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Front Matter

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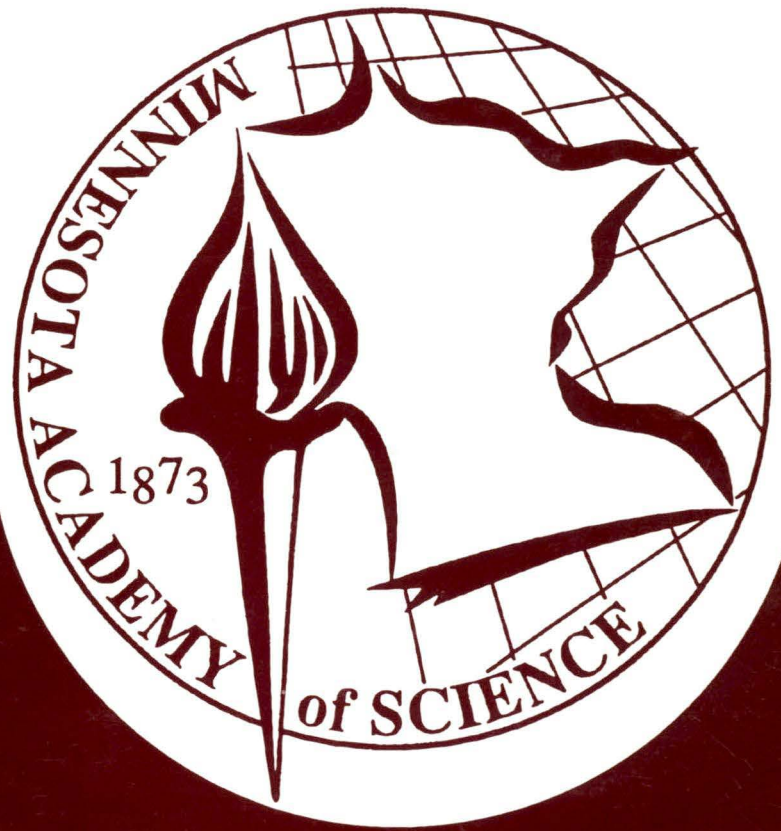
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64th Annual Meeting

with
Hamline University



**Journal of
the**

Minnesota

Academy of Science

SPRING 1996

VOLUME 60, No. 2

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Journal of the
MINNESOTA
ACADEMY OF
SCIENCE

Vol. 60, No. 2

Spring 1996

64th Annual Meeting
Minnesota Academy of Science

Hosted by

Hamline University
St. Paul, Minnesota

April 26-27, 1996

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The Minnesota Academy of Science does not take a stand on issues that may be discussed in articles published in the journal. Readers should bear in mind that views expressed in these articles are strictly those of the authors.

Address Editorial Correspondence to: Editor,
Minnesota Academy of Science, Room 410,
408 St. Peter St., St. Paul, MN 55102.

MISSION STATEMENT

Minnesota Academy of Science is the local affiliate of the American Association for the Advancement of Science (AAAS). It promotes communication and interaction among people interested in science through annual meetings and the Journal of the Minnesota Academy of Science. Another major emphasis is to promote and encourage science among the youth of Minnesota through communication and interaction with the scientific community. Youth activities include science fairs, science clubs and research paper competitions on both the high school and college level.

PROGRAMS

The Minnesota Academy of Science State Fair

Of the over 10,000 science projects and papers generated each year by Minnesota students, the top 300 are invited to display and/or present their projects at the three-day Minnesota State Science Fair. Twenty-four projects are selected to compete at the International Science and Engineering Fair where Minnesota outperforms much larger states, including California and New York.

Duluth

April 11-12, 1997

Winchell Undergraduate/Graduate Research Competition

At the Annual Meeting of the Academy, college students are invited to present their research to the academic and corporate community. The abstracts of the student participants are published in the spring issue of the journal.

Annual Meeting

The annual meeting includes an interdisciplinary symposium as well as technical paper and poster sections. Concurrently with the technical papers are the Winchell Research Papers (see above).

Future annual meetings:

University of Minnesota,
St. Paul

April 18-19, 1997

Winona State University

May 1-2, 1998

Macalester College

April 23-24, 1999

Joint Meeting with NDAC

2000

Journal

Published several times a year, this magazine is of interest to all Minnesotans. The journal provides an arena for publication of research articles of regional impact. The journal is distributed throughout the University State Library system, as well as national and international exchange libraries, including the British Museum.

Preliminary

CALL FOR PAPERS

SYMPOSIUM ON WOUND REPAIR, REGENERATION AND ARTIFICIAL ORGANS

APRIL 18-19, 1997

Purpose: This symposium will explore mechanisms for solving problems arising from tissue and organ damage. The program will consist of invited presentations, selected presentations of current investigations, and a panel discussion. An introduction to the symposium will be provided by focal presentations surveying mechanisms of wound repair and regeneration as physiological saltines to injury and current strategies being explored to induce regeneration or to develop and employ artificial organs as means for improving final outcome. Selected presentations from local scientists active in wound healing and regeneration research or artificial organ development will highlight current investigations in these areas. The program will conclude with a panel discussion intended to draw connections among these three areas, underscore ways in which advances in each area might be mutually reinforcing, and suggest topics for the future.

Mail all inquiries and abstracts to:

Raymond E. Sicard, Ph.D.
Center for Wound Healing and Reparative Medicine
Box 120 UHMC
University of Minnesota
Minneapolis, MN 55455
Fax: 612/624-8909
E-mail: sicar001@maroon.tc.umn.edu

SYMPOSIUM ON WATER QUALITY ISSUES OF THE MINNESOTA RIVER WATERSHED

APRIL 18-19, 1997

Purpose: This symposium will be a multi-disciplinary symposium covering a wide variety of issues. We feel that it would be valuable to bring together stakeholders from the academic, government, business and agricultural communities to learn about and discuss topics of common concern. Scientists provide data on which governmental authorities base management decisions. These decisions often result in regulations that business and agriculture must abide by. As one of these stakeholders, we would like to invite you to participate in the symposium by addressing a question on the Minnesota River, such as:

- What is the future of water quality in the Minnesota River?
- Will it ever be a crystal clear stream? (Was it ever?)
- Who has made the management decisions for the watershed?
- Who should make them?
- What is the role of the states in the Minnesota River watershed management? The County? Local authorities?
- What is the role of the scientist in decision making?
- What is the impact of watershed management decisions on agriculture and industry?

Mail all inquiries and abstracts to:

| | |
|--------------------------------|---------------------------------|
| Dr. James Waddell | Dr. James Perry |
| University of Minnesota | University of Minnesota |
| College of Veterinary Medicine | Dept. of Forest Resources |
| 385 AnSc/VetMed Bldg. | 115 Green Hall |
| St. Paul, MN 55108 | St. Paul, MN 55108 |
| Phone: (612) 625-3118 | Phone: (612) 624-9796 |
| FAX: (612) 625-1210 | Fax: (612) 625-5212 |
| E-mail: | E-mail: |
| wadde001@maroon.tc.umn.edu | jperry@mercury.forestry.umn.edu |

REGISTRATION: Abstract and Registration Fee - \$50.00

SPONSORED BY: The Minnesota Academy of Science. Established in 1873 "to provide for the advancement of pure and applied science through the fostering of research, education, and understanding."

HOSTED BY: University of Minnesota, St. Paul, Minnesota

PROCEDURES AND DEADLINES

1. Submissions: Individuals interested in participating in this symposium should provide suggested title and a brief (2-4 sentence) description of the nature of their work and its relation to the symposium objective by **September 30, 1996**.
2. Notification of provisional acceptance will be made by October 18, 1996.
3. Submission of final title and 200-300 word abstract will be required by **November 22, 1996**
4. Notification of acceptance will be made by December 13, 1996.

Preliminary

CALL FOR PAPERS

SURFACE WATER/GROUND WATER INTERACTIONS AND ASSOCIATED IMPACTS ON WATER QUALITY

APRIL 18-19, 1997

Purpose: Although the established professional disciplines have generally treated surface water and ground water systems as separate entities, it is becoming increasingly apparent that the management of surface water and ground water quality is not possible without recognizing that these systems are intimately coupled. This symposium will provide a forum for scientists and engineers to present results of studies related to surface water and ground water quality as influenced by the processes coupling surface water and ground water systems.

Mail all inquiries and abstracts to:

Dr. John Nieber
University of Minnesota
203 Biosystems and Agricultural Engineering
St. Paul, MN 55108
Phone: (612) 625-6724
FAX: (612) 625-3004
E-mail: nieber@gaia.bae.umn.edu

REGISTRATION: Abstract and Registration Fee - \$50.00

SPONSORED BY: The Minnesota Academy of Science.

Established in 1873 "to provide for the advancement of pure and applied science through the fostering of research, education, and understanding."

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SUSTAINABLE AGRICULTURE SYMPOSIUM

APRIL 18-19, 1997

Purpose: Our nation's farmers face increasing economic, environmental, and social pressures, and our agricultural sector is under continuous scrutiny from an urban population. Scientists must remain open to diverse dialogue and thought in order to participate in shaping sustainable development. The purpose of this symposium is to provide a healthy environment for a discussion of sustainable agriculture and to explore the role of scientists in this arena. The symposium will present examples of sustainable agricultural systems to the Minnesota Academy of Science. Presentations will be made by farmers, researchers, and others working in the area of sustainable agriculture.

Individuals and groups interested in this forum should send a brief description, 2-4 lines, of their idea (**NOT ABSTRACT**) by **September 30, 1996** to:

Dr. Helene Murray
Minnesota Institute for Sustainable Agriculture
U of M - 411 Borlaug Hall
Saint Paul, MN 55108
Phone: (612) 625-0220
Fax: (612) 625-1268
E-mail: murra021@maroon.tc.umn.edu

A meeting registration fee of \$50 will be required of all participants.



HAMLIN UNIVERSITY

Founded in 1854 as Minnesota's first university, Hamline University is today a high-quality, nationally ranked, private university of liberal arts and sciences with over 3,000 degree-seeking students in the College of Liberal Arts, School of Law, and Graduate School. Located in Saint Paul, it is affiliated with the United Methodist Church. Hamline has an annual operating budget of \$38.5 million and an endowment of \$32 million. Hamline's World Wide Web (Internet) site is <http://www.hamline.edu>.

A HISTORY OF "FIRSTS"

- Minnesota's first university and one of the first coeducational universities in the U.S.
- Conferred Minnesota's first bachelor's and master's degrees (1859) and prepared Minnesota's first lawyers, judges, doctors, public administrators and teachers.
- Created the first computer literacy requirement in the U.S.
- Hosted the nation's first men's intercollegiate basketball game in 1895.

COLLEGE OF LIBERAL ARTS

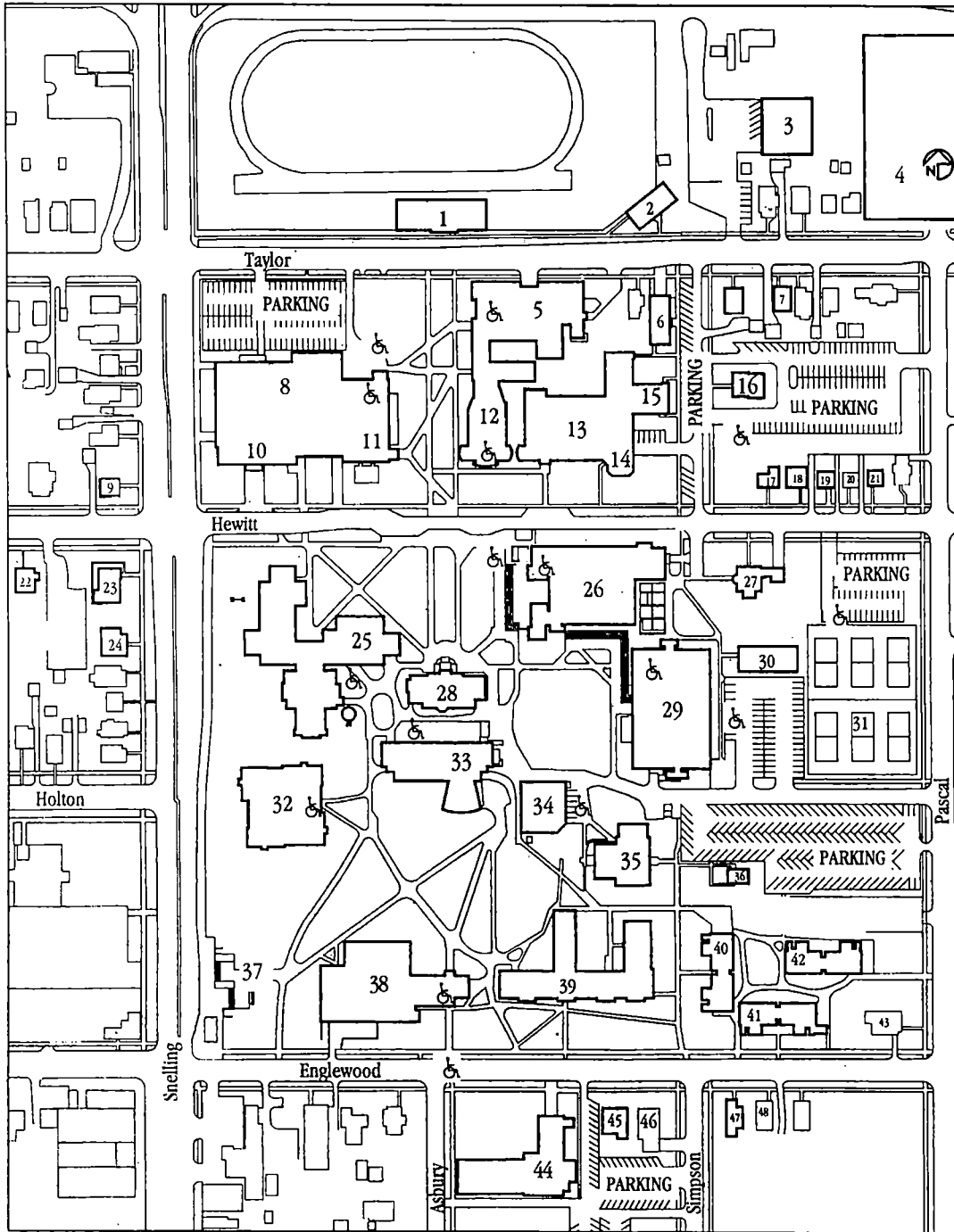
- Profile (1995-96): 1,645 students from 40 states and 37 countries include 13% students of color and 4% international students. Average ACT score is 25; average combined SAT score is over 1200. Class rank: 34% come from the top 10% of their graduating classes; over 70% come from the top quartile. Student-faculty ratio is 13:1. Tuition: \$13,650.
- Listed as "very selective" in Cass and Birnbaum's *Comparative Guide to American Colleges*. It is also listed as a top caliber liberal arts college in *Barron's 300: Best Buys in Higher Education*, *Peterson's Competitive Colleges*, *The 100 Best Colleges for African-American Students*, and *U.S. News & World Report*.
- Hamline University has produced five Rhodes and 14 Fulbright Scholars and is one of only 248 institutions with a Phi Beta Kappa chapter, a national hallmark of excellence.

- The undergraduate curriculum, the Hamline Plan, has attracted national attention. An innovative legal studies major (3-3 BA/JD law program) is one of 34 major areas of study.

SCIENCE HIGHLIGHTS

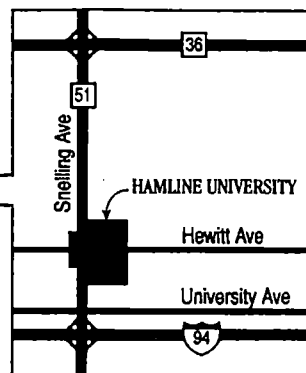
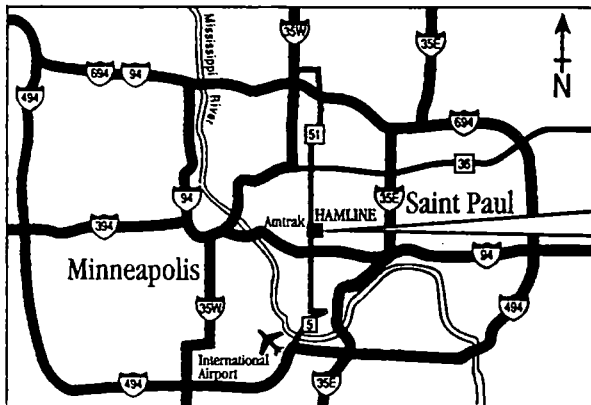
- 24% of first-year students indicate natural science as first preference for a college major—over three times the national average.
- Hamline boasts decades-long record of published faculty-student collaborative research in the sciences and psychology that is unusual in a small liberal arts college, and which has now expanded to all disciplines.
- From 1965-1993, the College has produced more American Chemical Society certified graduates than any other college in Minnesota except the University of Minnesota.
- The College ranks 43rd and 44th in its production of graduates who eventually earned Ph.D. degrees in chemistry and physics, respectively, when compared to 847 other selected liberal arts colleges in the United States.
- Two science faculty maintain the Internet's international forum for dissemination of lupus research results, as well as a separate support forum for lupus victims.
- The sciences are supported by National Science Foundation, Kresge Foundation, Arthur Vining Davis Foundation, W. M. Keck Foundation, and the Lupus Foundation of America, Minnesota Chapter.

HAMLIN UNIVERSITY CAMPUS MAP



1. Norton Stadium
2. Sculpture Studio
3. Physical Plant
4. Recreation Field
5. Drew Fine Arts Center
Anne Simley Theatre
6. Ceramics Studio
7. PRIDE Culture House
8. Swimming Pool
9. MALS/MFA House
10. Hutton Field House
11. Bush Student Center
HUB Snack Bar
12. Sundin Music Hall
13. Drew Hall
Graduate School Office
English Language Services Program
14. Safety & Security
15. Human Resources
16. Hanna Apartment
17. Hamline Day Care
18. Women's Law House
19. Law Annex
20. Residential Life
21. HECUA
22. Delta Tau Sorority
23. Undergraduate Admission Office
24. Theta Chi Fraternity
25. Giddens/Alumni Learning Center
Art Gallery
26. Bush Memorial Library
27. President's House
28. Old Main
Bridgman Hall
29. School of Law
30. Student Affairs
Career Development
Scheduling
31. Holt Tennis Courts
32. Robbins Science Center
33. Drew Hall of Science
Computer Lab
Student Publications
34. Heating Plant
35. Old Gymnasium
36. Law Review
Journal of Public Law and Policy
37. Bridgman Court
38. Sorin Hall
Food Service
39. Manor House
40. Schilling Hall
41. Osborn Hall
42. Peterson Hall
43. Language House
44. Hamline United Methodist Church
45. ATO Fraternity House
46. Crossroads Center
47. AGE Sorority House
48. Men's Law House

♿ Handicapped access



GENERAL SCHEDULE

FRIDAY, APRIL 26

1 - 5:30 P.M. SYMPOSIA

SCIENCE OUTREACH. Learning Center 100E
 MINNESOTA ARCHEOLOGY Drew Science 119
 RESEARCH USE OF LASERS IN
 PHYSICAL SCIENCE. Robbins Science 11

Keynote Speaker: Dr. William Phillips

Laser Cooling: Atomic and Molecular
 Physics at MicroKelvin Temperatures

2:20 - 2:40 P.M.

REFRESHMENT BREAK Robbins Basement

5:30 P.M.

MAS BUSINESS MEETING Robbins Science 11

6:00 P.M.

NEW MEMBER RECEPTION Sorin Lobby Room

6:30 - 8:30 P.M. DINNER PROGRAM

PRESIDING

Alan Olness, *Past-President of the Minnesota Senior
 Academy of Science*

WELCOME

Gerry Greiner, *Dean of the College of Liberal Arts and
 Vice-President for Academic Affairs for
 Hamline University*

Judith E. Parker, *President of the Minnesota Academy of
 Science*

PRESENTATION OF THE MINNESOTA COLLEGE SCIENCE

TEACHER OF THE YEAR AWARD TO

Christine McLaren, *Moorhead State University*

PROGRAM

"The Coldest Stuff in the Universe"

Dr. William Phillips, *National Institute of Standards and
 Technology*

WINCHELL UNDERGRADUATE RESEARCH POSTER

SESSION AND DESSERT

SATURDAY, APRIL 27

9:00 - NOON SYMPOSIA

MINNESOTA ARCHEOLOGY Drew Science 119

9:00 - 12:30 P.M. WINCHELL PAPERS

Agricultural and Soil Science Robbins Science 203
 Cellular and Molecular Biology . . . Robbins Science 130
 Chemistry and Biochemistry Drew Science 19
 Ecology I Robbins Science 9
 Ecology II Robbins Science 10
 Ecology III Robbins Science 11
 Economics, Geology and Math Drew Science 4
 Medical Science and Physiology I . . . Robbins Science 7
 Medical Science and Physiology II . . Robbins Science 12
 Meteorology. Drew Science 2
 Physics Learning Center 203
 Psychology and Teaching Robbins Science 220

PROFESSIONAL PAPERS

Agricultural & Soil Science Learning Center 106W
 Biology Learning Center 106W
 Business. Learning Center 245W
 Geography. Learning Center 108W
 Physical Science. Learning Center 141S
 Women in Science Learning Center 108W

12:30 - 2 P.M. LUNCHEON PROGRAM

"The Ethics of Health Care Rationing"

Dr. Walter Benjamin, *Professor Emeritus Hamline
 University*

PRESENTATION OF WINCHELL UNDERGRADUATE

RESEARCH AWARDS

Dr. Lynn Hartshorn, *Winchell Advisor*

2:00 P.M.

MAS Business Meeting
 Demos: Lasers and WINNS
 MN Archeology Meeting
 Sigma Delta Epsilon Meeting

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