56 W. Loyola Ave.
5. 1054-52 W. Loyola Ave.
6. 1030 Arrupe House (Jesuit residence)
7. Lakefront Hall (co-ed residence)
8. Mertz Hall (co-ed residence) — Centennial Forum (Student Center) — Mullady Theatre
9. Bremner Hall (Jesuit residence)
10. Lewis Hall (Jesuit residence)
11. Stebler Hall (women's residence)
12. Chamberlain Hall (women's residence)
13. 1051 W. Loyola Ave.
14. 1047: Security/Institute of Pastoral Studies
15. 1043: Guidance Center
16. 1041: Upward Bound/EOP
17. 1037: Research Services
18. The Edward Crown Center for the Humanities/Admissions/University Ministry
19. Power Plant/Maintenance
20. Security Post/Information
21. Cudahy Memorial Library and the Martin D'Arcy Gallery of Art
22. Jesuit Residence
23. Madonna Della Strada Chapel
24. Day School
25. Damen Hall / Finnegan Auditorium
26. Cudahy Science Hall
27. Dumbach Hall
28. Alumni Memorial Gymnasium
29. George Halas, Jr. Sports Center
32. Loyola University Community Program Office
33. Flanner Science Hall/Financial Aids
34. Winthrop Apts. North and South (co-ed residence)
35. Sheridan Place (co-ed residence)
36. 6320 N. Kenmore (graduate residence)
37. Gonzaga Hall (student's residence)
38. Albion Garage



Lake Michigan

Map not to scale

LAKE SHORE CAMPUS
6525 N. SHERIDAN ROAD
CHICAGO, ILLINOIS 60626

PARKING LEGEND

1. Commuter Students
2. Faculty and Staff
3. Commuter Students
4. Permit Parking
5. Faculty and Staff
6. Visitors
7. Permit Parking
8. Permit Parking
9. Faculty and Staff
10. P.T. Faculty and Staff
11. Open Parking
12. Resident Students

ABSTRACTS

-1-

AGRICULTURAL DEVELOPMENT POTENTIAL OF THE CENTRAL BRAZILIAN PLATEAU. R. N. Woll and Glenn Allen, N. Woll and Company Inc. San Jose, IL 62682-0077. The high plateau area of the state of Bahia in Brazil has the potential to become a world leader in agricultural production. Recently completed roads and planned rail service are important factors in developing the area. Unlike Brazilian areas in Amazonia and "Legal Amazonia" (the area to the west and north) this area need not have adverse environmental impact if developed for agricultural purposes. This paper will describe the situation now and detail a plan for future development.

-2-

TWENTY YEARS OF VEGETATIONAL CHANGE ON A SOUTHERN ILLINOIS BARREN. R. C. Anderson and J. Schwegman, Illinois State University, Normal, IL 61761 and Illinois Dept. of Conservation, Springfield, IL 62706. Vegetational change on a southern Illinois barren was monitored over a 20-year period. The site was burned in the springs of 1969, 1970, 1972, and 1973. Herbaceous and woody species were sampled in 1968 (preburn), 1969, 1970, 1971, 1983, and 1988. Following burns, tree density decreased from 202 to 157 trees/ha between 1968 and 1971 and then increased to 333 trees/ha in 1988. Tree basal area was fairly stable between 1968 and 1971 (5.0 to 5.5/m²) but increased to 7.9 and 10.2/m² in 1983 and 1988, respectively. In seedling and sapling layers, there was a continual change in species composition and a large increase in the number of tree species following cessation of fire; from ten in 1970 to 20 in 1988. Invading species found in these strata in 1983 and 1988, but not in previous years, were shade-tolerant, mesophytic species. Annual legumes responded positively to fire and these species and prairie plants declined in the absence of burning, whereas woodland herb abundance increased.

-3-

WOODY VEGETATION OF A MESIC SAND FOREST, MASON COUNTY, ILLINOIS. S. E. Jenkins and J. E. Ebinger, Eastern Illinois University, Charleston, IL 61920. An inventory was completed of the woody vegetation of a 6½ ha mesic sand forest in northern Mason County, Illinois. This forest has a stand composition of 247.5 stems/ha (above 10 cm dbh.), and a basal area of 16.1 sq m/ha. Of the 10 overstory species present, black oak is the leading dominant, averaging 150.1 ind/ha, a basal area of 13.5 sq m/ha, and an importance value of 144.9 (out of 200). Other common overstory species include black hickory, blackjack oak, and mockernut hickory.

-4-

EFFECTS OF SEED PREDATION ON THE COMPONENTS OF REPRODUCTIVE YIELD OF BAPTISIA LEUCANTHA (FABACEAE). C. E. Petersen and K. Zaker, College of DuPage, Glen Ellyn, IL 60137. Effects of seed predation by Apion rostrum Say (Coleoptera: Curculionidae) on components of reproductive yield of the legume, Baptisia leucantha T. & G, were studied in a restored prairie. The beetle annually infested from 41% to 100% of the pod crop over the four year study period. Additional seed mortality was caused by the beetle affecting selective pod abortion. However, seeds surviving predation on more heavily infested plants tended to be heavier.

- 5 -

ECOPHYSIOLOGY OF CICHORIUM INTYBUS. Janice Capelle and Marian Smith, Southern Illinois University at Edwardsville, IL. 62026-1651. Photosynthetic stems of C. intybus, a wide-spread introduced species which grows primarily along roads and in dry, rocky disturbed areas, contribute an increasing proportion of the plants' total carbon budget as diurnal and seasonal temperatures increase. This is due, in part, to an increase in stem/leaf ratio and comparatively lower stem temperatures as the season progresses. Data collected from two populations in Madison County, IL. indicate that morning, noon, and afternoon stem temperatures are significantly lower than leaf temperatures, maintaining a reduced Vapor Pressure Deficit and allowing plants to continue carbon uptake during hot, dry periods of stress. Preliminary photosynthesis data indicate that stems are as efficient in fixing carbon as leaves, and that chicory may depend upon stem photosynthesis to prolong its growing season and increase flower and seed production.

- 6 -

WOODY VEGETATION OF A POST OAK FLATWOODS, EFFINGHAM COUNTY, ILLINOIS. D. L. Coates, K. J. Lyman, and J. E. Ebinger, Eastern Illinois University, Charleston, IL 61920. An inventory was completed of the woody vegetation of a post oak flatwoods near Lake Sara, Effingham County, Illinois. This 3 ha forest, which is located in the Southern Till Plain Division, has a stand composition of 280.3 stems/ha (above 10 cm dbh.), and a basal area of 19.5 sq m/ha. Of the 11 overstory species present, post oak is the leading dominant, accounting for more than 50% of the Importance Value (IV of 104.8). Black oak ranks second in IV, followed by blackjack oak, white oak, shingle oak, and three hickory species. Tree seedlings average 25,209 ind/ha, but few saplings are present (41 ind/ha), probably the result of yearly fires.

- 7 -

THE STENOKOLEACEAE: AN ALTERNATIVE ANCESTRAL GROUP FOR LYGINOPTERID GYMNOSPERMS. Lawrence C. Matten, Southern Illinois University, Carbondale, IL 62901. Recent evolutionary models have relied on the Aneurophytales as the base of a single, double, or triple line of seed plant evolution. However, the Lyginopteridales, the earliest seed plants lack periderm; lack a monopodial protoxylem system with a central protoxylem strand; have a swollen, pulvinus-like leaf base; have three-ridged, papilionoid, or arc-shaped traces containing several protoxylems arranged in an arc; and several genera lack secondary growth. All of the preceding characters differ from those in the Aneurophytales. Comparison of early seed plant stems from West Virginia, Ireland, Scotland, and France with Stenokoleos from the Devonian of New York reveals a number of common characters. The agreement in characters suggests an alternative model of evolution of gymnosperms, namely that the gymnosperms are polyphyletic and some evolved from the Stenokoleaceae.

- 8 -

TRANSCRIPTIONAL CONTROL OF SOYBEAN NITRATE REDUCTASE

John Smarrelli, Jr. and John J. Callaci, Department of Biology, Loyola University of Chicago, Chicago, IL 60626. Under normal field conditions, nitrate is the predominant form of nitrogen utilized by most crop plants. In most higher plants, nitrate reductase, the first enzyme of the nitrate assimilatory pathway, is induced by nitrate and repressed by end products of nitrate assimilation such as amino acids. In soybeans, three nitrate reductase isoforms have been identified and separated. Two of these activities are constitutive and one is inducible. Using RNA isolation experiments, we have shown that amounts of mRNA for the inducible nitrate reductase isoform correlate with activity determinations. Further, we have demonstrated transcriptional control by performing in vitro transcription experiments using soybean nuclei isolated from plants supplied with various nitrogen sources.

- 9 -

REFINEMENT OF A BIOASSAY FOR THE SUBSTANCE THAT STIMULATES BASIDIOME FORMATION IN MYCENA CITRICOLOR (TRICHOLOMATACEAE, AGARICALES, BASIDIOMYCETES). R. A. Morgan, G. L. Warren, and W. J. Sundberg. Dept. of Botany, Southern Illinois Univ., Carbondale, IL 62901.

Mycena citricolor (Berk. & Curt.) Sacc. rarely produces basidiomes in agar culture unless grown together with some other fungi including Penicillium oxalicum Currie & Thom. As a prelude to molecular purification work, this study attempted to improve and standardize a previously developed bioassay for the basidiome stimulating substance (BSS). BSS-containing extract was obtained by filtering potato dextrose broth on which P. oxalicum was grown for 7 days. Several methods of applying 0.2 to 5 ml aliquots of the extract to cultures of M. citricolor grown on Yeast Powder-Soluble Starch agar were tested. Time from application of the extract to growth of recognizable basidiomes of M. citricolor was reduced from about 21 days to 5-6 days if the extract was mixed with the medium during preparation and/or plate pouring. Seven distinct stages of basidiome development--from initial formation to maturation--were identified and characterized. Numbers of basidiomes at various developmental stages occurring over time are now being used to develop standard bioassay curves for relative BSS concentration.

- 10 -

SURVIVORSHIP OF INTRODUCED PRAIRIE PLANT SPECIES IN A DEGRADED WEEDY MEADOW UNDER PLANT REMOVAL AND NON-PLANT REMOVAL CONDITIONS. R. R. Kirt and R. A. Durnberger, College of DuPage, Glen Ellyn, IL 60137. This two-year study addressed the survival of four prairie species, Andropogon gerardi, Spartina pectinata, Monarda fistulosa, and Silphium terebinthinaceum planted one meter apart under plant removal and non-plant removal conditions in a degraded weedy meadow. Statistical analyses indicate that there is no significant difference ($p > 0.05$) in the planting treatment of the prairie seedlings after the first two growing seasons. It does not appear advantageous to remove adjacent existing weedy plants when planting these four prairie plant species into old field meadows. Planting these prairie plant seedlings directly into weedy old field areas may be advantageous to establish low quality prairie in areas which are small, steeply inclined, or otherwise unsuitable for conventional soil preparation methods such as plowing, discing, and roto-tilling. This planting method can also be used to establish buffer areas surrounding pristine prairie remnants.

-11-

RIVER BIRCH FORESTS IN MASON AND CASS COUNTIES, ILLINOIS. C. A. Uhlarik and J. E. Ebinger, Eastern Illinois University, Charleston, IL 61920. Four stands of Betula nigra L. (river birch) were surveyed in Mason and Cass Counties, Illinois. River birch is the dominant overstory species in each of the study areas, accounting for 83% to 92% of the basal area (sq m/ha) and 75% to 87% of the overstory individuals. Understory species include black oak, black cherry, black hickory, silver maple, American elm, sassafras and green ash. All sites studied are in shallow depressions with acidic and sandy soils.

-12-

THE INFLUENCE OF VARIED MICROBIAL SUBSTRATE CONDITIONS ON THE GROWTH AND MYCORRHIZAL COLONIZATION OF LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM). J. Meredith and R.C. Anderson, Illinois State University, Normal, IL 61761. Plants were grown in three substrates (1) autoclaved soil, (2) autoclaved soil to which a vesicular-arbuscular mycorrhizal (VAM) fungal free filtrate of nonsterile soil was added and (3) nonsterile soil. To establish mycorrhizal plants in autoclaved soil, little bluestem root pieces were surface sterilized for 9 or 17 seconds in a 10% chlorox solution and used as a source of VAM fungal inoculum. Treatment plants were grown in substrates receiving root pieces surface sterilized for 9 seconds or 17 seconds. Control plants were grown in substrates receiving autoclaved root pieces. Plants grown in the autoclaved soil had significantly ($p < 0.05$) greater total plant biomass (0.30g) than plants grown in nonsterile soil (0.12g). Among the autoclaved soil treatments, plants grown in the substrate receiving root pieces sterilized for 9 seconds and a VAM-fungal free filtrate had significantly higher levels of VAM-fungal colonization than any of the other treatments, which did not differ significantly from one another. However, the addition of the VAM-fungal free filtrate, or root pieces that were autoclaved or surface sterilized, had no effect on plant root, shoot, or total biomass of plants grown in autoclaved soil.

-13-

COMPETITIVE ABILITY OF MUHLENBERGIA FRONDOSA, A SHADE-TOLERANT C_4 GRASS, WHEN GROWN WITH SCHIZACHYRIUM SCOPARIUM, A PRAIRIE C_4 SPECIES. Tim Clemann, Carmen Jackson and Marian Smith, Southern Illinois University at Edwardsville, 62026-1651. Rhizomes of M. frondosa and S. Scoparium were grown under high- and low-light regimes together and in monoculture in a greenhouse. In monoculture M. frondosa produced more total biomass under both light regimes. However, when grown with S. scoparium proportional differences in biomass were noted between light regimes, as well as in stem versus rhizome growth. Root/shoot ratios indicated that M. frondosa produced relatively less underground biomass when grown with S. scoparium at high light and more at low-light. Conversely, S. scoparium had greater root/shoot ratios under both light regimes when grown with M. frondosa. These results may be indicative of growth patterns which are adaptive to the species' different natural habitats.

-14-

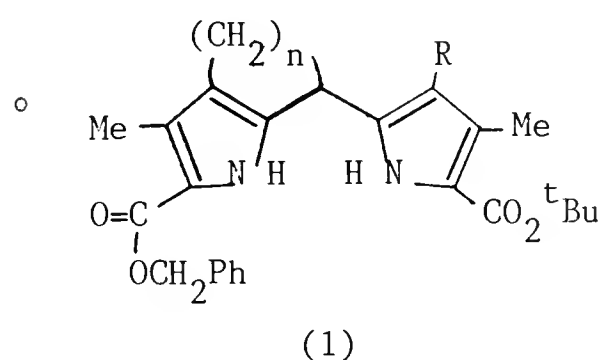
SEASONAL VARIATION OF CYANIDE PRODUCTION IN THREE ILLINOIS PLANT SPECIES. L. Horton and J. E. Ebinger, Eastern Illinois University, Charleston, IL 61920. Two populations each of Phlox divaricata L., Mertensia virginica (L.) Pers., and Celtis occidentalis L. from east-central Illinois were examined for cyanide production. The frequency and amount of cyanide produced was found to vary seasonally among the individuals tested within each population of each species. All three taxa peaked in cyanide production during the first two weeks in May.

-15-

ANDROECIAL DEVELOPMENT IN SALPIGLOSSIS. L. Ampornpan and J. E. Armstrong, Illinois State University, Normal, IL 61761. Androecial development of Salpiglossis, a zygomorphic member of the Solanaceae is being studied. After the terminal flower is determined, each unit of the inflorescence consists of a floral apex arising in the axil of a bract and producing two lateral bracts and then one flower. A whorl of five stamen primordia is initiated soon after the inception of the petal, alternating with the petal primordia. A dorso-ventral asymmetry among the anther primordia is apparent with two larger primordia on the adaxial side and a smaller primordia on the abaxial side. The smaller is destined to become a staminode.

-16-

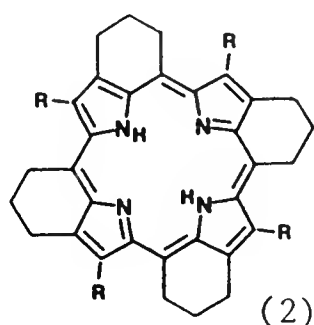
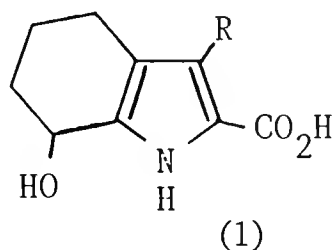
SYNTHESIS OF PORPHYRINS WITH SIXTEEN-MEMBERED EXOCYCLIC RINGS. Thomas G. Marron and Timothy D. Lash, Illinois State University, Normal IL 61761. Recent studies in our laboratory have concerned the synthesis of porphyrins with exocyclic rings from β -cycloalkenopyrroles. Dipyrroles incorporating carbocyclic rings (1; $n = 2-5$, $R = H$ or Et)



were the key intermediates in these studies. The carbocyclic ring size had a significant impact on the efficiency of porphyrin cyclizations, although these effects were modified by a variety of additional factors (Lash, Tetr. Lett., 1988, 29, 6877). In the present study, the influence of large carbocyclic rings on porphyrin cyclizations is being investigated. A novel dipyrrole (1; $n = 13$, $R = Et$) incorporating a sixteen-membered carbocyclic ring has been prepared and further studies are in progress to assess the utility of this compound in porphyrin synthesis.

-17-

CYCLOTETRAMERIZATION OF 7-HYDROXY-4,5,6,7-TETRAHYDROINDOLES: THE INFLUENCE OF BULKY 3-SUBSTITUENTS. Craig M. Shiner and Timothy D. Lash, Illinois State University, Normal IL 61761. Treatment of 7-hydroxy-4,5,6,7-tetrahydroindoles (1; $R = Me$ or Et) with potassium ferricyanide in refluxing acetic acid gave the unusual porphyrins (2) bearing four exocyclic rings (Lash et al., Tetr. Lett., 1987, 28, 1135). In order to assess the generality of this reaction, tetrahydroindoles bearing 3-phenyl, 3-tert-butyl and 3-isopropyl substituents have been prepared. Cyclotetramerization of the 3-phenyltetrahydro-



indole (1; $R = Ph$) gave the corresponding porphyrin (2; $R = Ph$) in low yield. It seems likely that steric crowding, between the carbocyclic rings and the phenyl substituents, leads to inhibition of porphyrin formation.

-18-

FRIEDEL-CRAFTS ALKYLATION - FACTORS THAT EFFECT ISOMERIZATION DURING ALKYLATION. M. T. Cygan, J. W. Hills, A. D. Glover, K. W. Field, K. E. Kolb, Bradley University, Peoria, IL 61625. When a straight chain alkyl halide, e.g. 1-halobutane is used to alkylate an aromatic ring, the ratio of n-butyl versus sec-butyl substitution product varies with both the nature of the aromatic and the halide (Cl, Br, I). Efforts have been directed at developing a simple organic laboratory experiment to demonstrate these factors. For example, the alkylation of mesitylene at 0-5° in presence of $AlCl_3$ gives 96.6% n-butyl and 3.4% sec-butyl product while p-xylene gives 82.7% n and 17.5% sec product.

-19-

THE CLEMMENSEN REDUCTION OF ACETOPHENONE. M. F. Clifton and K. W. Field, Bradley University, Peoria, IL 61625. Six major synthetic methods to carry out the Clemmensen reaction were studied as they related to the reduction of acetophenone. Experimental design techniques were used to examine the variables of heating time, heating temperature and acid concentration. Zinc treatment and choice of cosolvent were also investigated. Of the six major methods described in the literature, the highest yields of ethylbenzene were obtained by those using immiscible cosolvents. The presence of pi bonding in the cosolvent resulted in decreased yields. Yates' analyses showed increased ethylbenzene yields could be anticipated by utilizing concentrated acid, long heating times, elevated temperatures and amalgamated mossy zinc.

-20-

A SOLVENT EFFECT IN THE REACTION OF CARBOETHOXYCARBENE WITH AN ALKANE. Joe W. Arndt and JoAnn P. DeLuca, Illinois State University, Normal, IL 61761. The reaction of carboethoxycarbene, produced by the photolysis of ethyl diazoacetate, with 2,5-dimethylhexane (1) was carried out in a series of solvents including pentane, benzene and ethyl ether. In each case the three products anticipated as a result of insertion of the carbene into the C-H bonds of 1 were formed, as well as products of reaction of the carbene with the solvent. The ratios of products formed in the reaction of 1 with the carbene were identical in pentane and ethyl ether solution. In benzene solution, however, a different product ratio was observed. This is consistent with solvent effects observed in reactions of methylene (1CH_2) and may be due to complexation of the carbene by the aromatic solvent.

-21-

EFFECT OF A DIRECTING GROUP ON ADDITION OF A CARBENE TO A DOUBLE BOND: COMPARISON OF METHOXY AND METHYLTHIO GROUPS. Colleen O'Rourke, Terry A. Young and JoAnn P. DeLuca, Illinois State University, Normal, IL 61761. The reaction of singlet methylene (1CH_2), produced by the photolysis of diazomethane, with 3-methoxycyclohexene was carried out earlier in this laboratory. The products of methylene addition to the double bond, syn and anti to the methoxy group, were identified and the ratio of these two products determined. The results were consistent with a small directing effect of the methoxy group on carbene addition. The reaction of 3-methylthiocyclohexene with singlet methylene has now been carried out. The results of the two experiments will be compared and the influence of a methylthio vs. a methoxy group on methylene addition to a nearby double bond will be evaluated. Differences between the two sets of results may be the result of a stronger preference for carbene attack at sulfur than at oxygen.

- 22 -

ELECTRON-NUCLEAR INTERACTIONS IN ISOTOPE EXCHANGE EQUILIBRIA. Steven J. Peters and Gerald R. Stevenson, Illinois State University, Normal, IL 61761. Electron spin resonance analysis of the anion radicals of mixtures of perdeuteriated and perprotiated polyaromatics (*R and R respectively) show that the equilibrium constant for the reaction: $R^{\cdot-} + {}^*R = R + {}^*R^{\cdot-}$ is less than unity. These results predict that a separation of anion radical from neutral molecule would represent *a new method for isotopic enrichment*. Actual separations were accomplished and they agree with those predicted. The aromatic nature of the substrate has much to do with this enrichment as antiaromatic substrates yield opposite results. For these antiaromatic anions, isotopic exchange (H to D) can also be accomplished via the addition of heavy water. Surprisingly, even the oxygen atom in the water can be exchanged in a similar manner using oxygen containing anion radicals.

- 23 -

A MOLECULAR BLACK HOLE. Kerry A. Reidy and Gerald R. Stevenson, Illinois State University, Normal, IL 61761. The sequential addition of neutrons to the 6 possible sites in benzene results in a nonlinear decrease in the solution electron affinity, and this decrease in the EA is independent of the relative positions of substitution and thus orbital splitting. A plot of the reciprocal of the number of neutrons vs. $1/(1 - K)$, where K represents the equilibrium constant for electron transfer from the anion radical of normal benzene to the neutron substituted benzene, is exactly represented by a perfect parabolic curve. The intercept of this plot represents a cluster of an infinite number of neutrons. This is best interpreted in an astrophysical sense, as it implies that we have initiated the construction of a *black hole*.

- 24 -

HYDRATION EFFECTS ON ION-CONDUCTION IN CLAY-MODIFIED ELECTRODES

S. A. Lee and A. Fitch, Loyola University of Chicago, Chicago, IL 60626. The conductivity of a clay modified electrode with respect to $Fe(CN)_6^{3-}$ depends upon the type of cation present in the bathing electrolyte. The effect of the cation can be interpreted in terms of the cation assisted hydration of the interlayer region between two clay platelets. The electrochemical measurements for Na^+ show that the stepwise changes in conductivity correspond to approximately 3, 9, and 30 Å clay interlayer spacings, which mirror X-ray studies of spacing. K^+ and Cs^+ show no conductivity for all electrolyte concentrations consistent with a single layer of hydrate. Ca^{2+} shows conductivity consistent with two layers of hydrate for all electrolyte concentrations. The sensitivity of clay films to electrolyte may have application in the design of sensors for electroinactive alkali cations.

-25-

THE APPLICATION OF AN IODINE TITRATION TO THE DETERMINATION OF RARE-EARTH ARSENATE CONCENTRATION. F. Henry Firsching and John K. Walker, School of Sciences, Southern Illinois University at Edwardsville, Edwardsville, IL 62026

Iodine titrations have a broad application to the determination of a variety of oxidizing and reducing agents. Arsenate determination would be reasonable under normal circumstances. However, the presence of rare-earth cations could seriously interfere because the rare-earth arsenates are very insoluble. This study has investigated various parameters and their effects on the accuracy of the determination when rare-earth cations are in solution. The limitations of determining the concentration of saturated rare-earth arsenate solutions will be presented.

-26-

METABOLISM OF NITROXIDES BY MOUSE LYMPHOCYTES. J. M. Petruszak and P. D. Morse II, Illinois State University Normal, Illinois 61761.

Understanding the metabolism of nitroxides is important for their use as contrast agents for magnetic resonance imaging. It is our aim to explain the interaction between nitroxides and cells of the immune system. We have begun this study with lymphocytes which also circulate in the blood where nitroxides would most likely be introduced in medical application. We have explored the metabolism of nitroxides by mouse lymphocytes using ESR spectroscopy. Three types of nitroxide were studied; charged nitroxides which cannot enter the cell, uncharged nitroxides which can enter the cell, and ionized nitroxides which can enter the cell, but slowly. We found that nitroxides which entered lymphocytes were reduced in the order: positively charged > uncharged > negatively charged. Charged nitroxides which could not enter the lymphocytes were reduced most slowly. Piperidine nitroxides were reduced more rapidly than pyrrolidine nitroxides. Our studies show that lymphocytes may be an important site of reduction *in vivo*.

-27-

CONTROL OF OXYGEN CONCENTRATION FOR MEASUREMENTS OF NITROXIDE METABOLISM. F.H. Russo and P.D. Morse II, Illinois State University, Normal, Il. 61761.

The metabolism of nitroxides by most cells depends on oxygen concentration. To date, no method adequately controls oxygen concentration during electron spin resonance measurements. We describe here a method to overcome this problem. Cells (3 ml) in a container (37°C) outside the ESR cavity are bubbled with oxygen. The oxygen concentration can be controlled easily in this container and can be measured with an oxygen electrode. The cells are circulated by a peristaltic pump (2.2 ml/min) through silicon rubber tubing (1 mm ID, 100 cm length, 0.78 ml total volume) through a specially constructed ESR cavity insert Dewar. Both cell viability (90% or above) and cell counts (1.3×10^7 /ml) remained constant for one hour of circulation. Potential sources of cell loss (bubbling and damage by the pump) are minimal. This is a considerable improvement in cell viability over other methods in which cells remain totally or nearly anoxic during the course of the experiment. We have used this method for measurements of the effect of oxygen concentration on nitroxide reduction rates.

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DETERMINATION OF ZINC IN COW HOOVES BY ATOMIC ABSORPTION SPECTROMETRY. M.A. Boyko, F.S. Johnson, M.A. Jones, J.W. Webb, and C.L. Moore, Illinois State University, Normal, IL 61761. A major problem with dairy cattle involves the development of hoof rot and interdigital dermatitis which can severely affect general health and milk production. It was recently reported that hoof texture, heel cracks, interdigital dermatitis, and hoof rot showed improvement with the addition of dietary zinc methionine (1). In this paper zinc concentrations in cow hooves will be reported. The hooves were taken from two groups of cows, one on normal diet and the other on a diet supplemented with zinc methionine. The hoof samples (approximately 1 gram each) were digested in concentrated nitric acid then analyzed by atomic absorption spectrometry.

- (1) C.L. Moore, P.M. Walker, M.A. Jones, J.W. Webb, and J.R. Winter, J. of Dairy Sci., submitted for publication.

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THE EFFECT OF AGE AND NONENZYMATIC GLYCOSYLATION ON THE RAT OPTIC NERVE MYELIN. T. D. Noggle, M. A. Jones, and A. S. Jacks III, Illinois State University, Normal, IL 61761. Studies of biochemical events caused by hyperglycemia have considered primarily peripheral system myelin (Vlassara et al., 1981). Little work has been done on central nervous system (CNS) myelin, especially the effect of hyperglycemia on both CNS protein and lipid components. The effect of nonenzymatic glycosylation on optic nerve myelin *in vitro* from 8 and 18 month old animals was studied using a micromethod (Jacks, et al., 1989) for the isolation of the optic nerve myelin. The ability of ¹⁴C-glucose to covalently bind to individual optic nerve protein was measured, and the amount of glycosylation that occurred at each protein was determined by SDS-PAGE and scintillation spectroscopy.

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ISOLATION OF DOLICHOLS FROM RABBIT REPRODUCTIVE TISSUES. S.B. Peters, M.J.K. Harper, J. Sudbury and M.A. Jones, Department of Chemistry, Illinois State University, Normal, Ill. 61761 and Department of Obstetrics and Gynecology, University of Texas Health Science, Center, San Antonio, TX. 78284.

Previous studies have shown that dolichols are a family of long-chain polyprenols which contain 85-110 carbons (Keenan et al., 1977). The biochemical function of dolichols is as a lipid intermediate in glycoprotein biosynthesis (Eggens, 1982). Since glycoproteins are agents involved in cell recognition, dolichols may serve in site selection and implantation of an embryo into the uterine wall. Reproductive tissues were surveyed for their dolichol content. Following lipid extraction (Bligh and Dyer, 1959) of ovaries, oviducts and uteri, the dolichols were separated using HPTLC silica gel plates. Preliminary data suggest dolichols are present in reproductive tissues of rabbits at low concentrations.

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THE APPLICATION OF INTERACTIVE INTELLIGENT COMPUTER AIDED INSTRUCTION TO DISTANCE EDUCATION. R. N. WOLL, N. Woll and Company, San Jose, IL. 62682-0077. The concept of distance education or distance learning involves the use of electronic communication to facilitate learning among persons that are geographically separated. From early beginnings in Australia and elsewhere using radio, the state of the art has advanced substantially. Newer systems such as fiber optics and satellite relay have made very sophisticated systems cost effective. This new practical capability can play a vital role in the educational reform measures being studied by the U.S. government. A system design and projected strategy for a nationwide implementation of the concept will be presented.

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THE MACINTOSH AND THUNDERSCAN IN IMAGE PROCESSING FOR DETERMINATION OF SOYBEAN PROTEIN BODIES. L.H.Tichenor, L.D.Dove, and S.E.Hale, Western Illinois University, Macomb, IL 61455. Soybean, Glycine max cotyledons were harvested, sectioned, stained with bromophenol blue, and photographed using a phase contrast 25X objective. Photomicrographs were digitized using the ThunderScan scanner and stored as scan images. These were later edited with ThunderScan software to enhance contrast and saved as ASCII EPSF files. The EPSF files were used by a simple Pascal program to determine the percentage of area containing protein bodies.

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GENETIC ALGORITHMS AND GAME PLAYING. P. J. C. Lamont, Western Illinois University, Macomb, IL 61455. Genetic algorithms are exciting new search procedures based on the methodology of natural selection and natural genetics. Rote, instruction, analogy, deduction, induction, experiment, intuition, inspiration, discovery, and levels of metaknowledge synthesize methods of learning for humans and machines. Genetic algorithms provide inspirational learning techniques within the field of machine learning, a subfield of artificial intelligence. Let S be the search space. The process of search is to find an s belonging to S such that an oracle objective function f achieves an optimal value $f(s)$ at s . The purpose of this paper is to illustrate the methodology of genetic algorithms by application to a problem in game playing.

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THE METAKNOWLEDGE OF SYSTEM DESIGN. P. J. C. Lamont, Western Illinois University, Macomb, IL 61455. Students learn well in courses that include good metaknowledge. This paper reports on the application of metaknowledge to system design by relating goals, variables, relationships, strategies, data, state-structure and structure associated with the system to be designed. The paper gives plans for proceeding from the specification of goals to the theoretical structure made up of primitives and to the final physical implementation. The process involves the triptych of knowledge acquisition, knowledge formalization, and knowledge representation. Function precedes form. Thus definition and specification of the system may suggest the introduction of data structures and their format, algorithm development, and the identification of modularity. The methodology may be repeated for individual modules, splitting them into submodules as necessary to facilitate clear coding, maintenance, and testing. Preparation is all.

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COMPARISON BETWEEN ANTARCTIC METEORITE CONCENTRATIONS AND THOSE OF ROOSEVELT COUNTY, NEW MEXICO. P.P. Szipiera and R.T. Urbanik, Harrison H. Schmitt Meteorite Research Group, Harper College, Palatine, IL 60067. Two rather unique geographical locations, Antarctica and Roosevelt County, New Mexico, have provided the science of meteoritics with a wealth of specimens for study. Despite the obvious differences between the two places, there appears to be similarities responsible for the concentration of large numbers of meteorites at each location. In an attempt to find out these similarities, a detailed study was undertaken in Roosevelt County to gather data on the nature of the sediment present in a typical blowout where the rate of meteorite recovery is high. Over 600 pieces of gravel were collected from representative sites within the blowout. They were examined for size, mass, and surface appearance, and classified according to type. This data was then used to calculate the force required to transport the material. When compared to similar data collected from Antarctica, this data should provide a better understanding of the transportation mechanism responsible for the large concentrations at each place.

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FIRST REPORTED OCCURRENCE OF THE MINERAL MORDENITE IN THE BLACK HILLS, SOUTH DAKOTA. J. G. Kirchner, Illinois State University, Normal, IL 61761. Mordenite, with minor montmorillonite, occurs in small green masses and as green flame-structures in a rhyolite pipe along Meadow Creek in the northern Black Hills. The mordenite formed by replacement of rhyolitic vitrophyre clasts and vesicular glass produced by escaping gases. The alteration appears to be deuteric, rather than hydrothermal. Comparison of the mordenite to unaltered glass indicates that the replacement involved a loss of alkalies and silica and increases in CaO, MgO, Fe₂O₃ and H₂O. These changes are consistent with experimentally-determined, progressive alteration of silicic glass to mordenite to montmorillonite.

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AN INVERTEBRATE MEGAFUNA FROM THE JOPPA MEMBER OF THE STE. GENEVIEVE LIMESTONE (MISSISSIPPIAN) OF SOUTHERN ILLINOIS. G. H. Fraunfelter, Southern Illinois University, Carbondale, IL 62901. A study of the megafauna of the Joppa was undertaken in order to determine its composition, its nature, and its bearing on the placement of the Valmeyeran/Chesterian boundary. The Joppa is the upper member of the Ste. Genevieve Limestone. It directly underlies and interfingers with the Aux Vases Sandstone. Thus, it occupies a strategic stratigraphic position relative to the Valmeyeran/Chesterian boundary. The position of this boundary has been subject to much debate in recent times. For many years it was placed at the base of the Aux Vases. Some recent workers, however, have placed it above the Aux Vases at the top of the Levias Member of the overlying Renault Limestone. A better knowledge of the Joppa megafauna, now poorly known, should clarify the situation. Preliminary results indicate that the Joppa megafauna is brachiopod dominated. It contains the brachiopod species Composita subquadrata, C. trinuclea, Diaphragmus elegans, Eumetria verneuilliana, Orthotetes kaskaskiensis, Anthracospirifer leidyi, A. pellaensis, as well as the crinoid Platycrinites penicillus, the coral Amplexizaphrentis spinulosa, and fenestellid bryozoans. The composition of this megafauna suggests that the Joppa is transitional.

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ANALYSIS OF RADON CONCENTRATIONS AND PLEISTOCENE DEPOSITS IN ILLINOIS. T.B. HUDSON and R.S. NELSON, GEOLOGICAL TESTING SERVICES, TOWANDA, IL 61776. Most of the surface of Illinois is underlain by unconsolidated material related to Wisconsinan (Woodfordian) and Illinoian drift. These deposits consist of a variety of sediments transported by ice, meltwater and wind, which contain levels of Radon that exceed the E.P.A. recommended standards. Preliminary data suggest a strong contrast between materials of Wisconsinan age and those of Illinoian age.

MODERN DEVELOPMENT OF THE ILLINOIS LAKE MICHIGAN SHORE AND ITS EFFECT ON COASTAL PROCESSES Charles Collinson, Illinois State Geological Survey, Champaign, IL 61820

Since man's earliest occupation of the Illinois shore, coastal processes have been increasingly affected by construction of protective structures, harbors and lakefills. As early as 1873, Chicago had more than 70 groins or piers. On the North Shore there were only 3 structures. Today, virtually the entire shore has become protected by structures--nearly 700 on the North Shore alone. Less than 3% of the Illinois shore south of Waukegan remains unprotected. The high water levels of a few years ago stimulated the construction of more than 60 new structures since 1986.

Consequently the Illinois shore no longer has natural sediment resources to replenish the already lean littoral drift and present sediments are being winnowed offshore. Within a decade or two the shore will be essentially barren except for residual coarse sediments and those artificially emplaced.

STUDY OF EROSION ALONG THE ILLINOIS LAKE MICHIGAN SHORELINE USING DIGITAL TECHNIQUES James R. Jennings, Illinois State Geological Survey, 615 East Peabody Drive, Champaign, IL 61820

Dynamics along the Illinois shoreline of Lake Michigan have been investigated using digital cartographic techniques. Historical maps of this area are available covering approximately the last 150 years, but cannot be directly matched with recent maps. Computational capability allows adjustment of each historical map such that it conforms closely to its recent counterparts. Old lake survey sheets, county plat maps, subdivision plats, topographic maps, and (post 1937) aerial photographs have been used. Historical maps were digitized using ARC/INFO software supported by a Prime mainframe, and compared to digital versions of current USGS 7 1/2 minute quadrangles that were updated utilizing recent aerial photographs. Adjustment was performed by locating equivalent points (such as road intersections), which could serve as registration points for the historical maps. These points were then repositioned to achieve the best fit obtainable when altering size and direction, but not shape, of individual lines. Residual discrepancies were further reduced by linking maps using an ARC/INFO adjustment program.

The amount of erosion during the last 150 years has been greatly different at various sites along the lakeshore. Near the Wisconsin line, there has been approximately 1500 feet of erosion, whereas deposition has extended the shoreline lakeward by over 2000 feet in the area just north of Waukegan. The amount of erosion in other areas is discussed along with erosion rates during various time intervals.

GEOMORPHIC DEVELOPMENT OF THE ILLINOIS RIVER VALLEY BETWEEN OTTAWA AND PERU, ILLINOIS. R. S. Nelson, Illinois State University, Normal, IL 61761. Evidence of four episodes of valley incision and two episodes of valley filling are preserved along the Illinois River. The valley was cut to a elevation of 520 to 550 feet (Buffalo Rock Terrace) with the release of early Woodfordian meltwater. This valley was filled to an elevation of about 605 feet by Carmi Member, Equality Formation lake floor silts and slack water deposits. The valley was partially cleaned out and deepened to elevation of 480 feet (Ottawa Terrace) by massive releases of lake storage (Kankakee Flood). The valley floor was deepened to 400-420 feet before partial filling by Cahokia Alluvium (Peru and Modern terraces) to elevation of 450 feet. The most recent stream action has been to cut down through Cahokia Alluvium to the present level.

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ENIGMATIC FOSSIL PLANTS FROM THE EARLY PENNSYLVANIAN OF WESTERN ILLINOIS. Richard L. Leary, Illinois State Museum, Springfield, IL 62706. Quarries in Rock Island County, Illinois, have exposed Early Pennsylvanian-age sediments filling channels eroded in Silurian and Devonian carbonates. The Pennsylvanian sediments contain abundant well-preserved plant fossils. These fossils represent plants which grew on a well-drained surface and hence many are distinct from plants which grew in coal-forming swamps. These fossils are especially significant because it is thought that major evolutionary events took place on the "uplands" rather than in swamp or lowland environments. One quarry in western Rock Island County has produced many enigmatic fossils. Among these are 1) a stout axis with opposite to subopposite lobes, possibly bearing ovules; 2) a cluster of attached ovules; 3) a possible long, narrow fertile lamina; and 4) a stout bilateral axis with alternate elongate projections. These and other unusual plant fossils provide glimpses into diverse Early Pennsylvanian "upland" floras which may have contained ancestors to extant plants.

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DESIGN OF LEAD COMPENSATOR FOR MINIMUM GAIN REQUIREMENT. L. Youn and A. Godhwani, Southern Illinois University at Edwardsville, IL 62026-1801. Given the transient and steady-state performance specifications of the control system the design of the first-order compensator can be accomplished by the use of analytical equations. However, in the design of lead compensator, the value of T is chosen to obtain the largest value for α so that the additional gain required of the amplifier is as small as possible. In this case the equation of error constant as a function of α can be derived from the analytical equations and the largest value of α and the value of T are found from the derived equation. If the minimum gain requirement is not required, it is possible to choose a larger value of error constant for the better steady-state performance from the derived equation.

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THE USE OF VERHULST-PEARL EQUATIONS IN DETERMINING THE TOXICITY OF COPPER TO GREEN ALGAE. E. P. Kreml, P. K. Suresh, R. B. Brugam, and F. B. Kulfinski, Southern Illinois University at Edwardsville, Edwardsville, IL 62026. A new method for determining copper toxicity to algae was proposed and investigated. Selenastrum capricornutum and Scenedesmus quadricauda were each grown in modified Weber's medium in Nephelo flasks. The flasks were inserted into a colorimeter for population growth data (absorbance) with time. The results were comparable to those of other copper toxicity studies. The use of Nephelo flasks enabled us to monitor growth in relation to time without opening the vessels and risking contamination. The use of r and K values plotted against concentration is compared.

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SOIL AND WATER CONSERVATION GAMING/SIMULATION. C.J. Midden and K.L. Stoelzle-Midden, Southern Illinois University, Carbondale, IL 62901. Soil and water are two of the basic elements of life; neither resource is limitless (but are often viewed in this manner), and the quality of both are being threatened. Affecting an attitude change that gives these resources their respectful understanding is an important step in protecting the future of the environment. It has been found that attitudes towards the world are formed during the middle school years of a child's development. This gaming/simulation guides middle-school children through management decisions typically found on a Southern Illinois farm. Through active role playing, interaction with a simulated farm represented on a game board and guided discussion the participants experience the results of their farming practices.

EDUCATIONAL RECYCLING EXHIBIT. K.L. Stoelzle^{MIDDEN}, Southern Illinois University, Carbondale, IL 62901. The critical issue mandating recycling is the rapid consumption of landfill space. Yet our 'throw-away' society encourages the disposal of used packages, containers, paper, etc. The value of an individuals' understanding and participation in a recycling program is significant; the understanding that their refuse utilizes landfill space. This electronic exhibit presents to the participants several decision-making situations concerning recycling vs. disposal. The participant experiences the consequences of each decision by movement on a gameboard. This exhibit is one facet of on-going research to increase the public's awareness that an individuals' life style does have an effect on the environment.

THE CONVERSION OF A CHRONIC CERVICITIS TO A VIRGIN-LIKE CERVIX.

Calvin P. Midgley, M.D., Lake Villa, IL 60046.

Symbiosis means that two different organisms are living harmoniously together. To make our meanings clear, in this paper, we will use a new term sym-triosis to emphasize that in a healthy virgin cervix there are three vital factors:

1. There must be a spindle shaped canal filled with alkaline mucus produced by the columnar cell lining. These cells thrive only in the environment of their own secretion.

2. The external cervical os must block the escape of mucus except in small portions to lubricate the vagina. And finally,

3. The Doderlein bacillus must be in the vagina to produce the optimal acidic environment for the squamous cells.

Conclusion: These three conditions prevail only in a virgin. If the external os is removed or destroyed, as by the laceration in the birth of a first child, the mucus is lost and the major symptom of chronic cervicitis manifests itself.

BIOCHEMICAL AND ANATOMICAL CHANGES IN RAT LIVER ON DIRECT EXPOSURE OF THE ORGAN TO ND-YAG LASER. L. L. Gershbein (Group Report), Northwest Institute for Medical Research and Midwest Bio-Laser Institute, Chicago, IL 60634. Discrete liver lobes of sham-operated rats and the remnant of animals with two-thirds of the organ extirpated, were exposed directly to Nd-YAG laser (106.4 nm; spot, 1.0 cm; 0.6-8.0 W; 120-180 s); the respective controls were manipulated but not irradiated. With the higher power, the resulting lesions displayed larger centrally carbonized cores, some with cavitation and surrounded by a lighter halo or zone of necrosis and penetrating to a thickness of up to 3 mm. Healing was progressive from the start and with the laser at 5-8 W, well-demarcated smaller granulomatous lesions occurred 4 months later. The liver increment or the weight of organ regenerating over an observation period of 10 days for the laser-exposed rats was in the respective control range; no remarkable differences in liver weight percentages occurred among the intact groups. Small decrements in lesion-free hepatic microsomal aminopyrine demethylase were apparent among partially hepatectomized rats exposed to 5.0 W-laser as compared to the corresponding controls.

CYTOTOXIC CONSTITUENTS OF MICHELIA FLORIBUNDA. Ing-On Mondranondra, Agnes M. Rimando, Chun-tao Che, Harry H.S. Fong, and Norman R. Farnsworth. Program for Collaborative Research in the Pharmaceutical Sciences, College of Pharmacy, University of Illinois at Chicago, Chicago, IL 60680. A MeOH extract of the root part of Michelia floribunda (Magnoliaceae) exhibited cytotoxic activity when tested in KB and P388 tumor cell lines. Bioassay-directed fractionation of the extract led to the isolation of three cytotoxic sesquiterpene lactones, namely, parthenolide, costunolide, and santamarine, as well as a cytotoxic isoquinoline alkaloid, liriodenine. Inactive sesquiterpene lactones were also obtained during the course of this study. They included dihydroparthenolide and two new glucosides of dihydroreynosin and dihydrotamaulipin A. The structures of these new compounds were determined through interpretation of their spectroscopic data, including 2D-NMR spectroscopy. A non-cytotoxic phenolic glucoside was found to be syringin. Detailed spectroscopic properties of the new compounds will be presented.

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ANTIFERTILITY AND CYTOTOXICITY STUDIES OF SEDGES USED BY THE ECUADORIAN AMAZON INDIANS. K.S. Lowell and N.R. Farnsworth, University of Illinois, Chicago, IL 60680. 250 plants used by the Shuar Indians of the Ecuadorian Amazon were collected and their medicinal uses documented. Among these were *Cyperus prolixus* HBK and *C. articulatus* L. (Cyperaceae), known by the Indians as "piripri" or "piripiri" and deemed by them to be their most important medicinal plants. Rhizomes of these plants were used to treat lumps and sores that don't heal. In the markets of Peru, rhizomes were sold to treat cancer. *C. articulatus* and *C. prolixus* were used by the Shuar to induce permanent sterility in women, while *C. corymbosus* was used in Peru as a contraceptive. Based on the Shuar medicinal uses of these plants, collections of each species were extracted and tested for anticancer and antifertility activity. The petroleum ether extract of a collection of *C. articulatus* had an ED₅₀ of 0.05, 11.09, 15.09 and 11.17 µg/ml against P388, HT, KB and BC cancer cell lines, respectively. P388 bioassay-directed fractionation led to the isolation of two compounds that showed cytotoxicity, and were identified by spectroscopic methods to be a triterpene of the little-known serratene skeleton, with an ED₅₀ = 0.02 µg/ml against P388, and a sesquiterpene, corymbolone, with an ED₅₀ = 0.9 µg/ml against P388. Extracts of *C. articulatus* and *C. prolixus* rhizomes were found to disrupt the estrous cycle in rats.

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WHY DO MEDICAL SCIENCES NEED TROPICAL RAIN FORESTS? D.D. Soejarto, C. Gyllenhaal, and C. Lewandowski. University of Illinois at Chicago, Chicago, Illinois 60680 (M/C 877). At present, one in every eight drugs prescribed in the U.S. contains ingredients derived from tropical rain forest plants. Worldwide, one in three of plant-derived drugs comes from tropical rain forest plants. In view of the fact that 65% of flowering plants growing on our planet are found in the tropical belt, of which only a small fraction has been investigated for medical purposes, it is believed that further investigation of tropical rain forest plants could yield important drugs to treat diseases for which we still have no satisfactory cure. Tropical rain forests also provide medicine with animal models as research tools, which lead to an understanding of the disease process, and which may lead to cures in humans. However, with the rapid process of decimation of this tropical biome, and with the consequence of large scale species extinction, the prospect of finding new medicinal compounds from tropical rain forest plants is slim, if attempts are not implemented to conserve this tropical biome and to mount and sustain explorations to study the plants for their medical potential.

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EVALUATION OF FUNGICIDAL ACTIVITY BY MACROPHAGE CELL LINES DERIVED FROM IMMUNE-DEFICIENT MICE. Sarah A. Kemp*, Nancy S. Steward and Dennis J. Kitz, Southern Illinois University at Edwardsville, Edwardsville, IL 62026-1651. With the continued increased of opportunistic fungus infections in immune-compromised human beings, we have been interested in studying the fungicidal activity of macrophage cell lines derived from immune-deficient mouse strains (DBA/2, AKR and N:NIH(S)-III) for Cryptococcus neoformans and Candida species, and the effects of immune-modulating lymphokines such as recombinant human tumor necrosis factor-alpha (TNF; Genentech, Inc.) on this interaction. Macrophage cell lines were derived from murine bone marrow and grown in a medium which stimulates cell division. Uptake of the yeasts was enhanced by including a source of complement in the assay medium, and use of the proper priming:triggering signals (TNF:LPS) promoted fungicidal activity by the cultured macrophages. TNF has also been found to enhance clearance of Cryptococcus from murine organs following intravenous challenge, and therefore may provide an adjunct therapy for patients with fungus infections. This work was supported in part by a grant from the American Lung Association and U.S. Department of Education Grant Award # P202A80053.

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COMPARISON OF THE ENHANCEMENT OF MURINE IMMUNE RESPONSE BY ERYTHROMYCIN, TROSPECTOMYCIN, AND NORFLOXACIN. Michelle L. Landrem, Jewell A. Coulson and Dennis J. Kitz*, Southern Illinois University at Edwardsville, IL 62026-1651. Previous studies from our laboratory have shown that clindamycin, an antibiotic known to be concentrated by phagocytic cells, boosts host delayed type hypersensitivity (DTH) response and the ability to kill yeast pathogens both in vivo and in vitro. In our current study we have examined the ability of three additional antibiotics (erythromycin, trospectomycin and norfloxacin) which are known to be concentrated by phagocytic cells to effect host immune response. Of the three, erythromycin and trospectomycin were found to boost in vitro killing of Candida lusitaniae by cultured murine macrophages. Erythromycin also was found to boost in vivo clearance of C. lusitaniae following intravenous challenge of the mice, and to effect their DTH response to the chemical antigen DNFB as measured by an ear-thickness assay. These findings demonstrate that antibiotic-mediated enhancement of murine immune response is not simply related to uptake by the host phagocytic cells. This work was supported in part by a Sigma Xi Grant-in-Aid of Research to M.L.L.

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DETECTION OF ALKALINE PHOSPHATASE ACTIVITY IN MOUSE REPRODUCTIVE TISSUE HOMOGENATES. A. Watson and M.A. Jones, Illinois State University, Normal, IL 61761. While alkaline phosphatase (AP) activity has been reported from a number of tissues, there have been few studies of the reproductive tract organs. These organs (ovaries, uterus, and oviducts) are critical for the developing embryo and successful pregnancy. We have undertaken studies to assess the AP activity in reproductive tissues. Fresh tissues were obtained from mature, female mice and homogenized. Activity was determined by following the hydrolysis of paranitrophenol phosphate spectrophotometrically. Uterine and oviducal tissues were more active than were ovaries under the conditions used in the assay. Enzymic activities from animals of different reproductive stages will also be reported. (Supported, in part, by the ORSP research program at Illinois State University.)

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ACTIVITIES OF OAT COMPARED IN MELANIN-CONTAINING AND MELANIN-FREE PIGMENT EPITHELIUM
K. O. Ratzlaff and J. Morales, Southern Illinois University at Edwardsville,
Edwardsville, IL 62026

The enzyme ornithine ketoacid-aminotransferase (OAT) catalyzes the reversible transamination of ornithine with alpha-ketoglutaric acid to yield glutamic- γ -semialdehyde and glutamic acid. A hereditary deficiency of this enzyme has been found to be associated with gyrate atrophy of the choroid and retina. The specific activities of OAT in the pigment epithelium (PE) of mammalian eyes is among the highest reported for normal tissues. Since the degeneration of the tissues in eyes with gyrate atrophy typically begins in the retinal periphery and does not progress symmetrically, we assayed the activity of OAT in the PE from the tapetal and non-tapetal areas of ox eyes to determine whether the enzyme was uniformly distributed or not. The PE from the tapetal area of the ox eye is almost free of melanin whereas that from the non-tapetal area is heavily laden with melanin granules. The specific activity of OAT of the PE from the tapetal area was several-fold higher than that from the non-tapetal area. This suggests that the melanin granules and/or the tapetum behind the PE accounts for a non-uniform distribution of enzyme activity in the ox eye.

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INHIBITORY EFFECTS OF THE EXTRACTS OF ZINGIBER SPECIES ON THE GROWTH AND REPLICATION OF PHAGE LPP-1 IN CYANOBACTERIUM. Ebby P. Jido, and Amrik S. Dhaliwal, Loyola University, Chicago, Il. 60626. Rhizome extracts from Zingiber officinale and Zingiber zerumbet were prepared by grinding them in saline with a mortar and pestle. Cyanobacterium was treated with each of the extracts (20% v/v) and the mixtures were constantly shaken for four hours using an orbit shaker under fluorescent 150 ft. c. light intensity. Extract treated cyanobacteria were inoculated with phage LPP-1. Samples were taken from this mixture at one hour intervals to determine the intracellular growth of the virus. In order to measure burst size of single infected cells, samples were diluted so that one infected filament would remain per milliliter of the solution. Plated samples were incubated at 24°C and constant 150 ft. c. light intensity. After three days of incubation the number of plaques were counted. Experiments were repeated at least twice and analyzed statistically. It can be stated that extracts from both of the zingiber species are inhibitory but Z. zerumbet causes greater inhibition of both intra-cellular growth and single cell burst size of the LPP-1 virus than Z. officinale.

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BIOENERGETICS OF AN ACTIVE HETEROTROPHIC NITRIFIER-DENITRIFIER. D. Castignetti, Loyola University of Chicago, Chicago, IL 60626 Thiosphaera pantotropha simultaneously oxidizes ammonia to nitrite while also reducing N-oxides, such as nitrate, nitrite, and nitrous oxide, to nitrogen gas. Proton translocation experiments have resulted in $\rightarrow H^+/N\text{-oxide}$ ratios indicative of energy conservation when the bacterium reduces nitrate, nitrite and nitrous oxide. Ammonia is presumed oxidized to nitrite via the intermediates hydroxylamine and nitroxyl. T. pantotropha oxidizes hydrazine, an analogue of hydroxylamine, to N_2 . Experiments are underway to determine if hydrazine oxidation results in energy conservation as evidenced by proton translocation.

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MASS ISOLATION OF CONTRACTILE STALKS FROM VORTICELLA SEPULCRETI. E. Vacchiano and H. E. Buhse, Jr., University of Illinois, Chicago, IL 60680. Contraction of the spasmoneme in the stalk of the sessile ciliated protozoan Vorticella involves neither actin, myosin, tubulin, nor an organic energy source. It is composed mainly of several calcium binding proteins. In a previous study (ISAS abstract, 1988), we reported on improved methods for culturing Vorticella sepulcreti. Now we report that agitation of cells during culture growth causes most of them to detach from the substrate, which makes them more accessible for biochemical manipulation. Thirty percent acetic acid extraction of whole cells (stalks and cell bodies) solubilized the spasmoneme and revealed the presence of several calcium binding proteins when these extracts were electrophoresed under non-denaturing conditions. To determine which of our calcium binding proteins are found in the spasmoneme, we have purified contractile stalks away from cell bodies. First by detaching the stalks from the cell body through agitating whole cells extracted with 0.2% saponins and 35% glycerol. And separating the stalks from the cell bodies by low speed centrifugation over a discontinuous gradient of 50%, 75% and 95% glycerol. The 75% glycerol fraction contained mostly stalks and few zooids.

SEPARATION OF TWO PHAGE TYPES FROM A NATURAL SALMONELLA TYPHIMURIUM ISOLATE. C. A. Hendrell, F. R. Goforth, and P. E. Wanda, Southern Illinois University at Edwardsville, Edwardsville, IL 62026. A Salmonella typhimurium bacterial strain isolated from nature was discovered to harbor two bacteriophages. Transmission electron microscopy using uranyl acetate as a negative stain, revealed a short-tailed, large capsid (stlc) phage as well as a long-tailed, small capsid (ltsc) phage. Two plaque morphologies were also observable. Separation of the two phage types was accomplished via a series of phage propagations from single plaques. A galactose negative strain of Salmonella typhimurium was found to be selective for the ltsc phage type. Once the two phage strains were purified, the stlc phage revealed "clear" plaques and ltsc phage gave "cloudy" plaques. Homogeneity was further verified by negative staining. Size exclusion chromatography also showed a slight separation between the stlc and ltsc. Currently, DNA restriction gel analysis of the two bacteriophage types is underway.

ULTRASTRUCTURE OF XANTHOMONAS SPECIES ASSOCIATED WITH SUDDEN DEATH DISEASE OF SOYBEANS. John J. Bozzola, Southern Illinois University, Carbondale, IL 62901. Isolates of gram negative bacteria, identified as a species of Xanthomonas cultured from soybean plants affected by Sudden Death Disease, were prepared for scanning (SEM) and transmission electron microscopy (TEM). Cells were fixed in glutaraldehyde/osmium, dehydrated in an ethanol series and either critical point dried for SEM or embedded in an epoxy resin and sectioned for TEM. By SEM, the cells appeared to be covered by an extracellular slime that often extended as strands from one cell to another. The slime was controlled by culturing the cells in a medium low in sucrose or glucose. By TEM, the 0.5 x 1.5 um cells often appeared to be surrounded by an extracellular capsular material, probably xantham gum. This material often attached groups of cells together into packets or clumps that were macroscopically visible in the culture liquid. When cells were cultured in a medium free of sugars, the aggregation phenomenon ceased. Cells had cell wall ultrastructures typical for gram negative organisms.

EVALUATION OF SOYBEAN EXTRACTS FOR PHYTOTOXINS IN SUDDEN DEATH DISEASE OF SOYBEANS. G.T. Evers, J. Leyden and J.J. Bozzola, Southern Illinois University, Carbondale, IL 62901. In earlier studies, it was demonstrated that potassium hydroxide extracts from a soybean strain with SDS-like symptoms was able to induce the symptoms in detached, normal soybean leaves. To further explore this finding, extracts were obtained from a different strain of soybeans thought to be affected with Sudden Death Disease symptoms and compared to extracts obtained from normal field grown plants. In the present assay, little or no symptoms were obtained from the extracts, indicating either that a toxic entity was not involved in the disease or that it had been inactivated by the storage conditions employed to preserve the plants (standard freezer at -20 F). Preliminary studies employing various extracellular polymers (gums) indicate that symptoms may be inducible at appropriate concentrations of the polymers. It is likely that careful titration of toxin and polymers is necessary to induce the foliar symptoms.

CHEMISTRY RETRAINING PROGRAM FOR SECONDARY TEACHERS. Frances H. Crean, Robert J. Van Lanen, and Margaret Yates, Saint Xavier College, Chicago IL 60655. A chemistry workshop program for retraining and updating high school chemistry teachers has been successfully conducted at Saint Xavier College with the support of Federal Education for Economic Security Act - Title II grants. The program includes assessment of the teachers' academic preparation and home school laboratory facilities, development of an individualized plan of projects by each teacher, an intensive summer workshop which emphasizes laboratory work, and an evaluation of the implementation of the curricular changes developed. The program provides funds for the teachers to purchase equipment needed to implement changes in their laboratory classes. The program also funds the purchase of audiovisual materials to be used by the participating schools.

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THE PHYSICS AND PHYSIOLOGY OF A BICYCLE RACE: THE INDIVIDUAL TIME TRIAL. K. Andrew, B. Timson, and Laurie Cullen, Eastern Illinois University, Charleston, IL 61920. An application of the laws of thermodynamics to an Olympic class bicycle racer is used to develop an integro-differential equation for the elapsed time to complete an individual time trial, i.e. a race against the clock on a specified course. Several critical parameters enter the equation; tire pressure, road resistance, wind resistance, maximum volume oxygen consumption, respiratory rate, and alactic and glycolytic energy production mechanisms. We examine the sensitivity of race time to these parameters in an effort to establish the best possible training routine and the lowest possible race time. Data was collected for these athletes using a bicycle Monarch™ ergometer. A variable resistive load, respiratory rate, and oxygen consumption were interactively monitored for several workouts, each followed by complete recuperation. The data was then used with our equation to determine the best possible times for an individual time trial. These results were then correlated with actual athletes and their most recent race results. For excellent road and tire surfaces we find deviations smaller than 10% for the best riders.

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BIODIVERSITY THEORY & APPLICATIONS: A NEW PARADIGM. Joe D. Pratt, IL Dept of Conservation, Springfield, IL 62701. Biodiversity (bd), based on principles of population biology and evolutionary theory, is defined as the number of different organisms, the cumulative human experiences of potential or real different phenotypic interactions and the genetic resources of an area. A method is elaborated to develop a model that can be used as an index for evaluation of bd goodness of any area measured by the factors of taxa richness, taxa abundances and endemism related to area scale and composition and compared to bio-similar areas. It is demonstrated that a bd perspective is empirically separate from other similar conceptual perspectives, cf. habitat, bio-resource, natural resource, ecology, environment, wildlife, community and culturally derived others because of bias and/or aesthetic, political and traditional standards and that there are social consequences for nature conservation because of this. I argue that two Wilsonian bd domains (human uses of nature) impact all present and future human activities: 1) an awareness in learning theory of bd for sated perception and balanced cognition for a psychologically healthy mentality, and 2) the value of the content of the information present in the large amounts of DNA present in all organisms that is meaningful in economic and communication contexts. Bd theory applied in broad spectrum conservation issues and recreation will have penetrating and significant impact.

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DIFFERENCES IN TESTICULAR STEROIDS LEVELS IN MINK WITH DIFFERENT COAT COLOR PHENOTYPES. A.G. Amador, C. Sundqvist* and A. Bartke*, SIU School of Medicine, Springfield, IL 62794 and *Carbondale, IL 62901.

The mink (Mustela vison) is a commercially important animal, farmed because of its varied coat color phenotypes. Since in the mouse, which also presents a high coat color variability, some coat colors have been associated with alterations in testicular function, the present study was designed to determine if this was the case in the mink. Testes were collected from five types of mink (fertile and infertile wildtype, fertile dark, fertile pasteland fertile opaline) at a northern Illinois farm. Steroid levels were measured in testes homogenates using solid-phase radioimmunoassays. Opaline mink had significantly higher progesterone, 17-oh-progesterone and testosterone levels than the other type of mink. The differences were more dramatic for 17-oh-progesterone and testosterone levels. Steroid levels were similar between fertile and infertile wildtype mink. These results indicate that in the mink, as in the mouse, some coat colors are due to genotypes that affect regulatory loci.

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MORPHOPHYSIOMETRIC ANALYSIS OF TESTICULAR CELLS FUNCTION IN HAMSTERS EXPOSED TO SHORT (SPP) OR LONG PHOTOPERIODS (LPP). A.G. Amador, A.P. Sinha-Hikim*, H.G. Klemcke**, A. Bartke* and L.D. Russell*, SIU School of Medicine, Springfield, IL 62794 and *Carbondale, IL 62901; **USDA MARC, Clay Center, NE 68933.

For about ten years a controversy has existed about the effect SPP has on testicular LH and FSH receptor levels in Syrian hamsters (Mesocricetus auratus). Repeatedly the concentration of receptors has been reported to be increased, and the total content to be decreased. In the present study different endocrine parameters were measured in hamsters, exposed to LPP or SPP, for which detailed testicular cell morphometry was available. The concentrations of receptors were again increased and the contents decreased in SPP hamsters. However, when the number of receptors was determined per cell, SPP hamsters had lower levels than LPP. The surface density of receptors was found to be similar in both groups, whereas the surface density of all membrane proteins was reduced, thus explaining the apparent elevation in receptor concentration. Measurement of steroids indicated a reduction in the 17 α -hydroxylase/c17-20 lyase cytochrome P-450 complex.

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INDUCTION OF GST ACTIVITY IN AN INSECTICIDE-SENSITIVE STRAIN OF MUSCA DOMESTICA. C. A. Berry and S. A. McCommas, Department of Biological Sciences, Southern Illinois University, Edwardsville, IL 62026. The response of glutathione S-transferase (GST) activity in a sensitive strain of housefly, Musca domestica, to several inducers was assayed. GST activity before and after treatment with these inducers was determined separately for both sexes using two substrates. The inducers used were phenobarbital, sodium barbital, tetrachlorvinphos, and trans-stilbene oxide. GST activity was shown to be induced to higher levels by these compounds in the housefly, and similar effects have been observed in mammalian systems. Comparisons made between GST activity due to induction in the housefly and their mammalian counterparts indicate that the housefly GST system may be a useful model for the mammalian system.

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THYROTROPIN (TSH) STIMULATES TESTICULAR TESTOSTERONE PRODUCTION IN MICE AND RATS. A.G. Amador AND A. Bartke*, SIU School of Medicine, Springfield, IL 62794 and *Carbondale, IL 62901.

Since we have previously shown that TSH stimulates testicular steroidogenesis in cricetid rodents, the present project was designed to determine if TSH has this effect also on the testes of murid rodents. Incubation with TSH caused an increase in media testosterone by testes of inbred mice that was not as great as that caused by hCG. However, in randombred mice the TSH-induced elevation in media testosterone was greater than that produced by hCG. Finally, in mice with inherited dwarfism and in outbred rats, the TSH stimulation of testicular testosterone production was similar to that obtained with hCG. Incubation both hormones did not produce further elevations in testosterone levels. The present results indicate that TSH is a steroidogenic hormone, but that the magnitude of this effect is dependent upon the genetic composition of the animal.

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THE INDUCTION OF GLUTATHIONE S-TRANSFERASE ACTIVITY IN A RESISTANT STRAIN OF THE HOUSEFLY MUSCA DOMESTICA USING PHENOBARBITAL AND SODIUM BARBITAL. E. D. Boedeker and S. A. McCommas, Department of Biological Sciences, Southern Illinois University at Edwardsville, Edwardsville, IL 62026. A resistant strain of Musca domestica having a high initial glutathione S-transferase activity was treated with two of the inducers used on an insecticide-sensitive strain of houseflies in similar experiments. Comparing and contrasting the responses to these agents show that the response in the resistant strain was less, suggesting that the high level of activity in this strain may be due to a regulatory mutation.

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IMMUNONEUTRALIZATION OF GnRH AND ITS EFFECTS ON MOUSE TESTICULAR FUNCTION. A.G. Amador, A. Mayerhofer*, A. Bartke* and B.D. Scharbacher**, SIU School of Medicine, Springfield, IL 62794 and *Carbondale, IL 62901; **USDA MARC, Clay Center, NE 68933.

To determine which effects of the deficiency of GnRH in hypogonadal mice are developmental and which are a direct result of the hypogonadal mice are developmental and which are a direct result of the lack of this hormone, normal adult DF/B mice were injected i.p. twice a week. They received either ovine anti-GnRH serum or normal ovine serum. Mice that received anti-GnRH had smaller testes, lower concentration of testicular LH receptors, and lower basal plasma and incubation media testosterone levels, when compared to animals that received control serum. In vivo treatment with hCG, 24h before sacrifice, restored normal LH receptor levels in mice with anti-GnRH, but did not elevate plasma testosterone to the same levels as in mice with control serum. In vitro treatment with hCG also did not elevate media testosterone to levels comparable to those in control mice. The present results indicate that although the deficiency of GnRH impairs testicular function in adult mice, it does not have as a dramatic effect as when it occurs congenitally.

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RESPONSE OF COYOTES TO AN EMERGENCE OF 13-YEAR CICADAS. B. L. Cypher, Southern Illinois University, Carbondale, IL 62901. The dietary response of coyotes (Canis latrans) to an emergence of 13-year cicadas (Magicicada tredecassini) in May-June 1989 was investigated via scat analysis at Crab Orchard National Wildlife Refuge, Illinois. The occurrence of cicadas in 2 biweekly samples of scats collected during peak emergence (15 May-15 June) was 83% and 90%, respectively. Compared to this same period in 1986-88, consumption of adult white-tailed deer (Odocoileus virginianus), cottontails (Sylvilagus floridanus), woodchucks (Marmota monax), muskrats (Ondatra zibethicus), and birds was significantly lower, particularly compared to 1988 when predation on some of these species increased due to drought-depressed vole (Microtus ochrogaster) populations. Thus, the opportunistic use of superabundant cicadas by coyotes resulted in a significant, although short-term, reduction in predation on primary prey populations, especially certain game species. However, predation on fawns did not decline, possibly because fawns are of optimal size for adult coyotes to transport to litters.

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THE METABOLIC RATES OF TWO SYNTOPIC ARANEID SPIDERS IN THE LATE SEASON OF ILLINOIS. A. L. Markezich, Black Hawk College, Moline, IL 61265. Respirometry at various test temperatures (ET's) was used to determine metabolic rates of adult female Argiope aurantia and Argiope trifasciata samples collected at two-week intervals in August, September, and October. At ET's of 15° C and above, samples of A. aurantia showed positive thermal acclimatization and those of A. trifasciata displayed negative thermal acclimatization. These interspecific differences were considered adaptive with respect to reproductive deadlines, overwintering strategies, and seasonal persistence of each species.

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CONSERVATION STATUS OF VENEZUELAN ANNUAL KILLIFISHES. J. E. Thomerson, SIUE Edwardsville IL 62026, and D. C. Taphorn-B., UNELLEZ, Guanare, Edo. Port. Venezuela 3310. Four species of annual killifishes occur in the Maracaibo Basin. Rachovia pyropunctata, a Maracaibo Basin endemic, is the most common species in the basin. R. brevis has limited Venezuelan distribution but is widespread in Colombia. Both R. hummelincki and Austrofundulus limnaeus have extralimital distributions. Six species occur in the Orinoco Llanos. Pterolebias hoignei, Cynolebias dolichopterus and Rivulus stellifer have restricted distributions, and are most common in forested areas. The other three species are widely distributed and have broad requirements. All species readily utilize roadside ditches and borrow pits. They are negatively impacted by pesticides, permanent water, and drainage. This research supported by CONICIT grant SI-1978 to DCT-B.

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THE GENUS TRITOMA (COLEOPTERA: EROTYLIDAE) IN ILLINOIS, WITH NOTES ON THE HOST FUNGI OF THE INCLUDED SPECIES. M. A. Goodrich, Department of Zoology, Eastern Illinois University, Charleston, IL 61920. The genus Tritoma is reviewed for Illinois. Of the 11 species found in the continental United States, 10 are believed to occur in Illinois. The species are: Tritoma biguttata, T. humeralis, T. atriventris (not yet recorded for Illinois, but likely to occur), T. aulica, T. mimetica, T. unicolor, T. angulata, T. tenebrosa, T. pulchra and T. sanguinipennis. Distribution in Illinois and relative rarity of these species are described and numerous new host records are provided.

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CHANGE IN PH AND MIDGE SPECIES IN A STRIP-MINE LAKE. J. B. Stahl, Southern Illinois University, Carbondale, IL 62901. The aim of this study was to find out if change in pH would result in a change in the midge fauna. For 24 years Bradley's Acid Pit had a pH of about 3.3 and a chironomid fauna of two species: Chironomus harpi and Tanytarsus dendyi. Then in August 1986, without any treatment, pH began to rise; it reached 7.0 by May 1989. In 1989 the species found were: Polypedilum tritum, Endochironomus nigricans, Chironomus decorus, Tanytarsus sp., and Chaoborus punctipennis. Thus change in pH did result in a change in the midge fauna. However, the species assemblage is not the same (yet) as in consistently circumneutral strip-mine lakes. Studies of acid, hard-water strip-mine lakes that become neutral can be a valuable complement to studies of neutral, soft-water lakes that become acid from acid rain.

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GROWTH AND MYCORRHIZAL COLONIZATION OF RICE (ORYZA SATIVA) UNDER VARIED INORGANIC NUTRIENT CONDITIONS. S. S. Dhillon and L. -A. Ampornpan, Department of Biological Sciences, Illinois State University, Normal, IL 61761. Plants were grown for 50 days in sterilized soil and non-sterilized soil containing vesicular-arbuscular mycorrhizal propagules. Plants in each substrate received additional P, N, or P + N weekly. Control plants did not receive any additional nutrients. Plant response to the substrates was a function of nutrient treatment. Percent colonization and colonized root length by mycorrhizae was lowest for the P + N treatment with non-sterilized soil. Total biomass was generally higher for plants in sterilized soil which received additional nutrients than plants in non-sterilized soil.

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EFFECTS OF LIGHT INTENSITIES ON LAKE MICHIGAN ALGAL COMMUNITY DEVELOPMENT. Nancy C. Tuchman, Riad E. Youssef, Randall J. Pane and Ibrahim S. Zabaneh. Loyola University of Chicago, Chicago, IL 60626. Substrates colonized with algae in Lake Michigan were brought to the lab and allowed to develop under a gradient of light intensities ($2.8 - 35 \mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$) for 28 days. Light intensity did not affect rates of successional development, but the directionality of succession was significantly changed. Under high light levels, Scenedesmus longus dominated the community, comprising > 85%, and drove other species to extinction. At intermediate light levels, S. longus had a lower competitive advantage, allowing four other species to codominate, effectively increasing species diversity and richness. Low light levels produced an assemblage where two facultatively heterotrophic species accounted for 99% of the community. Although all treatments reached a mature endpoint community within 28 days, the species composition of those communities were different.

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VESICULAR-ARBUSCULAR MYCORRHIZAL INOCULUM POTENTIAL ON BURNED AND UNBURNED SAND PRAIRIES. S. S. Dhillion and R. C. Anderson, Department of Biological Sciences, Illinois State University, Normal, IL 61761. Field and growth chamber bioassay procedures which measure only the active VAM fungal propagules serving as inoculum, were used to obtain an estimate of the inoculum potential of soil from burned and unburned prairies. Percent colonization decreased from October 1986 to June 1987 then increased through October 1987 for corn roots grown in soil from both sites. Plants from the growth chamber bioassays had significantly longer colonized root lengths than plants grown in the field.

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The Formation of Glyoxylate from Glycine by Melanin. Annette Baich and Jennifer Schloz, Southern Illinois University at Edwardsville, Edwardsville, IL 62026. Natural and synthetic melanins convert glycine to glyoxylic acid *in vitro* at physiological temperatures. Glyoxylic acid is further converted to formic acid under these conditions. The amount of glyoxylic acid formed is proportional to the amount of melanin added, and increases with time. The production of glyoxylic acid is not altered substantially when catalase is added. Melanin in tissues such as the pigmented epithelium of the eye, the skin and the substantia nigra may catalyze non-enzymatic oxidation of substrates.

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A NEW COLLEGIATE/PROFESSIONAL FIELD SHORT COURSE ON SOILS, GEOMORPHOLOGY AND BEDROCK GEOLOGY IN WARREN CO. (WESTERN ILLINOIS).

D. E. Liniger and L. A. Wiedman, Illinois Soil Conservation Service and Monmouth College, Monmouth IL 61462

Recent budget cuts in education and governmental services has left each searching for ways to maximize efforts with minimal funding. Cooperation at the local level is one possibility. An example of such is a newly organized field short course on soils, landforms and bedrock geology in western Illinois. Several unique localities were discovered during recent soil mapping. Interaction with local college educators stimulated discussion across the traditional agency boundaries. Several student research projects have resulted from the interplay. Advantages to both groups were many including; field opportunities for students with professionals, intern and extern possibilities, and possible employment options. The unique field sites are now being studied using equipment and human resources from both groups.

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A RAPID, IMPROVED METHOD FOR DETERMINING TYPE I COLLAGEN mRNA LEVELS IN INTACT HUMAN FIBROBLASTS. E. Touma and J. Doering, Department of Biology, Loyola University of Chicago, Chicago, IL 60626. A number of human connective tissue disorders involve abnormalities in the synthesis of Type I collagen mRNAs. In order to screen large numbers of samples for such defects, we have developed a simple and rapid dot blot technique for the quantitation of collagen mRNA levels in small numbers of intact fibroblasts. Monolayer cell cultures are harvested by trypsinization and fixed in phosphate buffered saline with either 4% paraformaldehyde for 5 minutes at room temperature or with 1% glutaraldehyde for 60 minutes at 4°C. The cells are then washed and resuspended in 70% ethanol. Cells are loaded onto poly-L-lysine coated glass fiber filters under strong suction, digested with proteinase K, and then hybridized with RNA probes made from Type I collagen cDNAs. A strong and easily quantifiable signal is obtained with 5000 cells per dot. This method is now being used to screen cells from osteogenesis imperfecta patients for defects in Type I collagen synthesis. (Supported by a grant from the Shriners Hospitals for Crippled Children).

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THE DORSAL RAMUS OF THE LUMBAR LEVEL SPINAL NERVE AND THE OSSEO-FIBROUS TUNNEL THROUGH WHICH ITS MEDIAL BRANCH PASSES. C. S. RO and W. E. BACHOP. The National College of Chiropractic, Lombard, IL 60148. As the spinal nerve emerges from its intervertebral foramen in the lumbar region, it bifurcates into diverging dorsal and ventral rami. The dorsal ramus passes posteriorly through an aperture which is bounded above and below by transverse processes, is bounded medially by the superior articular facet of the vertebra below, and is bounded laterally by the intertransverse ligament. The accompanying photographs provide an overview of the human lumbar level spinal nerve, its ventral ramus and dorsal ramus, the latter's medial and lateral branches, and the osseo-fibrous tunnel through which the medial branch passes. This tunnel is located between the mammillary process and the accessory process of the vertebra below. The mammillary process constitutes the lateral surface of the superior articular facet of the vertebra below; the accessory process projects from the transverse process of the vertebra below--from its postero-infero-medial surface.

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THYROID MORPHOLOGY AND FUNCTION IN TRANSGENIC MICE EXPRESSING THE GENE FOR BOVINE GROWTH HORMONE. J. Cher, S. Easterly, A. Mayerhofer, A.G. Amador, and A. Bartke, Southern Illinois University, School of Medicine, Department of Physiology, Carbondale, IL 62901-6512. We previously reported enlarged thyroids with large follicles over 250 μm in diameter and altered thyroxine (T₄) metabolism in transgenic mice (TM) expressing the human growth hormone (GH) gene (Trans. IL. State Acad. Sci. 81 (suppl.) 58, 1988). Since human GH in rodents has both somatotrophic and lactogenic activity, we have extended these studies to TM expressing the gene for bovine GH, which exerts pure somatotrophic effects in the mouse. In male bovine GH-TM, the proportion of follicles with diameters 50-100 and 100-150 μm was increased, while in female and male bovine GH-TM with a different promoter (PEPCK, rather than mMI), the numerical increases in the percentages of these follicles were not significant. A few larger follicles were found in two male bovine GH-TM, but they were not as large as those in human GH-TM. These findings, together with significantly reduced serum T₄ levels in male bovine GH-TM and significantly increased triiodothyronine (T₃) levels in female bovine GH-TM indicate furthermore that the effect of bovine GH on both the development and function of the thyroid differ from the effects of human GH.

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A QUINOLIZIDINE ALKALOID CONSTITUENT OF THE SEEDS OF ORMOSIA KRUGII WITH ANTI-HIV ACTIVITY. M. P. Nasution and A. D. Kinghorn, University of Illinois at Chicago, Chicago, IL 60612. As part of a research program designed to discover biologically active natural products, a methanol extract of the seeds of Ormosia krugii Urban (Fabaceae) was subjected to column chromatography. After application of UV, IR and NMR spectroscopy, as well as mass spectrometry, one of the isolates obtained was assigned as a hexacyclic Ormosia-type quinolizidine alkaloid. This compound, with a molecular formula of $C_{20}H_{33}N_3$, is an isomer of the alkaloid, panamine, and has been found to significantly affect syncytia formation in an established anti-Human Immunodeficiency Virus (HIV) bioassay system. Panamine itself was not active in this test system, when tested at the same dose levels.

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PLATELET AGGREGATION INHIBITOR FROM TEPHROSIA SEMIGLABRA. Lydia Jonathan*, Messanvi Gbeassor*, Chun-tao Che*, Guy C. LeBreton**, Duane Venton***, Harry H.S. Fong*, and Norman R. Farnsworth*. *Program for Collaborative Research in the Pharmaceutical Sciences, College of Pharmacy, **Department of Pharmacology, College of Medicine, and ***Department of Medicinal Chemistry and Pharmacognosy, College of Pharmacy, University of Illinois at Chicago, Chicago, IL 60680. Tephrosia semiglaba, a medicinal plant widely found in the southern part of Africa, was studied for its inhibitory activity against platelet aggregation. A crude MeOH extract of the leaf and root parts was shown to inhibit human platelet aggregation induced by both ADP and the stable prostaglandin- H_2 analog, U46619. The extract was then fractionated by solvent partitions and repeated chromatography. At each step in the fractionation procedure antiplatelet activity was evaluated using U46619. Finally two isomeric flavone constituents were isolated and identified as pseudosemiglabrin and semiglabrin by spectroscopic analyses. Pseudosemiglabrin showed antiplatelet activity [$IC_{50} = 25.5 \mu M$], while semiglabrin was inactive.

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GALANGIN-3,7-DIMETHYL ETHER, A CYTOTOXIC FLAVONOID FROM THE STEMS OF MUNTINGIA CALABURA, COLLECTED IN THAILAND. C. M. Nshimo, A. D. Kinghorn, and N. R. Farnsworth, University of Illinois at Chicago, Chicago, IL 60612. In a continuing search for antineoplastic agents of natural origin, a chloroform extract of the stems of Muntingia calabura (Elaeocarpaceae), collected in Thailand, was found to exhibit significant activity when tested against the P-388 lymphocytic leukemia test system *in vitro*. Activity-guided fractionation has led to the isolation of galangin-3,7-dimethyl ether as a cytotoxic M. calabura constituent. The compound was identified by comparison of its physical and spectroscopic data with published values. This rare flavonol was initially discovered as a secondary metabolite of the fern, Cheilanthes kaulfussii Kze. (E. Wollenberger, Flora, 168, 138, 1979), and is now being reported for the first time as a constituent of a higher plant.

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THE PATTERN OF RNA SYNTHESIS DURING THE FERMENTATION OF SANGUINARIA CANADENSIS TISSUE CULTURES. G. Mahady and C.Wm.W. Beecher, University of Illinois at Chicago, College of Pharmacy, Chicago, IL 60612. By determination of the rate of uridine incorporation into RNA by a fixed quantity of cells, a pulse of RNA synthesis has been determined to occur immediately after the cells enter stationary growth phase.

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IMMUNOGOLD/SILVER STAINING PROCEDURES DISPLAY DIFFERENTIAL EXPRESSION OF CARBOHYDRATES ON SERIAL TISSUES. D. L. Bishop, Evanston Hospital, Evanston, IL 60201. Cell surface and cytoplasm antigens which contain biochemically similar carbohydrate structures are clearly demonstrated on sections of paraffin-embedded tissues using immunogold/silver techniques. Examples used were T and Tn antigens which occur on human breast cancer tissues. These antigens were localized on adjoining serial sections of streptavidin. The possibility of detecting differences in site and number of these structurally similar moieties on a semi-quantitative basis is established.

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ACTION OF DRUGS AND METABOLITES ON CYTOCHROME P-450 AND ENZYMES EMPLOYING AN IN VITRO HEPATIC 9000 X G SUPERNATANT. L. L. Gershbein and C. J. Adamczyk, Northwest Institute for Medical Research, Chicago, IL 60634. Homogenates of intact and regenerating rat liver in sucrose were centrifuged at 4° and 600 x g and the filtrate centrifuged at 9000 x g similar to the method of Verebey (Res. Commun. Chem. Pathol. Pharmacol. 20, 21 (1978)). With this system, protein, cytochrome P-450 and enzymes, aminopyrine demethylase (APdM) and benzo[a]pyrene hydroxylase by methods presented earlier (Gershbein, Biochem. Pharmacol. 36, 3088 (1987)) were ascertained on aliquots following incubation of several metabolites and drugs in buffer systems at 37°. Several water-insoluble agents were employed in 1,2-propanediol solution. Similar to its behavior in vivo, diazepam had little effect on parameters as APdM at concentrations of up to 100 mM. Nikethamide depressed APdM at a level of 75 mM, the respective enzyme activities for drug and control (+ SD) being 0.862 ± 0.021 and 1.32 ± 0.10 μ M formaldehyde produced/g min (P < 0.01); at this concentration, the hydroxylase activity was not significantly altered. Further correlation of the current findings with those by in vivo approaches is necessary.

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CHARACTERIZATION OF THE BROWN COLORATION IN CORDYLOPHORA LACUSTRIS
Edward E. Palincsar, Warren R. Jones, Galenos J. Pilafas and Nadine F. Potempa, Loyola University, Chicago, IL 60626.

In its natural habitat, the brackish water colonial hydroid Cordylophora lacustris is brown. Under culture in the laboratory, the brown color is not produced. The nature of this coloration was investigated. Transmission electron micrographs showed pigment bands within the central portion of the perisarc of the wild form which were absent in the cultured form. Comparisons of solubilities of artificial melanin prepared by persulfate oxidation of l-tyrosine, melanin obtained from the ink sac of Sepia officinalis and the pigment extracted from C. lacustris showed many similarities. Ultrastructural histochemistry suggested that there was tyrosinase activity associated with the Golgi apparatus. Infra red spectrophotometric comparisons indicated some similarity between S. officinalis melanin, C. lacustris melanin and hair melanin. The possible relationship of C. lacustris pigment to sclerotin is under further study.

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DIFFERENCES IN SOCIAL INTERACTION OF HAND-REARED AND PARENT-REARED CAPTIVE COTTON-TOP TAMARINS (SAGUINUS OEDIPUS). Daniel J. Meinhardt and Nancy R. Parker, Southern Illinois University, Edwardsville, IL, 62026. Twin juvenile, male cotton-top tamarins (S. oedipus) were observed at the St. Louis Zoo over a three month period. One of the juveniles, who had not been successfully handled by his mother, had been hand-reared and gradually reintroduced to the family group over a three month period beginning at age eight days. Observations of social behaviors such as huddling and grooming were begun about six months after reintroduction was completed. Differences were observed in both the number and duration of social encounters of each of the juveniles with the parents. The hand-reared individual interacted significantly less with the mother and significantly more with the father than its parent-reared twin.

-92-

IMPACT OF MAMMALIAN DISPERSERS ON GERMINATION OF PERSIMMON SEEDS. B. L. Cypher and E. A. Cypher, Southern Illinois University, Carbondale, IL 62901. Germination rates of persimmon (Diospyros virginiana) seeds collected from feces of coyotes (Canis latrans) and raccoons (Procyon lotor) were compared to those of seeds from unconsumed persimmons to determine the effects of gut passage. Raccoon-ingested seeds had significantly higher germination rates than non-ingested seeds, whereas rates for coyote-ingested seeds were significantly lower. Furthermore, persimmon seeds digested along with animal matter by coyotes had reduced germination rates relative to those from fruit-only meals. Germination rates of seeds remaining enclosed by fruit tissue at the time of defecation did not differ from those of non-ingested seeds, but had higher germination rates than those in which the seed coat had been exposed. Results reflected the coevolution between historically sympatric raccoons and persimmons. Simultaneous ripening of large numbers of persimmon fruits may mitigate the harmful effects of coyote ingestion by increasing the likelihood of a meal composed primarily of fruit, leading to faster passage through the digestive tract and retention of protective fruit tissues around the seeds.

-93-

Aging Studies of Gerbil Embryo Fibroblasts In Vitro

L.B. Ost and P.J. Nielsen, Western Illinois University, Macomb, IL 61455

One strain of mongolian gerbil (Meriones unguiculatus) embryo cells was established and subcultivated at seven day intervals. Comparisons of culture age and growth rate were made to results from previous investigators with mouse cells. Gerbil cells demonstrate transformation by an increase in population doubling rates from 4.1 to 4.7, increase of cell numbers from 4.33×10^6 cells to 6.69×10^6 cells, and an increase in pulse labeled nuclei from 3% labeled to 85% labeled. Changes in morphology and colony growth were shown, proving the cultures to be transformed at the 7th subcultivation. Growth curve studies showed a higher rate of growth for transformed cells verses non-transformed cells.

-94-

EFFECT OF TRANSGENIC HUMAN GROWTH HORMONE ON ANTIOXIDANT ENZYMES AND LIPID PEROXIDATION. E. Xia, G. Rao and A. Richardson, Illinois State University, Normal, IL 61761. Transgenic mice offer an excellent model system to study regulation of gene expression. In the present study, the effect of transgenic human growth hormone on the activities of superoxide dismutase, catalase, and glutathione peroxidase was studied. SOD activity was approximately 40% higher in liver tissue of transgenic mice whereas the activities of catalase and glutathione peroxidase were lower (20 to 25%) compared to the normal mice. Lipid peroxidation, as measured by thiobarbituric acid reactive material, was higher in liver tissue of transgenic mice compared to normal mice.

-95-

EFFECT OF AGE ON THE EXPRESSION OF PHOSPHOENOLPYRUVATE CARBOXYKINASE. T. Wimonwatwatee and A. Richardson, Illinois State University, Normal, IL 61761. The age-related expression of phosphoenolpyruvate carboxykinase (PEPCK) in liver and kidney tissues of male Fischer F344 rats was studied. The activity of PEPCK decreased (approximately 40%) between 6 and 26 months of age in hepatocytes whereas this decrease was approximately 20% in kidney. The age-related decrease in PEPCK activity was paralleled by a decrease in the steady-state levels of PEPCK mRNA in both hepatocytes and kidney. Thus, it appears that the age-related changes in the expression of PEPCK occur probably at the level of transcription, mRNA processing, or PEPCK mRNA turnover.

-96-

ARBOREAL FORAGING BY WOODCHUCKS (Marmota monax) IN WILL COUNTY, ILLINOIS. D. M. Jedlicka, University of Illinois at Chicago, Chicago, IL 60680 and Field Museum of Natural History, Chicago, IL 60605. In Will County Illinois, woodchucks (Marmota monax) can be observed frequently foraging on grasses or forbes near their roadside or hillside dens. During March 1989, a woodchuck den was discovered in an isolated 100m² grassy plot within a cornfield. Grasses, forbes, tree leaves, and corn plants represent possible food sources. During May and June, an adult male and an adult female were observed foraging on tree leaves. Past rare sightings of arboreal woodchucks were attributed to escape behavior rather than the utilization of a food source.

-97-

FOSSIL FAUNA OF THE GREEN RIVER FORMATION. T. C. Grande, University of Illinois at Chicago, Chicago, IL 60680 and Field Museum of Natural History, Chicago, IL 60605. The Green River Formation of southwestern Wyoming is one of the richest and most interesting fossil localities in North America. It contains a number of vertebrate specimens which provide new information concerning early biogeographic and evolutionary relationships. An overview of this fascinating biota is presented, along with hypotheses of vertebrate interrelationships indicating a trans-Pacific biogeographic pattern for western North America.

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1991: University of Illinois, Chicago Circle

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1 July 1989

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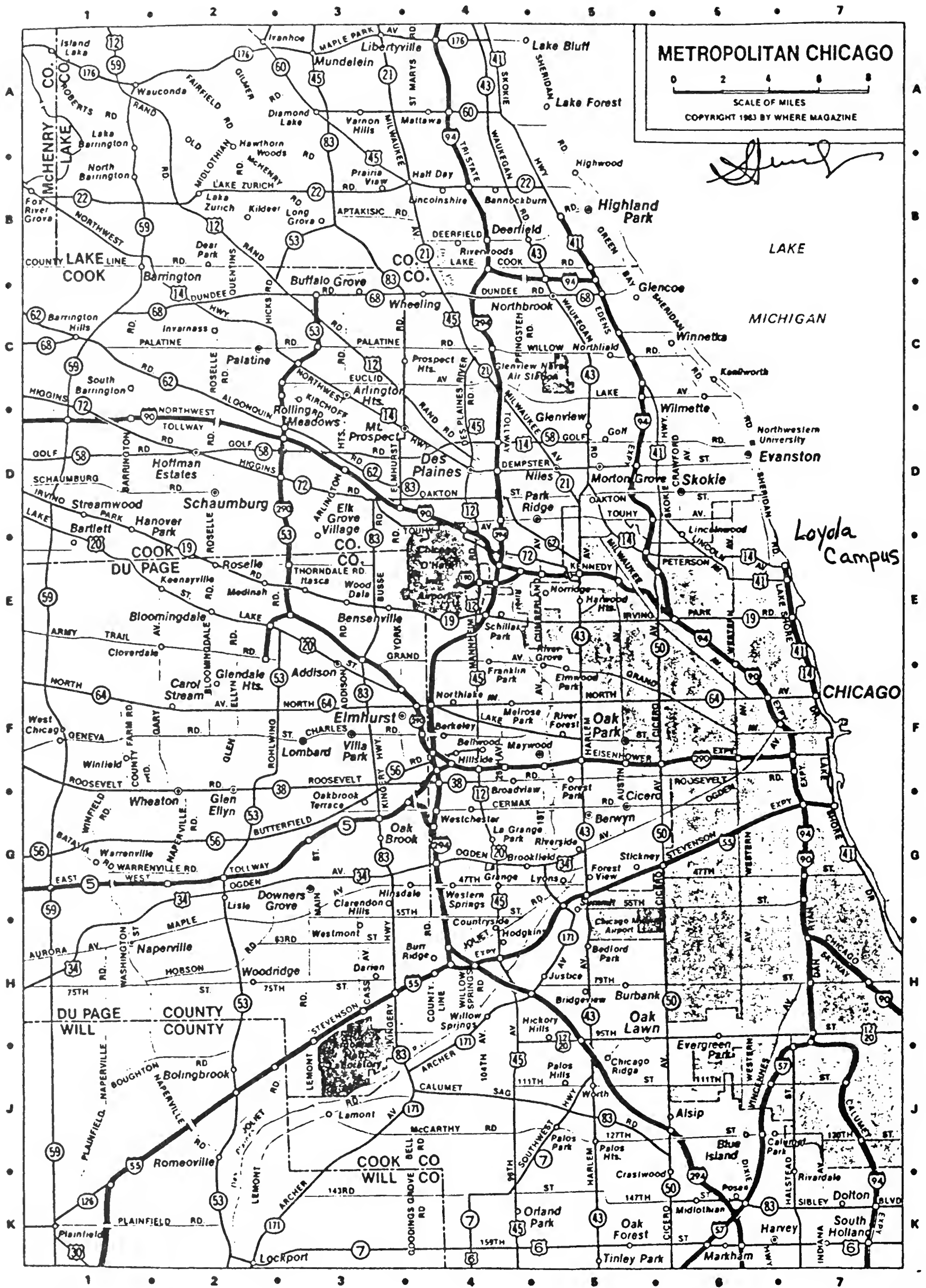
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