

NARST NEWS

NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

Thaddeus W. Fowler, Editor, University of Cincinnati, OH

Vol. 32 June 1990

P R E S I D E N T

Jane Butler Kahle
Miami University, Oxford, OH

Thoughts and Goals for 1990-91

With both national and international attention focused on science education, NARST is positioned to fulfill its mission of "improving science teaching through research." Our recent annual meeting exemplified our potential for contributing to the reform movement. For example, our meeting was preceded by an NSF supported conference to articulate methods of evaluating current curriculum reforms. In addition, its theme, many papers, and all general sessions focused on *Teacher as Researcher/Researcher as Teacher*, and record numbers of us (385—over half of our membership) participated in and contributed to the Atlanta meeting. With the strong support of its members, NARST needs to become a more unified and articulate spokesperson for research as the basis for effective change.

Today our membership is steadily rising, and each of us needs to work to ensure that NARST becomes more inclusive and representative. Then, we need to capitalize on the interest of new members by involving them in the activities of NARST. In order to begin that process, many new names were listed as discussants and presiders on the Atlanta program, and Ann Howe and Frances Lawrenz organized a special session for graduate students and new researchers. Furthermore, the leadership team, introduced in this issue, contains many new names; for I filled the majority of committee openings with volunteers who had not previously served NARST. Those initiatives are first steps in reaching out to new and diverse members.

NARST needs both an active and diversified membership so that its voice represents a variety of theories and research findings. This year Joe Novak received our Distinguished Contributions to Research Award, one evidence of the strength and value of theory based research which is pursued independently of topical or popular theories. Through its various awards, NARST can continue to recognize and reward different ways of learning and knowing. In order to provide a forum

Call for Proposals 1991 NARST Annual Meeting

This is a call to NARST members and others to submit proposals for the program for the 1991 NARST Annual Meeting. The 1991 annual meeting will be held at The Abbey on Lake Geneva in Fontane, WI outside of Chicago, IL on April 7 through 10, 1991. All *presenters* must *register* for the NARST meeting.

The Program Committee encourages the submission of proposals that describe any of a variety of types of research including, but not limited to: case study, experimental, descriptive survey, documentary analysis, ex post facto, evaluation, historical, naturalistic, and philosophical.

PROPOSAL CATEGORIES, PREPARATION AND REVIEW

Proposals should fit into one of the seven categories of concurrent sessions presented at NARST annual meetings. Criteria and description of each category follow. Except in the case of poster sessions and seminars/workshops, it is anticipated that the research on which the session is based *will have been completed prior to proposal submission*.

1. **Contributed Papers:** This format accommodates three or four 15-minute reports on research papers by individual researchers or groups of researchers. Contributed papers are grouped by the Program Committee and discussants usually are assigned to such sessions. Presenters must provide discussants with a copy of the research paper before the annual meeting and are encouraged to distribute copies of the paper at the session. A *Contributed Paper proposal should include:* 1) an abstract, and 2) a three to six page, double spaced, synopsis (objectives or purpose of the study, significance, design and procedures, findings or results, and conclusions) with bibliography (not counted into the six pages). The materials should be stapled together in the upper left corner.
2. **Paper Sets:** This category accommodates several related research papers or a single paper, reporting on several studies which originate from a common base of research, presented in a single concurrent session. The format also allows for common elements of design or approach to be presented once

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for diverse views, I would like to invite others to contribute to this column and solicit possible editorials (about 300 words) which can be forwarded to me.

In addition, to external opportunities, I have some goals for internal change. NARST is governed by a Board that sets policy and interprets the By-laws. Pat Blosser has accepted the important assignment of codifying Board actions so that we have a cohesive set of policies. Her work will provide the foundation for a more efficient organization that can provide leadership because of its ability to act quickly and efficiently. In addition, John Staver, our newly appointed Executive Secretary (July, 1991), will work with Glenn Markle throughout the year to ensure a smooth transition.

Each year, NARST's president sets goals for the organization and for her/his term. Briefly my goals focus on internal and external change. Internally, I hope to actively involve more members and to increase the efficiency with which NARST acts. Externally, I hope that NARST will be identified as the source of information concerning the improvement of practice. It is untenable to us and to the scientific community that education reform is not based on research, yet we have spoken with individual, and often contradictory, voices. My agenda, therefore, as president is to enhance NARST's growth, diversify its voice, and increase its efficiency. I look forward to working with you in the upcoming year.

continued

rather than repetitiously. A discussant may be assigned to the session if one is not identified in the proposal. Presenters must provide the discussant with a copy of the research papers before the annual meeting, and are encouraged to distribute copies of the papers at the session. A *Paper Set Proposal* should include: 1) an abstract, and 2) a three to six page, double spaced, synopsis (objectives or purpose of the study, significance, design and procedures, findings or results, and conclusions) with bibliography (not counted into the six pages) for each paper proposed for presentation. The materials should be stapled together as a unit in the upper left corner.

- 3. Poster Sessions:** Poster sessions are designed to enable researchers to share information on research that may be in progress. Poster sessions combine the graphic display of materials with an opportunity for individualized, informal discussions of the research. Authors are encouraged to bring copies of a paper for distribution to interested participants. A *Poster Session Proposal* should include: 1) an abstract, and 2) a three to six page, double spaced, synopsis of the research to date (e.g., objective or purpose of the study, significance, design and procedures, findings or results, and conclusions) with bibliography (not counted into the six pages). The materials should be stapled together in the upper left corner.

- 4. Panels:** Panels are constituted to provide a mechanism for debating or discussing serious issues in science education. Each panel has a moderator, who may or may not have organized the panel, but who is expected to regulate the flow of discussion or debate. Panel members must provide the moderator with a copy of the paper in which their views on the issue are presented in a scholarly manner and are encouraged to distribute copies of their papers at the session. A *Panel Proposal* should include: 1) an abstract, and 2) a double spaced, Introduction which describes the issue focus of the panel, the research interests of panel members, and their varied backgrounds, *without naming the individuals* (maximum of two pages), and 3) a three to six page, double spaced, synopsis with bibliography (not counted into the six pages) of each paper proposed for presentation in the panel. These materials should be stapled together as a unit in the upper left corner.
 - 5. Symposia:** Symposia should promote discussion of current or needed research. Following a brief presentation by each member of the symposium, interaction among presenters and the audience is expected. A *symposium proposal* should include: 1) an abstract, and 2) a double spaced, Introduction which describes the research focus of the symposium, the research interests and professional backgrounds of symposium members *without naming the individuals* (maximum of two pages), and 3) a three to six page, double spaced, synopsis with bibliography (not counted into the six pages) of each paper proposed for presentation by a symposium member. This should be stapled together as a unit in the upper left corner.
 - 6. Round Table Discussions:** Round Table Discussions are used to provide a thorough analysis of one or more papers by a group of researchers. Presenters have an hour in which various aspects of the study are examined by others, the round table panel, in a discussion format. The researcher must provide round table panel members with a copy of the paper at least *two months* prior to the annual meeting. In addition, they are expected to bring materials such as protocols, instruments, computer printouts, experimental curriculum materials, and logs to aid in the discussion. A *Round Table Proposal* should include: 1) an abstract, 2) a three to six page, double spaced synopsis (objectives or purpose of the study, significance, design and procedures, findings or results, and conclusions) with bibliography (not counted into the six pages) of the research paper to be discussed, and 3) a description of each round table member, including their varied backgrounds, and respective research expertise, *without naming the individuals* (maximum of two pages). These materials should be stapled together as a unit in the upper left corner.
- All proposals will be reviewed anonymously by the

members of the Program Committee. The following criteria will be applied during the proposal reviews.

Significance of the program and conclusion for the advancement of research in science education as evidenced by the link to or departure from previously published research theories, methods, or conclusions.

Clarity of expression.

Appropriateness of the procedures and conclusions, given the stated purpose and results.

Adherence to the proposal preparation criteria presented herein, *including the deadline*.

An individual may present in only one contributed paper or paper session at the Annual Meeting but may be listed as a co-author on other papers and may participate in a symposium, round table, seminar/workshop as well as serve as a presider or a discussant. Presenters are strongly encouraged to stimulate discussion around their presentations. Overhead projectors and screens will be provided. Participants needing other equipment are expected to provide that equipment. All presenters *must register* at the NARST meeting.

PROPOSAL SUBMISSION

Persons wishing to submit proposals need to send:

1. Two (2) copies of the completed cover page (provided at the back of the newsletter).
2. Six (6) copies of the proposal *as described under the respective concurrent session type* above. Please omit the name(s) and identifying information about the proposer and other session participants.
3. Two (2) *additional copies* of an abstract of more than 500 words for *concurrent sessions* and all *symposia*. The abstracts of accepted sessions and symposia will be published in the collection of NARST abstracts, so form and accuracy are important. Please omit author name(s) and other identifying information.
4. Two (2) self-addressed, stamped, envelopes which will be used to acknowledge receipt of the proposal and the Program Committee's final decision.
5. Two (2) 3 × 5 inch typed cards containing name, address, and telephone (Fax and Bitnet, if possible) numbers of the individual proposing the concurrent session as well as the title of the session.

Send this material to: Dr. Russell Yeany, Chair; NARST Program Committee, School of Teacher Education, 320 A Aderhold Hall, University of Georgia, Athens, GA 30602.

DEADLINE: MATERIALS MUST BE POSTMARKED NO LATER THAN OCTOBER 1, 1990

U.S. Senate Hears Testimony From BSCS

Colorado Springs, Colorado, 30 April 1990)... In the early 1980s, *A Nation At Risk*—with its statement of impending national catastrophe—engaged the public in debates about the quantity and quality of education. By the end of the decade, *A Nation At Risk* had spawned more than three hundred additional reports that addressed different aspects of education and recommended improvements. The clear message was an imperative to improve American education. Current legislation before the U.S. Senate is directed toward achieving that goal.

The Senate Committee on Labor and Human Resources invited Dr. Rodger W. Bybee, associate director of the BSCS, to give testimony at a 19 April hearing on The Excellence in Math, Science, and Engineering Act of 1990 (S.2114). The Labor Committee, chaired by Senator Edward M. Kennedy is holding a series of hearings on S.2114 to consider recommendations from the science community concerning the bill. This bill designates the 1990s as the decade of Excellence in Math, Science, and Engineering education, with the goal of achieving significant improvement by the year 2000. Title I sets forth national objectives and policies. Title II upgrades the scientific and technical literacy of the general public. Title III strengthens the professional development of scientists and engineers. Title IV stimulates the education, training, and retraining of technologists. Title V increases the participation of women and minorities in math, science, and engineering. Title VI provides for continuing evaluation of the specific programs in the act, and authorizes \$125 million for fiscal year 1991, and such sums as necessary through fiscal year 2000.

Dr. Bybee was asked to direct his remarks at the hearing toward the current ecological crisis, which was highlighted by the nationwide observance of Earth Day 1990.

As we celebrate the 20th anniversary of Earth Day, our attention is drawn to complex problems, such as global warming, ozone depletion, deforestation, and species extinction. We also hear about the dismal achievement of American students in science and mathematics. There is a confluence of crises. Americans are not number one in biology, chemistry, and physics achievement. But, Americans are number one in the world in carbon emissions, waste materials, and energy use. The nation most responsible for large-scale environmental degradation is populated by citizens whose poor science background renders them incapable of understanding the ecological basis of that degradation or of participating knowledgeably in the development of solutions.

Dr. Bybee's testimony delineated four major areas of formal and informal education that need particular emphasis in the next decade. These areas are global environmental problems, middle-level education, implementation of exemplary programs, and women and minorities. In each of those four areas, new issues have emerged to challenge long-standing values and assumptions. Education has not kept pace with the resulting changes. The time is opportune for establishing new goals and working toward those goals in the coming decade.

In his opening remarks at the hearing, Senator Ken-

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NARST Award for Distinguished Contributions to Science Education Research

The National Association for Research in Science Teaching seeks to improve Science Education through research. To this end the Association desires to recognize individuals who have made significant contributions to Science Education through research. Contributions may be of several types, including but not limited to empirical, philosophical or historical research, evaluative studies, policy-related research and studies reflecting new techniques to be applied in research. To be considered over a period of at least 15 years and should be at the pinnacle of his or her career.

The award will be made to an individual who has over a period of 15 or more years: 1) made a continuing contribution to Science Education through research; 2) provided notable leadership in Science Education through research; and 3) had a substantial impact on Science Education through research.

This award is intended to be the highest recognition NARST can bestow for contributions to Science Education through research. The award will be bestowed only when a superior candidate has been identified by the awards committee.

To apply, a nominator or candidate should submit 10 copies of the following:

1. a cover letter, not to exceed 5 pages in length, describing the nature of the contributions of the individual, including specific documentation as to why these contributions are considered outstanding and substantive;
2. up to five letters of support, each not to exceed two pages in length, which provide evidence of extraordinary contributions of the individual; and
3. a curriculum vita including a complete list of publications and accomplishments.

Dr. Donald W. McCurdy, Chairperson, NARST Awards Committee

Department of Curriculum and Instruction
Room 211 Henzlik Hall
University of Nebraska-Lincoln
Lincoln, NE 68588-0355

Deadline, January 15, 1991

International Call for Papers

The Third International Consortium for Research in Science and Mathematics Education will be held in Merida, Yucatan, on February 25-27, 1991. This Consultation is jointly sponsored by the University of Florida,

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Submissions Invited —

1990 NARST Outstanding Paper Award 1990 NARST Practical Application Award

Each year at the annual meeting of the Association the NARST Awards Committee identifies persons to be recognized by the organization whose papers, presented at the meeting of the preceding year, are judged to be outstanding in one of each of two areas:

Contributions to science education research and Practical applications of research to classroom practice.

The NARST Awards Committee invites all persons who presented papers at the 1990 meeting in Atlanta, GA to submit copies of the complete paper and abstract for consideration for the Outstanding Paper Award or for the Practical Application Award. These awards will be presented at the next NARST meeting in Chicago.

The papers in each category will be judged on (1) significance of the problem investigated, (2) conceptual background, (3) research approach, (4) methodology, (5) significance of outcomes, (6) conclusions, (7) communication of information, and (8) overall uniqueness. Additionally, the papers submitted for the Practical Applications Award will be judged on (9) evidence of practical applications for practitioners.

Please send, **by September 15, 1989**, the eight (8) copies of your paper and abstract (a copy of the abstract needs to accompany each copy of the paper), a cover sheet of information including:

Name, Address with zip code, Telephone numbers, Request for review for the Outstanding Paper Award *or* Practical Application Award and a self-addressed post card (which will be returned to you upon receipt of your materials) to:

Dr. Lowell J. Bethel, Science Education Center, The University of Texas at Austin, Austin, TX 78712, (512) 471-3488.

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nedy stated that "... increasingly, citizens must make choices that demand a knowledge of science. For democracy to function effectively in an increasingly technological age, citizens must be comfortable with the science involved in the choices facing the nation." For thirty-one years, BSCS has been committed to providing leadership in science education through the development of programs that attempt to promote change in content and pedagogy. Indeed, BSCS was founded during the reform movement of the late 1950s and early 1960s and responded with programs that revolutionized the teaching of life science, both in the United States and abroad. BSCS is again being called upon to help set the course for improving the quality of science education.

NARST

LEADERSHIP DIRECTORY

National Association for Research in Science Teaching

1990-1991

CALENDAR

NARST MONOGRAPHS AVAILABLE

A Theory of Instruction: Using the Learning Cycle to Teach Science Concepts and Thinking Skills, A. Lawson, M. Abraham, and J. Renner, \$6US

Learning Environment Research in Science Classrooms: Past Progress and Future Prospects, B. Fraser, \$6US

Send orders with check payable to NARST to Glenn C. Markle, NARST Executive Secretary, College of Education, University of Cincinnati, Cincinnati, OH 45221-0002

NARST Monographs Order Form

Please send me the following:

____ copy(ies) of *A Theory of Instruction* at a cost of \$6US each

____ copy(ies) of *Learning Environment Research in Science Classrooms* at a cost of \$6US each

Name: _____

Address: _____

ZIP _____

NARST News	June 1, 1989
First Call for Proposals for 1989	June 1, 1989
NARST Annual Meeting	
NARST News Submission Deadline	August 1, 1989
NARST News	September 1, 1989
Second Call for Proposals for 1989	September 1, 1989
NARST Annual Meeting	
Deadline: Submission for Outstanding Paper and Practical Application Paper Awards	September 15, 1989
Deadline: Proposals for 1989 NARST Annual Meeting	October 1, 1989
Fall Board Meeting (Tampa, FL)	November 3-4, 1990
NARST News Submission Deadline	November 1, 1989
NARST News	December 1, 1989
Payment of 1989 Dues	January 1, 1990
Deadline: Nominations for Distinguished Contributions to Science Education Research Award	January 15, 1990
Elections Ballots Distributed	January 8, 1990
Return of Ballots	February 9, 1990
NARST News Submission Deadline	February 1, 1990
NARST News	March 1, 1990
Deadline: Pre-Registration for NARST Annual Meeting	March 15, 1990
AERA Annual Meeting (Chicago)	April 10-14, 1991
NSTA Convention (Houston)	
NARST Annual Meeting (Chicago)	April 7-10, 1991
NARST News Submission Deadline	May 1, 1990

NATIONAL ASSOCIATION for Research in Science Teaching

Officers and Committee Members for 1990-1991

President

Jane Butler Kahle
418 McGuffey Hall
Miami University
Oxford, OH 45056
(513) 529-1686

President-Elect

Russell Yeany
Department of Science Education
The University of Georgia
Athens, GA 30602

Immediate Past President

William G. Holliday
Curriculum and Instruction
Benjamin Building
University of Maryland
College Park, MD 20742
(301) 454-7346

Board Members

Hans Anderson (1996)
NSTA
1742 Connecticut Ave., NW
Washington, DC 20009
(202) 812-

Lowell J. Bethel (1991)
Science Education Center - EDB 340
The University of Texas at Austin
Austin, TX 78712
(512) 471-3488

Dorothy Gabel (1993)
School of Education
Indiana University
Bloomington, IN 47405
(812) 335-8658

Thomas R. Koballa, Jr. (1993)
EDB 340 Science Education Center
University of Texas at Austin
Austin, TX 78731
(512) 471-7354

Donald W. McCurdy (1992)
211 Henzlik Hall
University of Nebraska
Lincoln, NE 68585
(402) 472-3155

Robert Sherwood (1991)
College Box 4, Peabody College
Vanderbilt University
Nashville, TN 37203
(615) 322-8070

Kenneth G. Tobin (1992)
Science Education
Florida State University
Tallahassee, FL 32306
(904) 644-2792

Executive Secretary

Glenn Markle
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Editor, Journal of Research in Science Teaching

Russell Yeany
Department of Science Education
The University of Georgia
Athens, GA 30602
(404) 542-1763

Editor-Appointed, Journal of Research in Science Teaching

Ronald G. Good
Department of Curriculum
and Instruction
Louisiana State University
Baton Rouge, LA 70803
(514) 388-2331

Editor, NARST News

Thaddeus W. Fowler
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-3583

Research Coordinator

Frances Lawrenz (1992)
370 Peik Hall
University of Minnesota
Minneapolis, MN 55455
(612) 625-2046

Financial Advisory Committee

Chairperson

Robert Sherwood (1991)
Department of Teaching and Learning
Peabody College, Box 30
Vanderbilt University
Nashville, TN 37203
(615) 322-8070

Members

Dorothy Gabel (1993)
School of Education
Indiana University
Bloomington, IN 47405
(812) 335-8658

Stanley L. Helgeson (1991)
Educational Studies: Science Education
The Ohio State University
Columbus, OH 43210
(614) 292-5381

Donald W. McCurdy (1992)
211 Henzlik Hall
University of Nebraska
Lincoln, NE 68585
(402) 472-3155

Douglas A. Roberts (1991)
EDCI, Ed. T 702
University of Calgary
Calgary, Alberta
T2N 1N4 Canada
(403) 220-5632

Glenn Markle (ex officio)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Committee Charge

The Financial Advisory Committee is responsible for considering the annual budget prepared by the Executive Secretary, approve program expenses, approve publication costs and new ventures, offer advice and recommendations to the Executive Board regarding all financial affairs of the Association, and conduct an annual audit of the financial accounts of the Association.

The members include a chairman (three year term) three members (with rotating terms) and the Executive Secretary (ex officio).

Publications Advisory Committee

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Kenneth G. Tobin (1992)
Science Education
The Florida State University
Tallahassee, FL 32306
(904) 644-2799

Members

Marianne Betkouski Barnes (1993)
Education/Curric. & Instruc.
University of N. Florida
Jacksonville, FL 32216
(904) 646-2578

Herbert K. Brunkhorst (1992)
School of Education
California State University
San Bernadino, CA 92407
(714) 887-7885

J. Preston Prather (1991)
The University of Tennessee at Martin
Rm. 205H, Gooch Hall
Martin, TN 38238
(901) 587-7166

Ronald G. Good (ex officio)
Department of Curric. & Instruc.
Louisiana State University
Baton Rouge, LA 70803
(504) 388-2331

Committee Charge

The Publication Advisory Committee is responsible for establishing policy concerning the newsletter, the journal, and special publication ventures of the Association; reviewing arrangements with editors of publications; and suggesting changes in yearly publication practices of the Executive Board.

The members include a chairman (three year term), three members (with rotating terms), and the Editor, (ex officio).

Policy Advisory Committee

Chairperson

William Holliday (1991)
Curriculum and Instruction
Benjamin Building
University of Maryland
College Park, Maryland 20742
(301) 454-1512/490-0599

Members

Heidi Kass (1993)
Dept. of Secondary Education
University of Alberta
Edmonton, Alberta
T6G 2G5 Canada
(403) 432-5415

Dr. John J. Koran, Jr. (1991)
Associate Dean
Graduate School
University of Florida
Gainesville, FL 32601
(904) 392-4646

Glenn Markle (ex officio)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Committee Charge

The Policy Advisory Committee is responsible for annually reviewing the Bylaws, changes in structure or orientation of the Association, and reviewing new activities or ventures of the association.

Research Committee

Chairperson

Frances Lawrenz (1992)
370 Peik Hall
University of Minnesota
Minneapolis, MN 55455
(612) 625-2046

Members

Kathryn F. Cochran (1993)
Div. of Research, Eval. & Devel.
University of Northern Colorado
Greeley, CO 80639
(303) 351-2807

Joseph S. Krajcik (1991)
University of Michigan
Ann Arbor, MI 48109
(313) 747-9497

Bruce Perry (1993)
Miami University
McGuffey Hall
Oxford, OH 45056
(513) 529-2820

Patricia Simpson (1993)
Biology Department MS 224
St. Cloud State University
St. Cloud, MN 56301-4498
(612) 255-3012

David R. Sronck
School of Education
California State University-Hayward
Hayward, CA 94542
(415) 881-3385

Glenn Markle (ex officio)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Committee Charge

The Research Committee is responsible for preparing yearly reviews of research in science education, working closely with the ERIC Center and recommending needed areas of research, research symposia, and training programs.

The membership of this committee consists of the chairmen and three members with two year rotating terms. The Executive Secretary is an ex officio member of the committee.

Election Committee

Chairperson

William Holliday (1991)
Curriculum & Instruction
Benjamin Building
University of Maryland
College Park, MD 20742
(301) 454-1512/490-0599

Members

Dale Baker (1991)
Department of Curriculum & Instruction
Arizona State University
Tempe, AZ 85287-1911
(602) 965-2705

Rodney L. Doran (1991)
553 Baldy Hall
SUNY at Buffalo
Amherst, NY 14260
(716) 636-2461/839-9710

Committee Charge

The Nominating Committee is responsible for establishing the slate of officers for each election four months prior to the date of the Annual Meeting, making arrangements for preparation and distribution of ballots three months prior to the date of the Annual Meeting, tabulating election results, notifying candidates of the outcome of the election a month prior to their assuming office, announcing election results at the Annual Meeting, and arranging for installation of new officers and transfer of responsibilities of the Executive Board for the Association.

The members of this committee shall consist of the immediate Past President as chairman and two members with one year terms.

Program Committee

Chairperson

Russell H. Yeany (1991)
212 Aderhold Hall
University of Georgia
Athens, GA 30602
(404) 542-1763/546-0420

Kathleen Fisher
Center for Research in Science Ed.
San Diego State University
San Diego, CA
(619) 594-4453

Alejandro Gallard
College of Education
Dept. of Curriculum & Instruction
The Florida State University
Tallahassee, FL 32306
(904) 644-2792

Peter W. Hewson (1992)
University of Wisconsin
225 N. Mills St.
Madison, WI 53706
(608) 263-4639

Warren Tomkiewicz (1993)
Natural Science Department
Plymouth State College
Plymouth, NH 03264
(603) 536-5000

Victor L. Wilson (1992)
Educational Psychology
Texas A&M University
College Station, TX 77840
(409) 845-1808

Frances Lawrenz (ex officio)
370 Peik Hall
University of Minnesota
Minneapolis, MN 55455
(612) 625-2046

Glenn Markle (ex officio)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Committee Charge

The Program Committee is responsible for establishing the theme and format for the Annual Meeting, arranging for special speakers and symposia, and evaluating abstracts for contributed papers, and the evaluation of the Annual Meeting. Additionally, a Local Arrangements Committee may be established.

The membership of this committee consists of the President-Elect as chairman, six members on two year rotating terms and as ex-officio members, the Research Coordinator and the Executive Secretary.

Distinguished Contribution Award Committee

Chairperson

Donald W. McCurdy (1992)
211 Henzlik Hall
University of Nebraska
Lincoln, NE 68585-0355
(402) 472-3155

Members

Michael R. Abraham (1991)
Department of Chemistry & Biochemistry
University of Oklahoma
Norman, OK 73019-0370
(405) 325-4981

Julia V. Clark (1993)
Curriculum & Instruction
Texas A & M University
College Station, TX 77843
(409) 845-8051

George E. DeBoer (1993)
Education
Colgate University
Hamilton, NY 13346
(315) 824-1000

Kathleen A. O'Sullivan (1992)
Department of Secondary Education
San Francisco State University
1600 Holloway Ave.
San Francisco, CA 94132
(415) 338-1240

Donald E. Riechard (1991)
Educational Studies
Emory University
Atlanta, GA 30322
(404) 727-6468

Burton E. Voss (1993)
School of Education
University of Michigan
Ann Arbor, MI 48109
(313) 747-0594

Glenn Markle (ex officio)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

JRST Awards Committee

Chairperson

Lowell J. Bethel (1991)
Science Ed Center - EDB 340
The University of Texas at Austin
Austin, TX 78712
(512) 471-3488

Members

Angelo Collins (1991)
CERAS 507
Stanford University
Stanford, CA 94305
(415) 723-5740

Frank E. Crawley (1992)
Science Education Center EDB 340
The University of Texas at Austin
Austin, TX 78712
(512) 471-7354

Diane Ebert-May (1993)
Science & Mathematics Learning Center
University of Northern Arizona
P.O. Box 5697
Flagstaff, AZ 86011-5697
(602) 523-7160

Steven W. Gilbert
College of Sciences and Humanities
Department of Biology
Ball State University
Muncie, IN 47306-0440
(317) 285-8820

Norman Lederman (1993)
Department of Science and Mathematics
Education
Oregon State University
Corvallis, OR 97331
(503) 737-4031

Karen K. Lind
School of Education
University of Louisville
Louisville, KY 40292
(502) 588-6431

Thomas R. Lord
Department of Biology
114 Weyandt Hall
Indiana University of Pennsylvania
Indiana, PA 15705
(412) 357-2484

Julie Newsom (1993)
Department of Science & Math Education
Oregon State University
Corvallis, OR 97331
(503) 737-4031

John C. Park (1991)
Mathematics and Science Education
Campus Box 7801,
North Carolina University
Raleigh, NC 27695

Ronald J. Raven (1993)
53 Wellingwood Drive
East Amherst, NY 14051
(716) 688-9268

Patricia Simmons (1993)
University of Georgia
212 Aderhold Hall
Athens, GA
(404) 542-1763

Sarah L. Ulerick (1993)
The Florida State University
Science Education
414 Education Building
Tallahassee, FL 32306
(904) 644-2792

Arthur L. White (1993)
252 Arps Hall
The Ohio State University
Columbus, OH 43210
(614) 292-8061

NARST Awards Committee

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Science Educ. Center EDB 340
University of Texas at Austin
Austin, TX 78712
(512) 471-7354

Members

Mary Atwater (1992)
212 Aderhold Hall
Department of Science Education
University of Georgia
Athens, GA 30602
(404) 542-1763

Heather Brasell (1991)
P.O. Box 6A
Alapaha, GA 321622
(912) 532-7665

Larry G. Enoch (1992)
College of Education
Kansas State University
Manhattan, KA 66502
(913) 532-5797

David Harmon (1991)
RESA IV
300 Main St.
Summerville, WM 26651
(304) 872-6440

Pat Heller
370 Peik Hall
University of Minnesota
Minneapolis, MN 55455
(612) 625-0561

Gail Jones
University of North Carolina at Chapel Hill
CB 3500, Peabody Hall
Chapel Hill, NC 27599-3500
(919) 966-3291

Paul H. Joslin (1993)
Graduate School of Education
Drake University
Des Moines, IA 50311
(515) 271-2114

Mary Lee Martens (1993)
East Williston Schools
110 East Williston Avenue
East Williston, NY 11596
(516) 379-7982

Sandra Y. McGuire (1991)
Alabama A & M
6506 Green Meadow Rd.
Huntsville, AL 35810
(205) 859-7328

Carole Mitchener (1993)
Department of Educational Studies
University of Missouri-St. Louis
206 Marillac Hall
St. Louis, Missouri 63121
(314) 256-0091

Larry Yore (1991)
University of Victoria
P.O. Box 1700
Victoria, BC, V8N 2Y2
Canada
(604) 721-7766

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New York University
Department of Mathematics, Science, and
Statistics Education
933 Shimkin Hall
50 West 4th Street
New York, NY 10003
(212) 998-5208

Members

Glen Aikenhead (1992)
Faculty of Education
University of Saskatchewan
Saskatoon, Saskatchewan
S7N 0W0 Canada
(306) 343-3892

Saouma BouJaoude (1992)
Syracuse University
Department of Science Teaching
101 Heroy Geology Lab
Syracuse, NY 13244-1070
(315) 443-9137

Reinders Duit (1992)
Institute for Science Education
The University of Kiel
Olshausenstr. 62
D 2300 Kiel 1
Federal Republic of Germany
49-431-880-3145

Geoff Giddings (1992)
Curtin University of Technology
PO Box 41987
Perth, WA, Australia 6001
61-9-351-2192

Avi Hofstein (1992)
The Weizmann Institute of Science
Science Teaching Department
PO Box 26
Rehovot, 76100, Israel

Doris Jorde (1992)
Centre for Science Education
University of Oslo
P.O. 1099 Blindern
0316, Oslo 3 Norway
02-45-5070

Representative to the Triangle Coalition

Patricia Blosser
Science Education Department
College of Education
The Ohio State University
Columbus, OH 43210
(614) 292-5381

Representative to the International Council of Associations for Science Education (ICASE)

Paul D. Hurd
549 Hilbar Lane
Palo Alto, Ca 94303
(415) 327-3805

Representatives to the American Association for the Advancement of Science

Section X

Elizabeth Stage (1991)
University of California
359 University Hall
Berkeley, CA 94720
(415) 643-8892

Section Q

Glenn Markle (1991)
College of Education
University of Cincinnati
Cincinnati, OH 45221-0002
(513) 556-2332

Two of the Leading Problems Facing Researchers in Science Teaching

William G. Holliday,
University of Maryland at College Park

Text of Remarks
NARST President Banquet Speech
April 10, 1990, Atlanta

I want to talk this afternoon about two of the leading problems facing today's researchers in science teaching; that is, my concern about our weak relationships with influential social scientists outside of science education and our pitiful influence on classroom practice.

First, we researchers in science teaching must wake up to the fact that we are becoming increasingly *isolated from other social scientists*—competent scholars whose work is focused outside of science education—the ones with increasingly *more* political and scholarly influence in our field.

These social scientists are beginning to increasingly set the research agenda in science education by controlling the funding agenda while some of us appear stuck in our own little, isolated worlds and while still some others appear stuck in the research and funding models of the *sixties* and not the *nineties*.

This first leadership problem is serious—that is how can we improve our political and scholarly positions in a world where we are becoming *less relevant*?

There are many things that are needed. Let me just make three recommendations.

First, the National Association for Research in Science teaching (NARST) needs to develop a closer relationship with the American Educational Research Association (AERA) as it has very successfully done with the National Science Teachers Association (NSTA). The time is right. The time was not right ten years ago. But, it is right today.

It is just as important to interact with other social scientists as it is to interact with science school teachers and physical science university professors.

At any rate, our influence is increasing at NSTA while our networking at AERA remains unsatisfactory. During the past 20 years, I've heard perhaps 40 people say something about this problem of *weak liaison* but no one is putting any *real effort*—personally or institutionally—into helping bind these two associations closer together.

I've met with Bill Russell, the executive director of AERA and talked to some other AERA officers *but I've not*—nor has anyone else—acted in a *clear and deliberate fashion* to establish substantive projects, joint ventures or affiliations.

Now is the time. If you believe that NARST should increase its interaction with

AERA, then write the NARST board of directors—address your correspondence to Jane Kahle—a letter expressing your feelings on this issue.

The board would also appreciate a suggestion or two and perhaps a name of an influential person of your acquaintance and your help, if possible, in bringing AERA people familiar to you closer to us. But, if you don't know AERA people and don't have any particular suggestion, write the board anyway.

NARST needs to stop talking about interaction with AERA people and start acting in some concrete fashion. Just write the board—within the next 30 days, before you forget. Write a short letter. Let the board know how you feel. This kind of grass roots effort—I believe—is most likely to be effective.

A second attack on this leadership problem of better integrating ourselves with the social scientists' scholarly community or network is to focus additional attention—each of us as individuals—on some of their prominent journals.

One of the problems with some of the articles appearing in the *Journal of Research in Science Teaching* (JRST) is that there are clear signs of *excessive inbreeding*—referencing too many of our own works in science education and our closest colleagues while neglecting important relevant works appearing in excellent journals outside of our field—works that would add cogency to our arguments—rationales arguing for internal and external validity of our naturalistic and non-naturalistic work (see Holliday, March, 1990, issue of the *NARST Newsletter*). I'm talking about arguments presented in the introductions of many JRST manuscripts.

Yet, school subject research journals—like those in mathematics, reading and writing—reference a broad range of general journal articles including articles published in our journal—JRST.

So what journals might we begin targeting? We all have our favorites—depending on our experiences. Let me recommend a few familiar to most of us.

Here are some non science education journals of a general nature that many of us read regularly but many more of us should be reading.

First, AERA's *Educational Researcher*—perhaps the most widely read educational research publication in the world—most often read by the educational leadership and AERA's *Review of Educational Research*—consistently a publication that provides good summaries of research and theory of particular interest to non science education researchers. (Postscript: I also recommend AERA's Volume 16 of *Review of Research in Education*, that just arrived in the mail—May 22, 1990. It covers many current research issues in science education.)

Another source is the American Psychological Association's (APA's) *American Psychologist*, like the October 1986 issue that every science educator should have read. It is still worth reading today. This publication reaches the offices of the leading

social scientists—researchers with greater influence than most realize.

In addition, APA's *Journal of Educational Research* is worthy of regular reading because it is one of the clearest and most respected quantitative educational research journals available, again containing articles that should be cited in quantitative and *qualitative* manuscripts submitted to JRST.

A third set of publications is Erlbaum's two journals, *Cognition and Instruction* and *Cognitive Psychologist*. Both publications print typically lengthy manuscripts describing quantitative and qualitative research of exceptional significance and influence. Few of us even read these publications much less publish in them. In contrast, research people in writing and reading, and, yes, mathematics education do publish in Erlbaum journals and books.

By the way the latest issue (1990, issue one) of *Cognition and Instruction* contains three articles, two of them describe learning and instructional research focusing on science students. Both articles are well worth reading.

Let me reiterate a partial solution to the first problem at this point. It is to increasingly interact with influential social scientists. My recommendations include greater AERA connectedness—that means I hope that you write a letter to the NARST board if you are serious about getting closer to AERA.

Let me prime the pump. I'll promise to write a letter to the NARST board as a member of NARST, not as an officer of NARST, but as a member before the end of the month. Please join me.

By the way three or six letters from the membership on this issue is not going to have a significant effect, that is to move our board or most any other board for that matter. Boards with memberships of our size need to see 20 or 30 letters "to guarantee" substantive action.

Second, read, cite and *occasionally* publish in influential journals outside of field of science education.

Third, we need to apply and interact with vigor—apply and influence research funding agencies and become more influential and less complacent and even less proactive—if that is possible.

We are dead in the water on this issue. None of us are—as a group—substantially influencing research funding. I'm not talking about developmental funding. I'm talking about research funding. Of course, both are important.

But, we are doing what some of us might call our fair share, frankly belly aching and finding a variety of ways to divert our attention while just following the agenda of others who are writing our research and funding agendas—people who, unfortunately, don't always know what they are talking about.

We need to—as individuals—interact with politicians who are making decisions—politicians, elected and appointed, and their staff people at the local, state, province and federal levels.

We need to identify where the money is

going, identify who is making the decisions and develop ongoing strategies for professional dialogs with key people in influential associations, like AERA and NSTA.

Here's an example of one thing that needs doing. We need to apply for some of these influential grants, for example, the OERI (Office of Educational Research and Improvement) grant for a science teaching and learning center. I have some of the materials up here, if you are interested. (Postsript: see Willis Hawley's [a social scientist from Vanderbilt who has the reputation for understanding the Washington, D.C. funding game] frank commentary on OERI and related topics in the *Educational Researcher*, May 1990, page 17 to 22.)

A second leadership problem we have as researchers in science teaching is our pitiful influence on classroom practice, as partly described by Prawat in his 1989 *Review of Educational Research* articles. Richard Prawat is a social scientist but not a science educator. He's from Michigan State University. I recommend that you read his article.

We need to work with scientists and science teachers by acting like leaders in science teaching rather than followers, by proving to science teachers that our research has relevance, by pointing to readable applied publications that validly and clearly describe what research has to say about improving science teaching.

We also need to make presentations to these colleagues that capture their attention and compel them to listen and accept our notions of how research can improve science teaching while listening and accepting their feedback to our guidance.

I contend, that we don't have, for example, a single exemplary publication available providing convincing and colorful arguments about how research can help teachers improve their science teaching. We can not, for example, point to a publication that talks to science teachers, and other intelligent and concerned citizens about research's impact on science teaching with the same secure sense as can reading researchers. They can point to the 1985 IRA (International Reading Association) publication, *Becoming a Nation of Readers*, a 150-page paperback written by researchers in reading education and professionally edited. What an impact this book has had on practice during the mid and late eighties.

Reading researchers need to revise this publication because of recent development in learning strategies. For example, reciprocal teaching is a classroom dialog strategy, promoted and described in *Becoming a Nation of Readers*—actually a series of four strategies—that are proving to be sometimes inflexible under classroom conditions and inconsistent with the apparent processes used by some good performers—according to an excellent 1990 article in *Educational Psychology Review* (Pressley, M., Woloshyn, V., Lysynchuk, L.M., Martin, V., Wood, E. & Willoughby T., "A primer of research on cognitive strategy instruction: The important issues and how

to address them." pages 1-58), on cognitive strategy instruction. I have a copy of that article up here.

If you have an interest in cognitive strategy instruction, I also recommend that you read a 38-page in press article in a journal of increasing quality over the past decade—*Elementary School Journal* (Lysynchuk, L.M., Pressley, M., & Vye, N.J. "Reciprocal teaching improves standardized reading comprehension performance in poor grade-school comprehenders").

Nevertheless, the book has stimulated discussions among researchers in reading and writing while leading and clarifying the classroom implementations of research on practice. Each chapter discusses researched topics and cogently and comprehensively lists supporting references. Concerned and intelligent parents can also get a great deal from this book.

Isn't the reading domain fortunate that the culture of reading education—including classroom teachers and reading professors—places a significant importance on research and its application to classroom practice?

Of course, reading and science education admittedly are different. They are very, very different. But, there are similarities that can help us to capitalize on selected successes of IRA with the goal of influencing science teaching.

In the early eighties, the IRA's tabloid equivalent to *NSTA Report!* described a survey of the IRA membership. Surveyed members sorted about a dozen memberships services in terms of importance to them. You can probably guess the one that ranked first, successful teaching techniques used by successful reading teachers.

No surprise. The surprise—not to reading education people but perhaps to science education people—is more likely the second ranked service among reading people, provides researched-based information designed for teacher consumption.

Can you imagine an equivalent survey at NSTA resulting in research ranking in second place—second place out of 12 possible positions? I can't. The importance of research in science teaching would seemingly rank far down an NSTA survey list or any other science teacher association, like AAPT, NABT or ACS, in my opinion. The reason I reference NSTA is because it has been the most successful science teacher association—successful in establishing productive grassroots links to practicing school teachers.

You would think that a school subject like science—where research is central to the procedural knowledge of the field—would naturally and without question relish the importance of research with teachers demanding that associations like NSTA produce numerous applied research articles in their teacher-oriented publications.

But, NSTA and other science teacher associations—for many reasons of tradition and current politics do very little to promote and nurture the research element, unlike the International Reading Association.

In addition to IRA's research-based paperbacks of good quality, they publish research-based articles for teachers in their periodicals, including *The Reading Teacher* and the *Journal of Reading*. For example, Suzanne Wade, a major researcher has authored an excellent article—the lead article in the March 1990 issue (pages 442-451) of *The Reading Teacher*—IRA's equivalent to NSTA's *Science and Children*. You ought to read it when you return to your home institution.

This article provides teachers with clearly expressed and valid descriptions of recent instructional research in ways that assume that teachers have brains—brains enough to understand the theory-based explanations presented in her article.

Professor Wade also cites 28 works in her article designed for teachers—mostly of high caliber—28 articles and books that add to the persuasive power of her scholarly yet readable explanations.

Science teacher associations seldom if ever, have published such impressive scholarly-based work designed for practitioners. Science teachers are being short changed.

What can NARST do to encourage the influence of research on classroom practice beyond our current efforts?

Well, we need to take a more active role by working with teacher associations, producing products and implementing processes that integrate research-based knowledge with experienced teacher know-how. This can be done first at gatherings of preservice and inservice science teacher groups.

We need to talk more convincingly about how research can influence practice. In this regard, I recommend that you read the November 1989 issue of the *Phi Delta Kappan* magazine, especially the articles (pages 200-205) by J. Myron Atkin, an informed writer, and the article (pages 212-214) by Nat Gage and Dave Berlinger on blending research and teacher experience. Teacher experience is just as important as research. The problem is that research is getting short shrift.

Second, we need to work through sophisticated teacher-oriented publications, and third, we need to encourage school administrators and the public to provide teachers with school time to read, discuss and make substantiated research findings become classroom realities, in ways discussed in our recent *NARST Newsletters*.

Again, NARST needs to work with its university colleagues by establishing teacher education programs that provide preservice teachers with both technological and intellectual backgrounds in science education, as do education programs in medicine and law.

Today, many science methods courses are limited to providing preservice teachers with a bare-bones, first-aid style curriculum on how to get through the school day—with too little attention focusing on the integration of research-based knowledge with clinical experiences.

In the future, universities must train

teachers to read research, and apply its practical and sustainable findings to classroom contexts.

Second, NARST also needs to convince teacher associations to commit substantial resources toward research-based projects such as increasing the editorial staff responsible for working with authors of research-based pieces like IRA does. This action can facilitate the creation of exemplary research-based publications in our field.

Historically, this has proven to be a difficult task, as evidenced by the publication of some unreadable works of questionable validity. Reading has its proud publications including *Becoming a Nation of Readers*. Where are ours? We have very few.

I have contended that we need an analogous publication, call it for now, *Becoming a Nation of Scientifically Literate People*. I'm talking about a well-referenced, scholarly based, readable and valid publication, like none other available in science teaching.

NARST also needs to inspire its membership to write manuscripts for teacher associations, presenting research-based knowledge in a useable form for today's busy teachers. These professionals cannot be expected to ferret out this practical knowledge from their libraries and integrate it into their teaching practices, given their inadequate university training in this regard and the unreasonable work loads currently demanded by their schools.

Third, we need to act on our own by getting to school administrators and the public—through press releases to the news media like *The Washington Post*, CNN news, MacNeil Lehrer's PBS daily news program and *Newsweek* magazine.

Let me comment on the latest edition (April 9, 1990) of *Newsweek* which features an analysis science teaching. In my opinion, this analysis is chock-full of folklore and lacks a research-based, balanced account of science teaching in today's schools, unlike previous *Newsweek* accounts of advances in the field of medicine. Such editions at least contain references to research in medicine. In contrast, the science teaching edition contains many statements without adequate foundation. A specific example of folklore is the inclusion of an incredible quote, "Einstein supposedly said that he'd learned half of his physics by age 3 (page 56)." Such statements are inconsistent with what modern-day social-cognitive models are suggesting about cognitive learning and, separately, cognitive development. But, *Newsweek's* out-of-balance and somewhat superficial account of science teaching seems to represent the norm in popular publications and the public's view in part perhaps because of our ineffectiveness as researchers in promoting the relevance of research to the public and practicing educators.

My point is that researchers need to take additional responsibility for the pitiful amount of cited research in these influ-

ential publications. Media people are crying for cogent and interesting material on how to improve science in the schools.

(*Postscript*: Also see *Education Week's* front page article, "2 science groups decide to tackle reforms together", April 18, 1990, where this publication highlights key statements made by two prominent science educators. Bill G. Aldridge representing NSTA and its Scope and Sequence curriculum said that, "We are letting [Project] 2061 tell us what ought to be taught." F. James Rutherford representing AAAS's Project 2061 responded saying that, "From our viewpoint, what they [NSTA] are doing is interesting." The point here is the lack of reference to research in science teaching which rests with *Education Week's* editorial department and us researchers, and not with these two leading science educators exchanging viewpoints about each others' curricular efforts.

Also see the May 1990 issue of *Phi Delta Kappan* where five well written articles on science teaching—all well written but authored by educators who seldom reference research-based information, except for the Shavelson, Carey and Webb article.

Also see *The Chronicle of Higher Education*, May 9, 1990 front-page lead article, "Science education seen in dire need of 'radical reform'" and follow up article, "A sampling of multidisciplinary science courses cited in the AAAS Report," page A16. The authors of these articles generally make good sense citing policy documents but fail to reference any research or, apparently, research-based documentation.

Also, the lead article in the latest edition of *The Reading Teacher* where two reading specialists from two small institutions talk to intelligent and experienced elementary school reading teachers about assessing students' attitudes. The authors include a cogent rationale for the instrument's construction and application for classroom usage, and technical information presented in the article's appendix—the instrument created by the authors and "drawn" by Mr. Jim Davis [creator of the cartoon character, Garfield], comprehensive administrative directions, normative tables based on 18,000 subjects, and finally, convincing information describing the instrument's validity and reliability. This final part was written for intelligent and experienced teachers with an academic background including one course in statistics. The article also cites 20 good-to-high quality publications including research-based works by Richard C. Anderson, Karen K. Wixson, Lee J. Cronbach, Michelene T.H. Chi, Thomas L. Good, Frank Smith and Herbert J. Walberg—major researchers known by experienced reading specialists and some teachers.)

What an opportunity for us to increase the role of research in science teaching by preparing news releases on timely topics, say in conjunction with successful grassroots science teacher organizations like NSTA. Again, I reference NSTA because

of its extraordinary competence in reaching very large numbers of practicing science teachers.

Bonnie Brunkhorst, the current president-elect of NSTA and professor, California State University at San Bernardino, is eager to share the facilities of her office to help us to publicize the importance of research in improving science teaching. What she needs is for articulate informed practicing researchers to come forward and offer to collaborate with her in producing news releases through NSTA's public relations system.

To Recap my message:

1. Thank you for your support over the years.
2. We need to get serious about leading rather than following in the trails made by other social scientists.

ONE: Read, cite and occasionally publish in scholarly journals outside of our field—like in *Cognition and Instruction*.

TWO: Write the NARST board arguing to improve our ties with AERA. I will get my letter to the NARST board before the end of the month.

THREE: Go for influential grants like the upcoming OERI center for science teaching and learning.

And, finally, the second leadership problem—let's be proactive and influence classroom practice by:

FIRST, convincing our pre- and inservice teachers that research can improve their teaching.

SECOND, publishing in applied magazines and persuading science teacher associations to commit resources to research-based activities. Don't let them fool you. We all know that research in science teaching is much more talk than action at science teacher associations, unlike teacher associations in reading, writing and mathematics education. I urge you to support the professional officers and salaried staff at science teacher associations who have the sense and the courage to begin making teacher experience, classroom context and research the basis for improving science teaching.

And, THIRD, let's get educational administrators and the public excited about research by going to the press—locally and nationally.

(The author appreciates the editorial and substantive advice provided by Bill G. Aldridge, National Science Teachers Association, and Ms. Laura M. Barden, University of Maryland at College Park.)

CALL FOR PAPERS!

Special issue of the *Journal of Research on Science Teaching* on

“The Research Issues of Science Curriculum Reform”

Editors: James A. Shymansky, William C. Kyle, Jr., and Deborah Muscella

PROPOSED FOCUS

We are now in the midst of major curriculum reform initiatives with efforts such as AAAS' "Project 2061", NSTA's "Scope, Sequence and Coordination" project and several joint NSF/publisher development projects. It is the purpose of this special issue to provide a forum for examining critical learning, teaching, and policy concerns related to science curriculum reform and development. Of particular interest are critical examinations of policies that promote teacher empowerment, issues surrounding alternative means of assessment, and factors that affect curriculum reform.

Current initiatives in reforming science curricula can be informed by research about how students construct their knowledge about science, effective ways to prepare teachers to use new pedagogy, and the influence of policy on curriculum reform at the classroom level. Reports of empirical research, case studies, position papers, reviews and other forms of scholarly work related to science curriculum reform are encouraged. To stimulate papers for the issue contributing authors may want to send for a copy of the report of the NSF sponsored meeting, "Setting A Research Agenda Related to Science Curriculum Reform" held in Atlanta, April 8, prior to the Annual Meeting of the National Association for Research in Science Teaching.

PROCEDURE

Persons wishing to receive a copy of the "Atlanta report" should write to J.A. Shymansky, 757 VAN, University of Iowa, Iowa City, IA 52242. Papers submitted for the special issue should be sent to the same address.

TIMELINE

- Papers due
November 1, 1990
 - Reviews returned
February 1, 1991
 - Revisions due
April 1, 1991
- Special issue will appear in Fall, 1991

1990 NARST Papers Wanted

NARST members who presented a paper at the 1990 annual meeting, held this past April in Atlanta, are invited to submit a copy of their paper to the ERIC Clearinghouse for Science Mathematics, and Environmental Education for inclusion in the ERIC database and for use by the author(s) of the 1990 review of research.

Documents used for the annual review of research consist of published materials in the form of journal articles, research reports, and papers presented at national and regional meetings. Papers fit into the category of fugitive literature in that they have a short lifetime and exist in limited supply. If papers presented at the MARST annual meeting are not retrievable, they do not form part of the research base for the review. Submitting a paper to ERIC does not preclude its eventual publication as a journal article.

Please send two copies of your 1990 NARST paper, and the copyright release form found in your book of

abstracts, to:

Acquisitions Secretary
ERIC Clearinghouse for Science, Mathematics,
and Environmental Education
1200 Chambers Road, Rm. 310
Columbus, Ohio 43212-1792

If you cannot find the release form, one will be sent to you upon receipt of your papers.

If you have additional papers that you would like to have considered for possible addition to the ERIC database, please send these, also.

continued

Ohio State University, and the Universidad Autonoma de Yucatan. Please contact Dr. John J. Koran, Jr., Professor and Curator, Science Education, and Associate Dean of the Graduate School, at 235 Grinter Hall, University of Florida, Gainesville, Florida 32611 for registration materials. A tentative title for your presentation and an abstract of 150-200 words should be submitted to Dr. Koran on or before September 15, 1990. Posters are also welcome. Join us at the Hoteles Montejó (\$36.00 per night single or double) for a relaxing and stimulating conference.

COVER SHEET FOR NARST PROPOSAL
1991 ANNUAL NARST MEETING, THE ABBEY, FONTANE, WI

(Please type the requested information)

1. Title _____

2. First author presenting paper

Name _____ Phone (____) _____

Institution _____

Address _____

Zip _____

3. Name and Institutional Address of Co-Author(s) and, if appropriate, Sub-titles (please include zip code for all co-author(s))

4. Signature _____ Date _____

5. Type of activity proposed (check appropriate entry)

Contributed Paper Paper Set Panel Symposium Poster Session Round Table

6. Special Instructions or Comments:

7. Descriptors that would identify the topic of the proposal:

8. Are you a member of NARST? _____ Yes _____ No. If not, you must join to be on the program.

9. Please include the following materials with your proposal
(Omit author name(s) and identifying information in abstracts)

- Two completed cover sheets
- Six copies of a 500-word abstract (to be published)
- Three to six page proposal with bibliography (6 copies)
- Two self-addressed, stamped envelopes
- Two 3 x 5 index cards containing name, address and telephone number of author and paper title

10. Do you plan a NSTA presentation?

PROPOSALS MUST BE POSTMARKED NO LATER THAN October 1, 1990

CALL FOR PAPERS!

Special issue of the *Journal of Research on Science Teaching* on

“Students’ Models and Epistemologies of Science”

Editors: Marcia C. Linn, Nancy Songer, and Eileen Lewis

PROPOSED FOCUS

Consistent with a growing body of research, we propose to focus a special issue of the *Journal of Research on Science Teaching* on “Students’ Models and Epistemologies of Science.”

Papers are solicited investigating how students construct views of science and of the scientific enterprise. Each paper should emphasize how students’ views of the scientific enterprise develop or how students’ views of science interact with science learning. Collaborations between philosophers of science, science discipline specialists, and cognitively oriented investigators are encouraged. In addition, studies involving empirical investigations conducted by teams of researchers in real classroom settings are sought.

POSSIBLE TOPICS

- The epistemologies of science held by students and how those contribute to learning in the science classroom.
- The development of belief systems about science and how they influence performance.
- How students’ beliefs about the scientific enterprise influence their scientific reasoning.
- Reviews of literature relevant to beliefs about the nature of science.
- Social *construction* of beliefs about the scientific enterprise.
- How students and scientists view the scientific enterprise.

TIMELINE

• Papers due
January 1, 1991

• Reviews back to authors
May 1, 1991

• Revisions due, if requested
July 1, 1991

This special issue will appear in 1992

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