

4-23-1971

83rd Session of the Iowa Academy of Science, April 23-24, 1971

Iowa Academy of Science

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**83rd Session
of the
Iowa Academy of Science**

April 23-24, 1971

LORAS COLLEGE

Dubuque

THE

IAS Bulletin

PROGRAM ISSUE

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Archeology	Dean Straffin, Parsons College, Fairfield
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Chemistry, Inorg. & Phy.	Joseph D. Danforth, Grinnell Col., Grinnell
Chemistry, Org. & Biol.	Gene Wubbels, Grinnell College, Grinnell
Conservation	David Roslien, Luther College, Decorah
Engineering	K.L. McRoberts, Iowa State Univ., Ames
(Co-Chairmen)	James Andrews, Univ. of Iowa, Iowa City
Geology	Lyle V.A. Sendlein, Iowa State Univ., Ames
Mathematics	Tim Robertson, University of Iowa, Iowa City
Physics	David Robinson, Drake University, Des Moines
Physiology	Walter R. Ingram, Univ. of Iowa, Iowa City
Psychology	David C. Edwards, Iowa State Univ., Ames
Science Teaching	Mrs. Lena Keithahn, Mason City
Zoology	Phillip J. Reitan, Luther College, Decorah

Committees

Annual Meeting Committee

Rev. L.E. Ernsdorff and Rev. W.E. Nye (local arrangements),
B.F. Graham, Gene Wubbels, David Roslien, Phillip J. Reitan,
W.F. Ames

Election Committee

George Knudson, Fred Dorheim, Elmer Hertel, David Fagle, Ruth N.
Siemer, G. Chester Leu

Resolutions Committee

Kenneth M. Cook, Karl E. Goellner

Auditing Committee

Erwin Richter, Paul Rider

NOTICES

Parking: Refer to the campus map printed in the centerfold of this program. A skeleton map of Dubuque appears on the back side of the campus map, along with motel information.

Registration: St. Joseph Hall of Science

Please pre-register to avoid delays, using the form enclosed. Pick up ID tags at the registration area in the foyer (see map) on arrival. If not registered by mail, you may register on arrival. There is a \$2.00 registration fee for members and non-members. Coffee and rolls will be available in the registration area. Abstracts will be available for most sections to those properly registered.

Meals: Noon luncheon on Friday will be available in the North Dining Hall of the Loras Cafeteria at a cost of \$1.35. Tickets may be purchased at the Registration Table at the time of registration. On Saturday the regular cafeteria line will be open for those wanting lunch on campus at a cost of \$1.25. The Academy Banquet on Friday evening will be served at 6:00 p.m. in the Loras Cafeteria (North Side). (Menu: choice top sirloin roast.) Reservations must be received in the Academy Office no later than April 20. See separate pre-registration form enclosed. Do not send money to Loras College.

A snack bar is located in the basement of Keane Hall on the same level with the bookstore.

Overnight Lodging: Please make your own reservations at one of the several motels listed on the back side of the campus map in the centerfold.

Dues: Dues will be collected from new members only who apply for membership at the time of registration. Others should pay dues by mail in response to dues notices to avoid confusion at the Registration Table.

Notes to Authors: As the PROCEEDINGS shifts to a quarterly format, some changes are necessary in the way manuscripts are prepared and submitted for publication. (1) The first quarterly issue will appear no earlier than July 1, 1971; the deadline for acceptance of manuscripts for that issue is April 1, 1971. (2) Those whose manuscripts could not be submitted by April 1

NOTICES

may submit them later for inclusion in the second, third, or fourth quarterly issue. The fourth issue will appear about April 1, 1972; material for this issue must be fully edited and ready for the printer no later than January 1, 1972. The Editor would appreciate a note from the author informing him of his intention to submit the manuscript. (3) Our new policy makes it possible to print articles that were not given at the Annual Meeting, though preference will be given to articles based on material presented at the Annual Meeting (quality properly considered). (4) The new format makes it especially important for authors to be equipped with new instructions for manuscript preparation. Please request these from Dr. Paul Meglitsch, Editor IAS, Drake University, Des Moines, Iowa 50311.

Future Meetings:

April 28-29, 1972: University of Iowa, Iowa City
(Local Arrangements chairman: W. F. Ames)

April 27-28, 1973: Grinnell College, Grinnell

(Invitations are solicited for 1974 and 1975.)

The Loras College planetarium and seismological observatory will both be open to visitors during the meeting of the Iowa Academy of Science. The planetarium, located between the Wahlert Memorial Library and Christ The King Chapel, will have regularly scheduled showings on Friday. Further information will be available in the registration areas. The seismograph station, located underground at the extreme north end of the campus, will be open for visits on Friday, 2:00 - 4:00 p.m.

PROGRAM SUMMARY

THURSDAY, APRIL 22

2:00 p.m. Board of Directors
Seminar Room, St. Joseph Hall of Science

FRIDAY, APRIL 23

8:00 a.m. - 2:00 p.m. Registration
Foyer, St. Joseph Hall of Science

9:00 - 10:50 a.m. Section Meetings (See Section Programs:
(Botany, Chemistry (both sections), Conservation,
Engineering, Geology, Mathematics, Physiology,
Science Teaching, Zoology.)

11:00 a.m. GENERAL SESSION Gymnasium
Dr. Samuel J. Tuthill, State Geologist
"Plans for Environmental Applications of Remotely-
Sensed Earth Resources Imagery in Iowa"

12:00 - 1:30 p.m. Luncheon Loras Dining Hall

1:30 - 4:00 p.m. Section Meetings (See Section Programs:
Archeology, Chemistry (both sections), Engineering,
Geology, Mathematics, Physics, Psychology, Science Teaching.)

1:30 - 4:00 p.m. Symposium: "The Prairie: Remnant and Restored"
Foley Aud., St. Joseph Hall of Science
(Joint session of the Botany, Conservation and Zoology
Sections. See Conservation Section program for details.)

1:30 - 2:30 p.m. Joint session of the Physiology and
Zoology Sections. Room 133, St. Joseph Hall of Science
(See Physiology Section program for details.)

1:30 - 2:40 p.m. Joint Session of the two Chemistry Sections
Room 245, St. Joseph Hall of Science
(See Chemistry Section programs for details.)

4:10 p.m. ANNUAL BUSINESS MEETING OF THE ACADEMY
Foley Aud., St. Joseph Hall of Science

6:00 p.m. ACADEMY BANQUET Loras Dining Hall
(Tickets must be purchased in advance - See "Notices".)

8:00 p.m. GENERAL SESSION Gymnasium
Jules Bergman, Science Editor, ABC News
"The Challenge of the 70's, or Environment - Fact and Fiction"

SATURDAY, APRIL 24

8:00 - 9:00 a.m. Registration
Foyer, St. Joseph Hall of Science

8:00 a.m. - 12:00 n. Section Meetings (See Section Programs:
Botany, Conservation, Geology, Physics, Science Teaching,
Zoology.)

12:00 n. Iowa Chapter of The Wildlife Society
(See Conservation Section.)

1:00 p.m. The Nature Conservancy
(See Conservation Section.)

1:30 p.m. Iowa Section of the American Association
of Physics Teachers. (See Physics Section.)

GENERAL SESSIONS

Dr. Herbert Hendriks, Academy President, presiding

FRIDAY, APRIL 23

11:00 a.m. Gymnasium

Greetings, Burt McQuillan, Acting President, Loras College
Invited Address: "Plans for Environmental Applications of
 Remotely-Sensed Earth Resources Imagery in Iowa",
 DR. SAMUEL J. TUTHILL, Director and State Geologist,
 Iowa Geological Survey.

4:10 p.m. Foley Auditorium, St. Joseph Hall of Science

Annual Business Session of the Academy

Announcements

Reports:

Board of Directors

R.W. Hanson

Treasurer

H.T. Horner, Jr.

Auditing Committee

E. Richter

Editor

P. Meglitsch

Membership Committee

W. Azbell

Resolutions

K. Goellner

Election Committee

G. Knudson

Presentation of new officers

New Business

Adjournment

6:00 p.m. Academy Banquet Loras Dining Hall

(Reservations must be made by mail before April 20. See notice on p. 2.)

Introduction of officers and guests.

Presentation of the Iowa Conservation Award of Merit and the Conservation Hall of Fame Award. RICHARD BISHOP, President, Iowa Chapter of The Wildlife Society.

Presentation of Excellence in Teaching Citations to five Iowa high school teachers. DAVID MCCALLEY, UNI.

8:00 p.m. Gymnasium

Introduction of the Iowa Science Talent Search winners, CHARLES ALLEGRE, UNI.

Academy Address: "The Challenge of the 70's or Environment - Fact and Fiction", JULES BERGMAN, Science Editor, American Broadcasting Company.

SECTION MEETINGS

Archeology

Chairman: D. F. Straffin

Friday, April 23, 1971

1:45 - 3:45 P.M.

Room 280, Hennessy Hall

1. Woodland pottery types of Southwest Iowa. JOSEPH A. TIFFANY, Iowa City.
2. Faunal analysis of vertebrates from the Lane Enclosure, Allamakee County, Iowa. JOHN T. JENKINS and HOLMES A. SEMKEN, Iowa City.
3. Results of an archaeological survey of the Big Sioux Valley in Northwest Iowa. ROYE D. LINDSAY, Lincoln, Nebraska.
4. The Schmidt site: a Woodland rockshelter. JOHN L. REESE, Dubuque.
5. A Nebraska phase house in Mills County, Iowa. ADRIAN D. ANDERSON, Iowa City.
6. Iowaville: an historic Ioway site on the lower Des Moines River. DEAN F. STRAFFIN, Fairfield.
7. The Quandahl rock shelter revisited: an archaeological and historical reconstruction. R. CLARK MALLAM, Decorah.
8. The Glenwood local sequence: implications for the ceramic typology. LARRY J. ZIMMERMAN, Iowa City.
9. A test excavation at the McKinney village site. RICHARD G. SLATTERY, Davenport.

Botany

Chairman: C. L. Christensen

Friday, April 23, 1971

9:00 - 10:30 A.M.

Concurrent Sessions

Section A, Room 48, St. Joseph Hall of Science

L. J. Eilers, presiding

1. Distribution of pectin methylesterase in leaves of *Ginkgo biloba*. G. WAYNE MOSHER, St. Ann, Missouri.
2. Petrified *Lepidophloios* specimens from Iowa coal balls. MRS. NANCY BROTZMAN and JEFFRY SCHABILION, Iowa City.
3. Dimorphism in the vegetative shoots of the Carboniferous arthrophyte, *Sphenophyllum*. JEFFRY SCHABILION, Iowa City.
4. Fecal coliform/fecal streptococci ratio as an indicator of bacterial contamination and its source. KAREN E. MESSLEY and PHYLLIS J. KINGSBURY, Des Moines.
5. Establishment of *in vitro* callus cultures of selections of *Ulmus*. MICHAEL D. WOODWARD, DALE F. HINDAL, HAROLD S. MCNABB, JR., and ABDOL-GHAYOON EBRAHIMI, Ames.
6. Location dependent intragenic recombination in maize. MING-HUMB YU and PETER A. PETERSON, Ames.

Section B, Room 54, St. Joseph Hall of Science

J. D. Koppen, presiding

7. Notes on autumn collections of diatoms from a central Iowa stream. MICHAEL EDWARDS and C.L. CHRISTENSEN, Webster City.
8. Some lacustrine diatom sediments of Pillsbury and Sylvan lake beds in northwest Iowa. JAMES J. HUNGERFORD, Marshalltown.
9. Certain bryophytes of Newfoundland and Labrador. RICHARD W. COLEMAN, Fayette.
10. Flora of the M.L. Grant Prairie in Black Hawk County, Iowa. GLENN H. CRUM, Ames.

11. Notes on fleshy fungi in Iowa. VI. KENNETH C. MILLER, MICHAEL D. WOODWARD, LOIS H. TIFFANY, and HAROLD S. MCNABB, JR., Ames.
12. Primary productivity in Lake Red Haw, Lucas County, Iowa. P.J. KINGSBURY, L.D. CORKUM, and P.D. KRAUSE, Des Moines.

Friday, 10:30 - 11:00 A.M.
Room 48, St. Joseph Hall of Science

Election of officers. (Section A and B meet together.)

Friday, 1:30 - 4:00 P.M.

Symposium: "Iowa Prairies". (Joint meeting with Conservation and Zoology Sections. See Conservation program for details.)

Saturday, April 24, 1971
8:30 - 10:30 A.M.
Concurrent Sessions

Section A, Room 48, St. Joseph Hall of Science
J. D. Dodd, presiding

13. The physiological role of endosperm cell wall polysaccharides in germinating asparagus (*Asparagus officinalis* L.) seeds. DAVID J. LEWIS and DONALD J. NEVINS, Ames.
14. Differential emergence of certain inbred lines of corn. DIANE CURRIE and DONALD J. NEVINS, Ames.
15. Cell aggregation in suspension cultures of Paul's Scarlet Rose. STEPHEN J. WALLNER and DONALD J. NEVINS, Ames.
16. Relationships between certain enzyme activities and cell wall changes associated with plant growth. WAYNE H. LOESCHER and DONALD J. NEVINS, Ames.
17. An attempt to induce bacteria-free plants of *Psychotria punctata* (Rubiaceae) in tissue culture. CLIFFORD E. LAMOTTE and NELS R. LERSTEN, Ames.
18. Morphology and distribution of secretory cavities in *Psoralea* (Papilionoideae, Leguminosae). ARDIS J. MOORE and NELS R. LERSTEN, Ames.

19. Crystals in tapetal cells of the Leguminosae. PAUL A. BUSS, JR. and NELS R. LERSTEN, Ames.
20. Problems in the circumscription of species of mosses in the genus *Plagiomnium*. KENNETH G. JENSEN and ROBERT L. HULBARY, Iowa City.

Section B, Room 54, St. Joseph Hall of Science
R. W. Coleman, presiding

21. Effect of adenosine triphosphate on photophobotaxis of *Euglena gracilis*. EUGENE C. BOVEE, ALAN E. ORGAN and MERCEDES ACUNA, Lawrence, Kansas.
22. Long and short hypocotyl development in soybean: An anomalous temperature dependence and some physiological correlates. CLIFFORD E. LAMOTTE and CYRUS SAMIMY, Ames.
23. Xylem and phloem regeneration in excised coleus internodes: Effects of hormones and other factors. CLIFFORD E. LAMOTTE and MYRNA ANN WHIGHAM, Ames.
24. Abscission of leaves and leaflets in *Acer negundo* and *Fraxinus americana*. HAROLD E. MOLINE and JACK M. BOSTRACK, Ames.
25. Cellular differentiation during early sporogenesis in *Selaginella pilifera*. CAROLYN K. BELTZ, Ames.
26. Pore development in the pollen wall of *Sorghum bicolor*. JON E. CHRISTENSEN, Ames.
27. Raphide crystal cells as taxonomic and developmental tools. HARRY T. HORNER, JR., Ames.
28. Genetic effects of x-ray in combination with streptomycin in *Arabidopsis thaliana*. II. SUJIT K. DHAR, Iowa Falls. (By title only.)

Chemistry: Inorg. & Phys.

Chairman: J. D. Danforth

Friday, April 23, 1971

9:00 - 11:00 A.M.

Room 245, St. Joseph Hall of Science

1. The chemistry and kinetics of the thermal decompositions of zinc and magnesium oxalates. JOSEPH D. DANFORTH and JAMES DIX, Grinnell.
2. Dialkylamino compounds of cobalt (II). D.C. BRADLEY, London, and K.J. FISHER, Grinnell.
3. The oxidation of mercury (I) by neptunium (VII). MARK A. THOMPSON, Mt. Vernon, JAMES C. SULLIVAN, Argonne, and EDWARD DEUTSCH, Chicago.
4. Reactions between stannous fluoride and hydroxyapatite. JEANA C. KING and TRUMAN H. JORDON, Mt. Vernon.
5. Metal phenyl-2-pyridyl ketoxime complexes. SISTER JAYNE ZENATY, Dubuque.
6. Coinage metal triphenylphosphine adducts of nickel dithiolates. SISTER MARY LOUISE CAFFERY and D. COUCOUVANIS, Iowa City.
7. Coinage metal adducts of some class (a) and class (b) metal dithioloxalates. D. PILTINGSRUD and D. COUCOUVANIS, Iowa City.

Friday, 1:30 - 2:40 P.M.

Joint Session with Organic and Biological

Room 245, St. Joseph Hall of Science

8. Coboglobins. PROFESSOR BRIAN HOFFMAN, Northwestern University.

Friday, 2:45 - 4:00 P.M.

9. Mass spectral studies of organo-aluminum compounds. G. EGGLETON and D. EYMAN, Iowa City.
10. The crystal structure of (+) D-tris(ethylenediamine) cobalt (III) nitrate. DAVID WITIAK, JON C. CLARDY, and DON S. MARTIN, Ames.

11. A preliminary electrochemical study of a photochemical reaction. EDWARD W. RESNICK, Ames.
12. Potentiometric determinations of potassium. THEODORE S. PROKOPOV, Fayette.
13. A model-interpreting the behavior of binary oxide systems. JOHN L. MORIARTY, Davenport.

Chemistry: Org. & Biol.

Chairman: G. G. Wubbels

Friday, April 23, 1971

9:15 - 11:00 A.M.

Room 141, St. Joseph Hall of Science

1. Electrochemical behavior of organic compounds in propylene carbonate. S. WAWZONEK and F. BEHR, Iowa City.
2. Pyrolysis of 1,1,1-trimethylamine-2-phenylcarbamoylimide, S. WAWZONEK, T.H. PLAISANCE and D.P. BOAZ, Iowa City.
3. Gas phase pyrolysis of substituted propargyl esters. PATRICK W. MULLEN and W.S. TRAHANOVSKY, Ames.
4. Solvent effects on the proton magnetic resonance spectra of α , α' -disubstituted bibenzyls. FREDERICK L. WEITL and W.S. TRAHANOVSKY, Ames.
5. The gas chromatographic-mass spectrometric identification of neutrals extracted from municipal water supplies. G.V. CALDER, J.S. FRITZ, G.A. JUNK and H.J. SVEC, Ames.
6. Assay of protein and nucleic acids without prior isolation. HAROLD D. SWANSON, Des Moines.

Business Meeting: Election of new chairman.

Friday, 1:30 - 2:40 P.M.
Room 245, St. Joseph Hall of Science

7. Invited lecture: Coboglobins. BRIAN M. HOFFMAN, Northwestern University. (Joint with Inorganic and Physical Chemistry Section.)

Friday, 2:45 - 4:00 P.M.

8. Unsaturated semidiones in six-membered rings. GLEN A. RUSSELL and RONALD A. BLANKESPOOR, Ames.
9. The preparation of benzyliidenecycloalkanones and their mixed hydride reductions to benzylcycloalkenes and benzyliidenecycloalkanes. JAMES E. PRIVETT, Sioux City.
10. The reactions of sulfur dichloride with 1,5-diyne-3-enes. A. JAMES NELSON and THOMAS J. BARTON, Ames.
11. Novel reactions of 3,3-dichloro-1,2-diphenylcyclopropene with negatively substituted isocyanates. JOANNE L. JOHNSON and THOMAS J. BARTON, Ames.
12. The addition of chlorosulfonyl isocyanate to small-ring olefins. ROBERT J. ROGIDO and THOMAS J. BARTON, Ames.

Conservation

Chairman: D. J. Roslien

Friday, April 23, 1971
9:30 - 11:00 A.M.

Room 280, Hennessy Hall

1. Trophic uptake of ruthenium in goldfish. JERRY NELSEN, Cedar Rapids.
2. Feeding of black bullheads *Ictalurus melas* (Rafinesque) in experimental cages. KAY R. HILL, Lamont.
3. Growth and reproduction of yearling *Tilapia aurea* in Iowa ponds. DOUGLAS W. PELREN and KENNETH D. CARLANDER, Ames.

4. Movement of bigmouth buffalo in Coralville Reservoir, Iowa. LARRY MITZNER, Chariton.
5. Intra-stream distribution and movement of channel catfish. JAMES MAYHEW, Chariton.
6. Distribution of sculpins (Pisces, Cottidae) in Iowa. MARLIN JOHNSON, Waukesha, Wisconsin.

Election of section chairman and vice-chairman.

Friday, 1:30 - 4:00 P.M.
Foley Aud., St. Joseph Hall of Science

Joint Session with the Botany and Zoology Sections.

Symposium: "The Prairie: Remnant and Restored"
Chairman, ROGER LANDERS

History of Iowa prairie preservation. ED CAWLEY, Dubuque.

The location of preserved prairie remnants in Iowa. PAUL KLINE, Indianola.

A revised management program for Hayden Prairie. PAUL CHRISTIANSON, Mt. Vernon.

The prairie as a laboratory. DAVID LYON, Mt. Vernon.

The remnant prairie flora of the Iowan area. LARRY EILERS, Cedar Falls.

The effect of fire on small mammal populations in a restored tall grass prairie. JOE SPRINGER and PETER SCHRAMM, Galesburg, Illinois.

Grassland - an ecological parable. JIM WILSON, Polk, Nebraska.

Saturday, April 24, 1971
8:30 - 10:30 A.M.
Room 280, Hennessy Hall

7. The current status of the limnology and bottom fauna of Lakes West and East Okoboji. DAVID D. GALE, Iowa City, MICHAEL P. GROSS, Newton, and EVERETT E. DREVS, Estherville.

8. A qualitative and quantitative study of the bacteriological quality of Lake Red Rock and the Des Moines River between Des Moines, Iowa, and Lake Red Rock. DEAN A. HOGANSON and STEPHEN C. ELLIOTT, Des Moines.
9. Determination of the distribution of fecal coliforms in Catfish Creek. BRUCE KYLES, Dubuque.
10. Results from lead poisoning studies at Forney's Lake. RICHARD BISHOP, Clear Lake.
11. Controlled goose hunting at Forney Lake State Wildlife Area, Fremont County, Iowa, 1967-1970. THOMAS L. BERKLEY and ROBERT MOORE, Panora.
12. Re-establishment of the giant Canada goose in Iowa. RICHARD A. BISHOP and RONALD G. HOWING, Clear Lake.
13. Mourning doves in Iowa, an analysis of the banding and band recovery for six years. GLENN E. JONES, Ruthven.
14. Survival of adopted fox pups. RONALD D. ANDREWS, Clear Lake.
15. Predator-prey interactions in grasslands ecosystems: a major determinant of ecosystem stability. WILLIAM J. PLATT, Iowa City.

Saturday, 12:00 P.M.

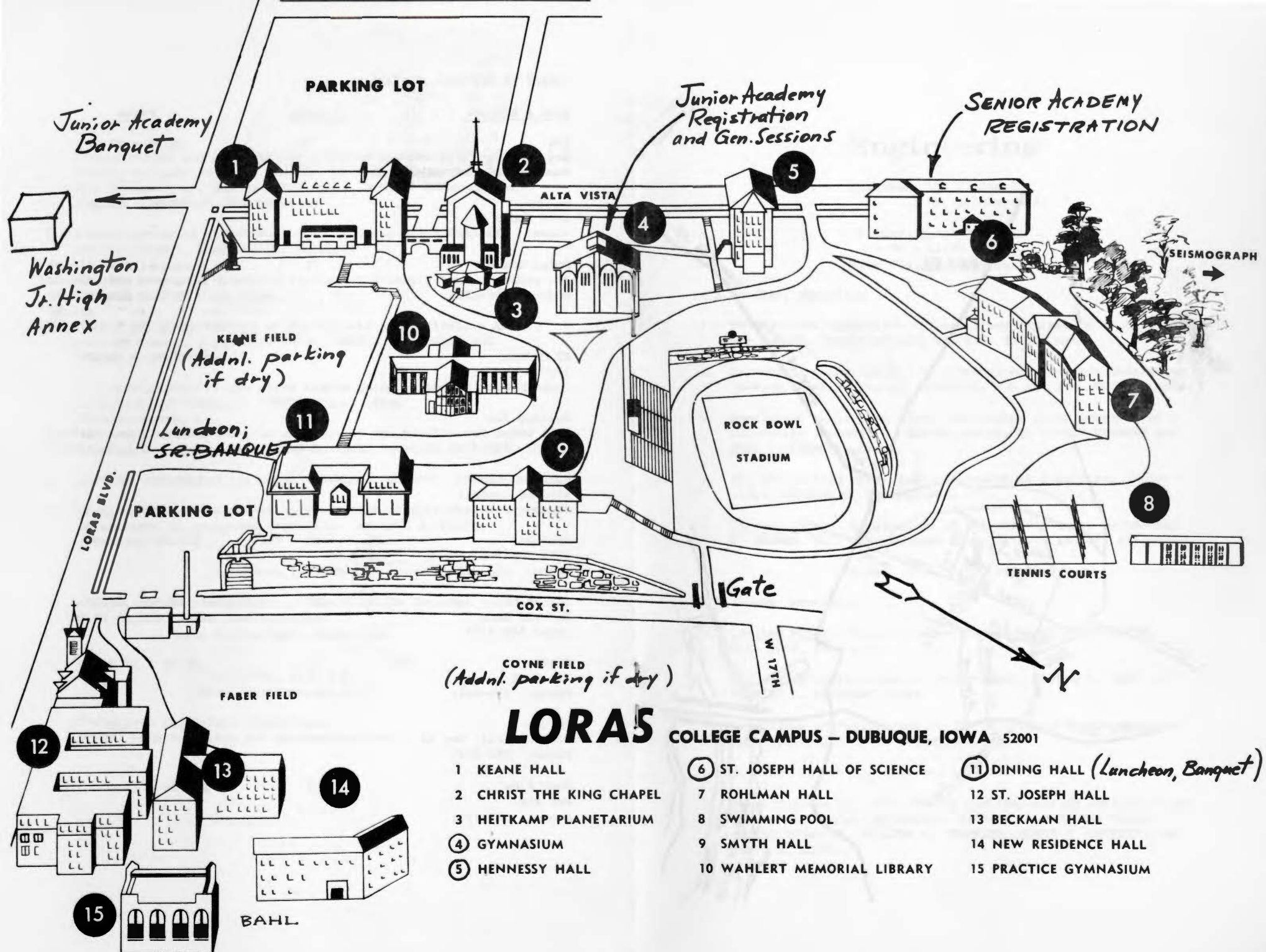
Meeting of the Iowa Chapter of the Wildlife Society
(Luncheon)
Loras Dining Hall, North Side

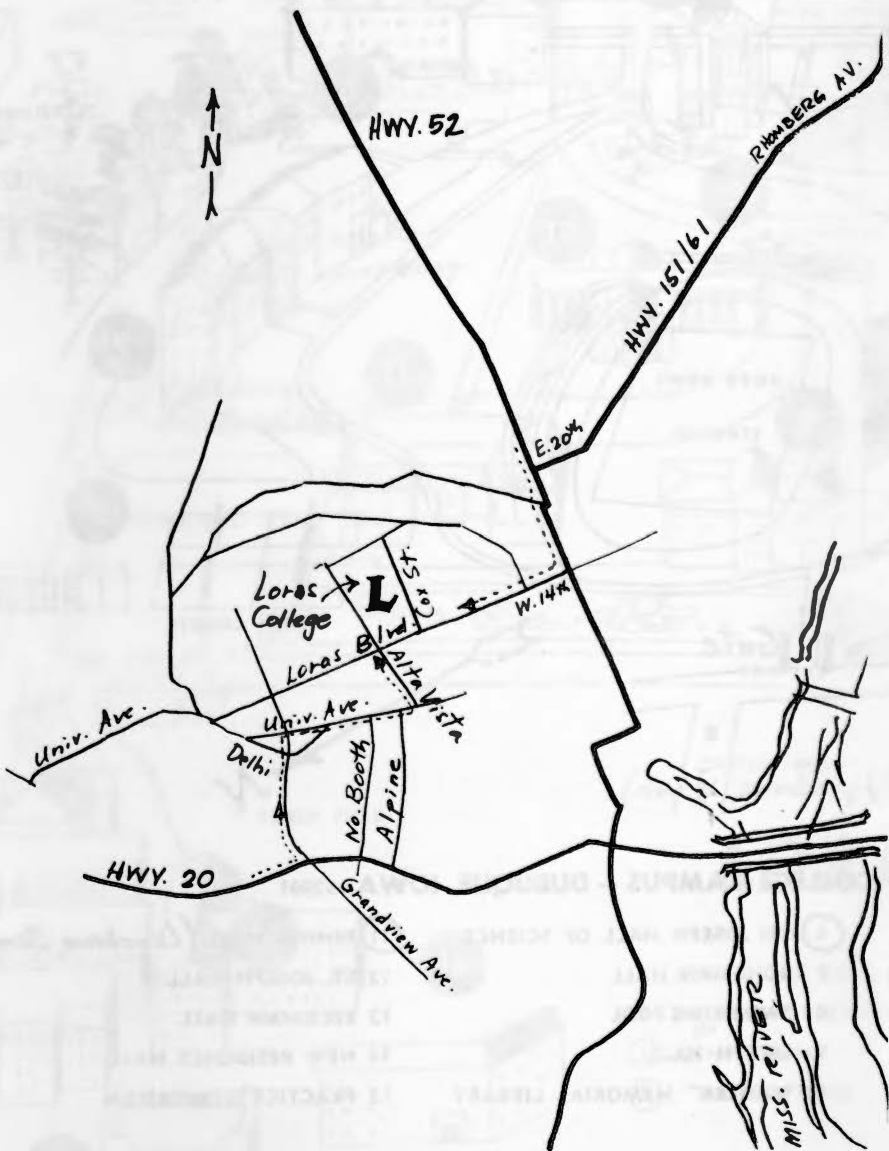
Saturday, 1:00 P.M.
Room 280, Hennessy Hall

Meeting of the Nature Conservancy
(Field trip to follow the business meeting.)

MOTELS IN AND NEAR DUBUQUE

<u>Name & Address</u>	<u># Units</u>	<u>Price</u>
Ace Hwy 20W Phone: 556-3141 (Area Code 319)	8	\$6.00 - 15.00
DeLuxe 2660 Dodge St. Phone: 556-1280	15	\$8.00 - 17.00
Dodge House 701 Dodge St. Phone: 556-2231	79	1 person--1 bed--\$12.00 2 persons-1 bed--\$15.00 2 " 2 beds-\$17.00 3 " 2 " \$19.00 4 " 2 " \$21.00
El Dorado 1280 Dodge St. Phone: 556-1551	17	\$9.00 - 14.00
Holiday Inn 1111 Dodge St. Phone: 556-3340	149	1 person--\$12.50 2 persons-1 bed--\$17.00 2 " 2 beds-\$18.00
Canfield Hotel 4th and Central Phone: 556-4331	66	\$8.00 - 18.00
Chateau 3750 Central, #52-3 Phone: 556-2120	25	\$10.50 - 19.00
Julien Motor Inn 2nd and Main Phone 556-4200	90	Single: \$8.50 - 12.50 Twin Beds: \$12.50-18.50
Siesta Hwy #20W Phone: 556-4411	10	\$9.00 - 18.00
Fulton 2565 Central, Hwy 52 Phone: 556-4445	9	\$8.00 - 16.00
West Pine Hwy 416 Phone: 582-9891	18	\$10.00 - 12.00





Engineering

Chairmen: J. G. Andrews
K. L. McRoberts

Friday, April 23, 1971
9:00 - 11:00 A.M.
Room 470, Hennessy Hall

R. B. Miller, presiding

1. An empirical expression for capillary depression of mercury. R.J. HUANG, TURGUT DEMIREL and T.D. MCGEE, Ames.
2. Parametric relationships of conventional versus repetitive loading triaxial tests. DARWIN E. FOX and J.M. HOOVER, Ames.
3. Population projection models and future water demands for a university community. MERWIN DOUGAL, E. ROBERT BAUMANN and JOHN F. TIMMONS, Ames.
4. The Engineering Operations curriculum at Iowa State University. RICHARD C. VAUGHN, Ames.
5. Invited Paper: Application of interdisciplinary technology. A. HAMMER, U.S. Army Weapons Command, Rock Island, Illinois.

Friday, 1:30 - 4:00 P.M.

A. E. Lundh, presiding

6. Invited Paper: Engineering education in Eastern Europe. W.F. AMES, Iowa City.
7. Off-campus instruction via video-tape. GEORGE E. LAMP and CHARLES L. TOWNSEND, Ames.
8. Directions of Engineering in the 1970's: A decade of introspection. RICHARD W. TOCH, Iowa City.

Election of Section Chairman 1971-72.

9. Panel Discussion: The role of the Engineering Section of the IAS in the '70's. Moderator, RICHARD L. BURDICK; Panel - LOUISE THOMPSON, WILLIAM E. FRANKLIN, ROYCE E. BECKETT, and ALVIN E. LUNDH.

Geology

Chairman: L.V.A. Sendlein

Friday, April 23, 1971

9:30 - 11:00 A.M.

Room 450, Hennessy Hall

Symposium on "The Geologists' Role in Environmental Problems" sponsored by The Geological Society of Iowa and the Geology Section of the Academy.

1. ROBERT C. PORTER; Director of the Des Moines Metropolitan Area Solid Waste Agency.
2. OTHIE R. MCMURRY; Director of the Iowa Natural Resources Council; Des Moines, Iowa.
3. JAMES E. BUNCH, Col., U.S. Corps of Engineers, Rock Island, Illinois.
4. RUSSEL B. CAMPBELL, President Recon Incorporated, Iowa City, Iowa.

Friday, 1:30 - 4:00 P.M.

Panel discussion on the symposium topic. Panel members are:

ROBERT C. PORTER

OTHIE R. MCMURRAY

JAMES E. BUNCH

RUSSEL B. CAMPBELL

JOHN LEMISH, Chairman, State Mining Board

DONALD L. BIGGS, Chairman, Governmental Cooperation and Assistance Comm. of Iowa Academy of Science

SAMUEL J. TUTHILL, Director and State Geologist

Saturday, April 24, 1971
9:30 - 11:00 A.M.
Room 450, Hennessy Hall

5. A primary mammoth site with associated fauna in Pottawattamie County, Iowa. LEO CARSON DAVIS, RALPH E. ESHELMAN, and JEAN C. PRIOR, Iowa City.
6. Groundwater flow patterns of the Ames Aquifer. R.R. VAN DER PLOEG, DON KIRKHAM, and L.V.A. SENDLEIN, Ames.
7. Shear strength and related characteristics of remoulded Iowa loess. RODNEY J. HUANG, RICHARD D. JOHNSON, and ROBERT A. LOHNES, Ames.
8. X-ray diffraction analysis of the Pennsylvanian clays of Mahaska County, Iowa. HAROLD DEAN ANDERSON, Columbia, Missouri.
9. New flexible crinoids from the Upper Devonian of north-central Iowa. HARRELL L. STRIMPLE and C.O. LEVORSON, Iowa City.

Mathematics

Chairman: T. Robertson

Friday, April 23, 1971
9:30 - 11:00 A.M.
Room 350, Hennessy Hall

1. Business meeting (election of officers for 1971-72).
2. Introducing mathematicians to some problems in robust estimation. ROBERT V. HOGG, University of Iowa.

Friday, 1:30 - 4:00 P.M.
3. Shapes of the future. VICTOR KLEE, University of Washington.
4. Panel discussion on accreditation and certification.
WILLIAM WALTMAN, Wartburg College; MERLIN FISHER, Iowa Central Community College; MARIAN CORNWALL, Marshalltown Community College; E.W. HAMILTON, University of Northern Iowa.

Physics

Chairman: D. Robinson

Friday, April 23, 1971

2:00 - 4:00 P.M.

Room 125, St. Joseph Hall of Science

1. Space science on parade. HERMAN C. SCHEPLER, University of Dubuque.
2. Space travel to the moon and Kepler's dream. PAUL B. SELZ, Parsons College.
3. Physics in the gay nineties. GRANT O. GALE, Grinnell College.
4. How we see like human beings. PHILIP W. GRAY, University of Dubuque.
5. NMR line-shapes in lithium wires. TOM HEFLEY and RALPH ENGARDT, University of Northern Iowa.
6. Determination of the sputtering yield of CO on W. FRANK HUTCHINSON, DAVID W. BAUER and ALLEN L. MOEN, Central College.
7. Spectroscopic studies of 3,6,3'6' - tetramethoxy $\Delta^{9,9}$ bifuorene. ARTHUR SERIANZ and ROBERT E. BUCKLES, University of Iowa.

Saturday, April 24, 1971

8:30 - 11:00 A.M.

8. Behavioral objectives in college physics courses. SISTER MARY BRIANT RYDER, Clarke College.
 9. Guided wave propagation with incomplete sets of normal modes. HERBERT H. SNYDER, Southern Illinois University.
 10. Production of the crossed-field instability in a laboratory plasma. ROBERT E. KRIBEL, Drake University.
- Election of Section Chairman for 1972.
11. Invited Address: Two-dimensional plasmas in a magnetic field. DAVID C. MONTGOMERY, University of Iowa.

Saturday, 1:30 P.M.
Room 125, St. Joseph Hall of Science

Meeting of the Iowa Chapter, American Association of
Physics Teachers.

Physiology

Chairman: W. R. Ingram

Friday, April 23, 1971
9:00 - 11:00 A.M.
Room 133, St. Joseph Hall of Science

1. Gibbs-Dennan ratios and rate of expulsion of water by *Tetrahymena*. ALLEN E. ORGAN, JOHN P. SIMS and EUGENE C. BOVEE, Lawrence, Kansas.
2. The effects of ion substitution on hydrogen ion secretion in isolated rat gastric mucosae. DOROTHY R. KARAL and C. ADRIAN M. HOGBEN, Iowa City.
3. The effects of graded levels of thyroxine and exercise on serum and hepatic cholesterol levels in aging rats. JON A. STORY and DAVID R. GRIFFITH, Ames.
4. Effect of exogenous thyroxine on the swimming performance of rats. HERBERT K. NAITO and DAVID R. GRIFFITH, Ames.
5. Effect of maternal age and calcium on longevity and fecundity of the rotifer, *Philodina citrina*. DONALD P. OTTO, Ames.
6. Bound and ionized calcium in rats with induced calciphylaxis. ROBERT J. SIMPSON and GARY L. ABBAS, Cedar Falls.
7. Effect of hypophysectomy during late pregnancy upon mammary gland growth of the rat. FREDRICK GEORGE and DAVID R. GRIFFITH, Ames.
8. Applications of fatty acid saturation analysis to environmental physiology. JUDITH A. MINOR and G. EDGAR FOLK, JR., Iowa City.

Friday, 1:30 - 2:30 P.M.

Joint Session with the Zoology Section.

Invited Lecture: "Some Studies of Thyroidal Iodide Transport."
DR. NICHOLAS S. HALMI, Iowa City.

Friday, 2:45 - 4:00 P.M.

9. Inhibition of lactogenesis in the rat by exogenous estrogen and progesterone. ANNELIESE STEFANIW and DAVID R. GRIFFITH, Ames.
10. Inhibition of experimentally induced lactation in the rat by mammary levels of estrogen and progesterone. LAURANCE F. FERRERI and DAVID R. GRIFFITH, Ames.
11. The effect of estrogen and progesterone on lactation in the rat. CHARLES HODSON and DAVID R. GRIFFITH, Ames.
12. Effects of prednisolone on ^{14}C -choline incorporation in synchronous L5178Y cells in culture. M.T. STORY and G. MELNYKOVYCH, Kansas City, Missouri.
13. Water response from the epiglottis of rat. IRVING Y. FISHMAN, Grinnell.

Psychology

Chairman: D. C. Edwards

Friday, April 23, 1971

1:45 - 3:45 P.M.

Room 150, Hennessy Hall

1. Evaluation of the Smith-Kendall retranslation procedure: a multitrait-multimethod analysis of ratings. THOMAS E. TICE, Ames.
2. The acquisition and maintenance of cooperative behavior in rats. STEPHEN W. EPLEY and M.E. ROSENBAUM, Iowa City.

3. The effects of experimental context bias and message bias on attitude change on cultural truisms. KELLEY A. CONRAD, Ames.
4. Discrimination between facilitation and interference pairs in a mixed list mediation (chaining) paradigm. BRUCE BRITTON, Iowa City.
5. Recall from iconic memory as a function of cued attribute and delay of report. DREW C. APPLEBY, Ames.
6. Category names as retrieval cues for category instances in free recall. RUDOLPH W. SCHULZ and BRUCE BRITTON, Iowa City.

Science Teaching

Chairman: Lena Keithahn

Friday, April 23, 1971

9:00 - 11:00 A.M.

Room 370, Hennessy Hall

K. E. Frazier, presiding

1. The effects of periodic catastrophe upon community structure. WILLIAM J. PLATT, Iowa City.
2. Given: the chance. SISTER CLAIRE M. PATIK, Davenport.
3. Auto instructional adjunct of computer-assisted instruction in general chemistry: phase 1. ERWIN E. BROWN, Iowa City.
4. Low-structured, student centered junior high school science. ROSS IVERSON and GERALD CUNNINGHAM, Marshalltown.

Friday, 1:30 - 4:00 P.M.

Lena Keithahn, presiding

5. A comparison of two innovative approaches to teaching BSCS biology. ROBERT J. BOES and DAVID GALE, Iowa City.

6. Invited Address: The impact of new elementary science curriculum projects on secondary science. DR. LYNN W. GLASS, Science Consultant, Dept. of Public Instruction, Des Moines.
7. Elementary children, teachers, a museum and lots of things come together. MARILYN MARSH, CAROLYN BENNE and LAWRENCE BENNE, Sioux City.
8. Relating concerns of elementary and junior high science teachers. ROBERT O. MAKI, Cedar Falls.
9. The change in attitude of students toward school subjects as the school year progresses. DONALD J. BROWN and ROBERT E. YAGER, Iowa City.
10. Science for the educationally uninvolved. JOE R. MOORE, Davenport.

Saturday, April 24, 1971
 8:30 - 11:30 A.M.
 Room 370, Hennessy Hall

Verlin Fleagle, presiding

11. Comparing levels of intellectual development in science oriented vs. non-science oriented high school students as measured by selected Piagetian-type tasks. D.L. CAMP, Iowa City.
12. Count Rumford - designer of clothes. PETER H. SWEEDY, Moline, Illinois.
13. Effects of individual belief systems on student-teacher interaction and the classroom environment. RAYMOND L. HEIMBUCH, Iowa City.
14. An educator's response to a community's drug problem. EUGENE A. BALK, Mason City.
15. Useful materials for field courses. SISTER MARY E. OLDHAM, Cedar Rapids.
16. A comparison of subject response patterns in two modes of presentation of five Piaget-type tasks. DONALD J. BROWN, Iowa City.
17. A little bit of chaos. JOE R. MOORE, Davenport.

Zoology

Chairman: P. J. Reitan

Friday, April 23, 1971

9:30 - 11:00 A.M.

Foley Aud., St. Joseph Hall of Science

1. A further note on *Formica exsectioides* forel. K.M. QUICK and C.L. CHRISTENSEN, Webster City.
2. Effects of DDT on the density and diversity of tardigrades. GARY W. BARRETT, Oxford, Ohio, and RONALD G. KIMMEL, Aurora, Illinois.
3. Distribution of benthos in Red Rock Reservoir, Iowa. R.C. KEITH and P.J. KINGSBURY, Des Moines.
4. Copepoda and cladocera populations of Red Rock Reservoir, Iowa, from April to November, 1970. R.L. ASCH and P.J. KINGSBURY, Des Moines.
5. Overlap of distributions of eastern and midwest vertebrate species in Iowa. J.J. BERBERICH and G.E. FOLK, JR., Iowa City.
6. Variation of turtle growth rates in Iowa, a preliminary report. ANTHONY J. QUINN and JAMES L. CHRISTIANSEN, Des Moines.

Election of section chairman and vice-chairman.

Friday, 1:30 - 2:30 P.M.

Room 133, St. Joseph Hall of Science

Joint Session with the Physiology Section. (See Physiology Section program for details.)

Invited Lecture: "Some Studies of Thyroidal Iodide Transport." DR. NICHOLAS S. HALMI, Iowa City.

Friday, 1:30 - 4:00 P.M.

Foley Aud., St. Joseph Hall of Science

Joint Session with the Botany and Conservation Sections. (See Conservation Section program for details.)

Symposium: "The Prairie: Remnant and Restored."

Saturday, April 24, 1971

8:30 - 10:30 A.M.

Foley Aud., St. Joseph Hall of Science

7. Biometrical analysis of swimming rate of *Paramecium caudatum*.
ROGER E. LINDBERG, RONALD E. GODDARD, and EUGENE C. BOVEE,
Lawrence, Kansas.
8. Growth and morphology of *Tritrichomonas augusta* (Alexeieff,
1911) in relation to temperature and culture medium. DAVOOD
SOLEYMANY-KASHI and BENTON W. BUTTREY, Ames.
9. Grass-seed agar for culturing small testate rhizopods. RONALD
E. GODDARD, Lawrence, Kansas.
10. The effect on the growth and morphology of *Tritrichomonas suis*
when cultured in chicken eggs. JACKSON L. MARR and BENTON W.
BUTTREY, Ames.
11. Teratogenic effects of bee venom on developing chick embryos.
ROBERT A. GRASSMICK, Ames.
12. Yellow phenotypes and evidence for a "non-red" mutation in the
Siamese Fighting Fish, *Betta splendens*. GENE A. LUCAS, Des
Moines.
13. An analysis of red and yellow pigments in two mutants of the
Siamese Fighting Fish, *Betta splendens*. B. KATHERINE ROYAL
and GENE A. LUCAS, Des Moines.
14. Regulation by testosterone of melanogenesis in the scrotal
epidermis of the rat. MICHAEL J. WILSON, Iowa City.
15. The effects of testosterone on ATPase activity in the sex
accessory tissues of castrated male rats. CAROL J. WIEMAN,
Iowa City.

GEOLOGY IN THE VICINITY OF DUBUQUE

by Wayne I. Anderson for the
Geological Society of Iowa

Introduction: This is the first in what I hope will be a regular feature in the Iowa Academy of Science Annual Program. As president of the Geological Society of Iowa for 1971 it is my pleasure to prepare this short summary of the geology of the Dubuque area. This year's host institution, Loras College, is located in one of Iowa's most geologically interesting cities.

The topography: Stream erosion has sculptured the region near Dubuque into a series of rounded hills, deep valleys and steep bluffs. Elevations near Dubuque range from highs of approximately 1,200 feet down to elevations of approximately 590 feet at river level. The topography around Dubuque is closely related to the type of bedrock that underlies the area.

A prominent ridge, known as a cuesta, is present to the south and west of Dubuque. This cuesta is underlain by resistant rocks of Silurian age. The smooth and gentle slopes north and east of the cuesta have developed on the less resistant shales of the Maquoketa Formation. The steep-walled valleys and bluffs along the Mississippi River are in the resistant rocks of the Galena Formation.

The rocks: The rocks around Dubuque were deposited in shallow seas that once occupied the interior of the North American continent. Fossils in these rocks, such as corals, brachiopods, cephalopods, trilobites and snails indicate that the seas were shallow and warm. The fossils also help establish the age of the rocks. The rocks belong to the Ordovician and Silurian systems and are approximately 400-500 million years old. The rocks tilt downward in a south-southwesterly direction. In central Iowa these same rocks are several hundred feet below the surface of the land.

The Silurian rocks are composed primarily of a carbonate mineral called dolomite. The Silurian rocks, near Dubuque, are divided into three formations: The Hopkinton Formation, the Kankakee Formation, and the Edgewood Dolomite.

The Ordovician rocks around Dubuque are represented by the Maquoketa and the Galena formations. The Maquoketa Formation consists primarily of shale. The Galena Formation is composed of dolomite. Nodules of chert, a silicon dioxide mineral, occur within the Galena Formation.

Mineral deposits: Lead ore was mined in the Dubuque area as early as 1690. Very little ore has been produced since about 1910 however. The lead occurs in the mineral galena (lead sulphide). Zinc deposits have been mined in the area also. The zinc comes from sphalerite (zinc sulphide) and smithsonite, (zinc carbonate). The ore deposits were found in the Galean Formation along breaks in the rock known as joints. Mineralized rock has been found continuously along some of the joints for more than two miles. Miners referred to these deposits as gash-vein deposits. Zinc-ore is still mined in Wisconsin.

Glaciation: The area around Dubuque was originally included in the "Driftless Area." Glacial till is now known to occur in isolated spots at higher elevations in the area. The till is believed to have been deposited by the Nebraskan-age glacier. Nebraskan glaciation is the oldest of the four major glaciations that took place during the Pleistocene Ice Age. The area apparently escaped glaciation during the last three glacial advances. The present topography has been developed by stream erosion since the time of Nebraskan glaciation.

The river: During glacial and interglacial times the Mississippi River eroded and filled its channel several times. At one time the river cut a trench 500 feet deep into the underlying bedrock. This trench has since been filled with glacial outwash to the present level of the valley floor. Two levels of terraces indicate that the Mississippi has had higher levels in the past. The lower terrace level is about 25 feet above the present river level and has been destroyed in most places by recent erosion. A higher terrace level is preserved in a few places. The higher level stands about 50 feet above the river level. Even during the recent past the river has not always "stayed put." Many Academy members will recall the flood conditions during the 1965 Academy meetings in Dubuque.

References: Several publications of the United States Geological Survey discuss the geology of the Dubuque area. The two references listed below provide detailed coverage of the geology for those who wish additional information.

Whitlow, J.W. and Brown, C.E., 1963, Geology of the Dubuque North Quadrangle, Iowa-Wisconsin-Illinois, U.S. Geological Survey Bulletin 1123-C.

Brown, C.E., and Whitlow, J.W. 1960, Geology of the Dubuque South Quadrangle, Iowa-Illinois, U.S. Geological Survey Bulletin 1123-A.

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PRE-REGISTRATION FOR THE 83RD SESSION
OF THE IOWA ACADEMY OF SCIENCE
AT LORAS COLLEGE, DUBUQUE
April 23-24, 1971

(Must arrive at Academy Office by April 20)

Print names and institutional addresses below as you want them to appear on ID badges. Pick up your ID badges and tickets on arrival. If more than one name is listed, the first name will appear on the envelope at the Registration Table.

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