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Organized to improve science teaching—through research

NARST NEWS

NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

Thaddeus W. Fowler, Editor

PRESIDENT

Linda R. DeTure
Education/Human Development
Rollins College, Winter Park, FL

1987 NARST 60th Anniversary Annual Meeting

The sixtieth Annual Meeting of NARST was recently concluded in Washington, D.C., amidst cherry blossoms, extravagantly colored tulips, and a slight drizzle. The success of the meeting was attested to by the attendance of 330 registered participants, a record in recent history. Over 180 presentations and four General Sessions resulted in a full agenda for everyone. A highlight of the meeting was to see twenty-five years of leadership in science education amassed on one stage at the reception honoring past presidents.

Always an exciting city, Washington provided the perfect setting for our special anniversary meeting focusing on retrospect and prospect. The perspectives of our general session speakers piqued our interest and challenged our thinking. If as is said "history repeats its self," it never does so in quite the same way. With new patterns constantly emerging, it will be interesting to see the shape of research in science education in the next decade of NARST.

The success of any meeting is directly dependent on the participants and the quality of the presentations. I thank each of you for demonstrating once again that NARST is THE organization devoted to improving science teaching through research and for giving me the privilege and opportunity to work with you.

It is time now to begin to look to the future. Next year our meeting will follow the NSTA conference in St. Louis. Once again we will move to the cloistered setting of a resort, The Lodge of the Four Seasons, where we will be able to share meals and have time to get to know one another better. With much appreciation for your support.

Linda DeTure
President

Call for Proposals 1988 NARST Annual Meeting

Patricia E. Blosser, Program Committee Chair

This is a call to NARST members and others to submit proprosals for the program for the 1988 NARST Annual Meeting. The 1988 annual meeting will be held at the Lodge of the Four Seasons, Lake Ozark, MO, April 10 - 13, following the NSTA meeting in St. Louis.

To promote a broad research base, the Program Committee encourages proposals that describe any of a variety of types of research. Please consider the following types of research: Experimental, Survey, Ex Post Facto, Evaluation, Historical, Philosophical, Case Study, Naturalistic, and other types. Standard guidelines appropriate for reporting each type of research are found in most research methods texts and should be followed in preparation of proposals and abstracts. In general the proposals should include *Objectives* or *Purpose of the Study, Design and Procedures, Findings* or *Results*, and *Conclusions*.

An individual may present only one paper, but may be listed as a co-author of another paper and may participate in a symposium or as a presider or discussant. Presenters are strongly encouraged to stimulate discussion around thier presentation. Overhead projectors and screens will be provided; participants needing to use other equipment are expected to provide their own. All presenters must register at the NARST meeting.

Persons wishing to submit proposals need to send:

1. Two copies of the completed cover page provided on back of Leadership Directory.
2. Six copies of a three to six page proposal with bibliography. Please omit author name(s) and other identifying information from the proposal.
3. Six copies of an abstract of *no more than* 500 words, to 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 self-addressed, stamped, envelopes, to be used to acknowledge receipt of proposals and the Program Committee's final decision.

continued

5. Two 3 x 5 in. cards containing *typed* name, address, and telephone number of the author(s) and the title of the paper.

Send this material to:

Patricia E. Blosser
Chair, NARST Program Committee
ERIC Clearinghouse for Science and Environmental Education
1200 Chambers Road, Rm 310
Columbus, OH 43212
(614) 292-6717

DEADLINE: MATERIALS MUST BE POSTMARKED NO LATER THAN OCTOBER 1, 1987.

All proposals will be reviewed anonymously by the members of the Program Committee. Standard criteria will be applied in the proposal review. The criteria are:

Significance of the problem and conclusions 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.

The following types of proposals have served as the basis of NARST Annual Meetings.

1. **Contributed Papers:** Brief 15-minute reports of research. These are grouped by the Program Committee to accommodate three or four per session. This format accommodates persons who have not planned to report their research with other members of a team. Discussants are usually assigned to these sessions. Presenters must provide discussants with a copy of the paper before the annual meeting.
2. **Paper Sets:** Several related studies originating from a common base of research are presented in a single concurrent session, accommodating from three to five persons who may divide a single report representing a major research effort in terms of time, number of researchers and/or geography. This format also allows for common elements of design or approach to be presented once rather than repetitiously. A discussant may be assigned to the session if one is not already identified in the proposal.
3. **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 organize the panel, but who is expected to regulate the flow of discussion or debate. Proposals should describe various aspects of the issue and the diverse views represented by the speakers.
4. **Symposia:** Symposia proposals should be submitted as a package listing participants on the cover sheet. The summary should address itself to the individual presentations and to the thread that ties the papers together. 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. Proposals should describe the common research interests of symposia members, their varied backgrounds, positions or experience, without naming the individuals.
5. **Poster Sessions:** Poster sessions are designed to enable researchers to share information on research in progress. These sessions combine the graphic display of materials with an opportunity for individualized, informal discussions of the research. Authors are encouraged to bring copies of the full paper for distribution to interested participants.
6. **Round Table Discussions:** Round Table Discussions are used to provide a thorough analysis of a paper by a group. Presenters have an hour in which various aspects of the study are examined by others in a discussion format. One or more papers may be discussed simultaneously in a round table format. If members agree to present their research in this format, they are expected to bring materials such as protocols, instruments, computer printouts, experimental curriculum materials, and logs to aid in the discussion. This format is not conducive to presentations which require the use of audio-visual equipment.
7. **Research Methods Seminar/Workshop:** This format is designed to enable NARST members to acquire new research skills or update old ones. These one or two hour sessions are planned for intensive involvement by those in attendance, and presenters are expected to provide resources for study and discussion.

The Program Committee wishes to accommodate as many papers as possible and asks support from proposers if it is necessary to reassign some papers from one format to another.

INTERNATIONAL ISSUES

News from Around the World

Arthur L. White and Donna F. Berlin

The need for science and mathematics educators to be in collaboration around the world grows day by day. I have witnessed individuals in many countries, Antigua, Australia, Barbados, Belize, Belgium, Brazil, Bulgaria, Canada, Costa Rica, France, Germany, Grenada, Guyana, Jamaica, Kenya, Mexico, Morocco, Panama, Trinidad & Tobago, The United Kingdom, and The United States asking and seeking answers to many of the same questions. The exploration into the improvement and equality of educational opportunity should be a cooperative, sharing, effort so that we all can proceed more rapidly and effectively. My admiration goes out to all of you who have committed time and resources toward the goals of this consortium. Special recognition is extended to those of you who have shared your needs, thoughts, expertise, and resources.

COSTA RICA:

The Second Regional Consultation for Research in Science and Mathematics Education will be held at the Sheraton Herradura Hotel in San Jose, Costa Rica December 9 to December 11, 1987. The meeting is sponsored by the Research Institute for Improvement of Costa Rican Education (IIMEC) and the Faculty of Education of the University of Costa Rica.

"We hope this encounter may be as interesting as the First Regional Consultation held in Trinidad and Tobago in February 1986, where eleven countries were represented including Antigua, Barbados, Belize, Costa Rica, Grenada, Guyana, Jamaica, Panama, Trinidad, the United Kingdom, and the United States. In this next meeting we are seeking to obtain the collaboration of reserachers of all these countries as well as those of the other Central American countries that did not participate in Trinidad and Tobago.

The social interaction that takes place between teachers and students as well as between students during the mathematics and/or science classes will be the central theme of this Regional Meeting. The program will include a variety of presentations, workshops, lectures, poster sessions, and opportunities for collaboration for future research.

Contributed papers are being selected for the program. Anyone desiring to make a presentation should submit a proposal by July 31, 1987. The author(s) should send six copies of not more than 6 double-spaced pages of a summary, including bibliography, and 6 copies of an abstract of 300-500 words to:

Dr. Juan M. Esquivel
Director: Instituto de Investigacion para el Mejoramiento de la Educacion Costarricense (I.I.M.E.C.)
University of Costa Rica
San Jose, Costa Rica, Central America

Projects underway in San Jose: (1) Rolando, Teresita, and Marielos have been hard at work on the calculator project data collected in November, 1986 and final report due July, 1987. (2) Victor Bujan has a new full-time job as a special assistant to the Ministry of Education. (3) IIMEC administered criterion referenced Spanish and mathematics tests to 305,000 3rd, 6th, 9th, and 11th grade Costa Rican students. (4) Juan Esquivel was asked by the Minister of Science and Technology to become his special counselor in Science Education. (5) Juan Esquivel has been appointed to the NARST Ad Hoc Committee on International Issues.

GERMANY:

International Organization for Science & Technology Education (IOSTE) has announced the 4TH INTERNATIONAL SYMPOSIUM ON WORLD TRENDS IN SCIENCE AND TECHNOLOGY EDUCATION. The 4th Symposium will take place August 4-12, 1987 at IPN (Institute for Science Education), Kiel, Federal Republic of Germany. The theme of this symposium is: *SCIENCE AND TECHNOLOGY EDUCATION AND THE QUALITY OF LIFE.*

The symposium fee of DM 1350,—(approx. $500.— at current rate) covers hotel accommodation, all meals, excursions, a copy of pre-symposium publication, membership of IOSTE until the fifth symposium as well as a copy of the proceedings. Further information can be obtained directly from:

Dr. K. Riquarts
IPN
Olshausenstrasse 40-60
D-2300 Kiel 1
West Germany.

TRINIDAD & TOBAGO:

First Regional Consultation: The Proceedings for the First Regional Consultation on Science Education Research in Latin America and the Caribbean have been completed and mailed to all participants. The First Consultation served to establish links between science education researchers. It is hoped that the Second Consultation in December, 1987 will serve to establish a framework for collaborative research. In an attempt to establish a mechanism for making fellow researchers aware of what research is being done and has been done in the Caribbean, Pamela Abder, Faculty of Education, The University of the West Indies, St. Augus-

tine, Trinidad, West Indies is currently collecting abstracts of science education research that has been done in and about the Caribbean. Joyce Glasgow, Faculty of Education, The University of the West Indies, Mona, Kingston 7, Jamaica, is collecting information on Jamaica. Consortium members are kindly asked to send any relevant information on Jamaica to Joyce Glasgow and on the rest of the Caribbean to Pamela Abder. We hope to have the abstracts ready for the Second Consultation in San Jose, Costa Rica.

The University of the West Indies, St. Augustine, Trinidad, W.I. has the following academic positions vacant:

READING: One Research Fellow/Junior Research Fellow, Teaching of Reading.—To prepare teachers at undergraduate and graduate levels and to engage in individual and group research.

MATHEMATICS: One Research Fellow/Junior Research Fellow, Teaching of Mathematics.—To research the teaching and study of Mathematics at the primary and secondary levels, develop curriculum and materials, teach courses in research methods and statistics in undergraduate and graduate programmes. Candidates with a sound knowledge of computer applications to education preferred.

PANAMA:

Deyanira Barnett has been appointed to the NARST Ad Hoc Committee on International Issues.

BULGARIA:

Arthur L. White and Donna F. Berlin have been invited to present papers at the Second International Conference and Exhibition on "Children in the Information Age: Opportunities for Creativity, Innovation, and New Activities" in Sofia, Bulgaria, May 19-23, 1987. This conference is organized and sponsored by the Committee for Science to the Council of Ministers and the Lyudmila Zhivkova International Foundation of Bulgaria.

MOROCCO:

Arthur L. White served as the United States Representative to the Symposium on the Educational Applications of the Computer which was organized by the Islamic Educational, Scientific and Cultural Organization (ISESCO) in collaboration with the Faculty of Education Sciences in Rabat, Morocco, January 5-9, 1987. Representatives from 23 Islamic Nations were represented for discussions concerning the uses of computers in education. England, Germany, France, and Belguim were also represented in these talks.

AUSTRALIA:

The International Council of Association for Science Education World Conference "Science Education and the Quality of Life—A World Issue" will be held in Canberra, Australia from July 3-9, 1988. For registration information contact Mrs. Gail Hawke, Capital Conferences Pty Ltd, PO Box E345, Queen Victoria Terrace, Canberra A.C.T. 2600, Australia.

Conference Announcement

Rural Education: A Hope for the Future

The Kansas State University Center for Rural Education and Small Schools, in cooperation with the Center for Science Education, is planning a science education section of the Ninth Annual Rural and Small Schools Conference. This year's conference will be held on the campus of Kansas State University in Manhattan, Kansas on October 26 and 27, 1987.

Presentations will include the following as they apply to science education in the rural and small school:

(1) networking and change in science education;
(2) development and dissemination of science curriculum innovation;
(3) pre-service and in-service preparation of science teachers;
(4) research and evaluation strategies in science education; and
(5) overcoming professional isolationism.

Research Opportunities

Rodger W. Bybee

The National Science Foundation (NSF) has awarded three major grants to develop instructional materials for elementary school science. Each project is now in the early stages of development. NSF support for three new elementary programs is an excellent opportunity for research on development, evaluation, and implementation curricula. While each project has an evaluator, each project would also welcome inquiries from individuals who are seriously interested in completing research on an aspect of the project. Listed below are the directors and addresses of the projects.

Dr. Rodger W. Bybee
Associate Director and Senior Staff Associate
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The Colorado College
Colorado Springs, CO 80903

Dr. June Foster
Technical Education Research Centers
1696 Massachusetts Avenue
Cambridge, MA 02138

Dr. Judith Sandler
Education Development Center
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1987-1988

National Association for Research in Science Teaching

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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).

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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

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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.

Election Committee

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Stanley L. Helgeson (1988)
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The Ohio State University
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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.

Research Committee

Chairman

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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.

Awards Steering Committee

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Committee Charge

The Awards Steering Committee is responsible for recommending policy for establishment of awards for the Association including the nature of the awards and the award's selection process.

The membership of this committee consists of the chairman and six members on three-year rotating terms. Additional sub-committee members may be appointed on a two year basis as needed for the review and selection process. The Executive Secretary is an ex officio member of the committee.

Ad Hoc Committee on International Issues

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NARST CALENDAR

NARST News	June 1, 1987
First Call for Proposals for 1988 NARST Annual Meeting	June 1, 1987
NARST News Submission Deadline	August 1, 1987
NARST News	September 1, 1987
Second Call for Proposals for 1988 NARST Annual Meeting	September 1, 1987
Deadline: Submission for Outstanding Paper and Practical Application Paper Awards	September 15, 1987
Deadline: Proposals for 1988 NARST Annual Meeting	October 1, 1987
Fall Board Meeting (Pittsburgh)	November 6, 1987
NARST News Submission Deadline	November 1, 1987
NARST News	December 1, 1987
Payment of 1988 Dues	January 1, 1988
Deadline: Nominations for Distinguished Contributions to Science Education Research Award	January 15, 1988
Elections Ballots Distributed	January 7, 1988
Return of Ballots	February 7, 1988
NARST News Submission Deadline	February 1, 1988
NARST News	March 1, 1988
Deadline: Pre-Registration for NARST Annual Meeting	March 15, 1988
AERA Annual Meeting (New Orleans)	April 5-9, 1988
NSTA Convention (St. Louis)	April 7-10, 1988
NARST Annual Meeting (St. Louis)	April 10-13, 1988
NARST News Submission Deadline	May 1, 1988

NARST Paper Awards

1987 NARST Outstanding Paper Award

Bob Sherwood, Vanderbilt University

"The Development of Videodisc Based Environments to Facilitate Science Instruction"

1987 NARST Practical Application Award

Dorothy Gabel and V. K. Samuel, Indiana University; Stanley Helgeson, Ohio State University; Saundra McGuire, Alabama A&M University; Joseph Novak, Cornell University; and John Butzow, Indiana University of Pennsylvania

"Science Education Research Interests of Elementary Teachers"

Submissions Invited —

1987 NARST Outstanding Paper Award
1987 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 1987 meeting in Washington, D.C. 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 St. Louis.

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, 1987**, the ten (10) 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:

Fred N. Finley
370 Peik Hall
159 Pillsbury Drive, S.E.
University of Minnesota
Minneapolis, MN 55455

COVER SHEET FOR NARST PROPOSAL
1988 ANNUAL NARST MEETING, LODGE OF THE FOUR SEASONS, LAKE OZARK, MO.

(Please type the requested information)

1. Title _____

_____

2. First author presenting paper

   Name _____ Phone (____) _____

   Institution _____

   Address _____

   _____ Zip _____

3. Name and Institutional Address of Co-Authors(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 ☐ Research Methods Workshop/Seminar

6. Special Instructions or Comments:

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

_____

8. Are you a member of NARST? _____ Yes _____ No

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 × 5 index cards containing name, address and telephone number of author and paper title

PROPOSALS MUST BE POSTMARKED NO LATER THAN October 1, 1987

NARST

60th Anniversary of NARST Presidential Address

Perspectives in Research in Science Education:
A Legacy and a Promise

James P. Barufaldi
Washington, D.C.
April 25, 1987

NARST was founded in 1928 for the purpose of promoting research in science education at all educational levels and of disseminating the findings of this research in ways to improve science teaching. In one sense, the existence of NARST is a remarkable fact. It was an association without parallel at the time it was founded. It is even more remarkable that nearly six decades later it is still unique in the field of professional organizations.

I believe that the success of NARST is due, initially, to those pioneer members who not only recognized the need for research in science teaching but also responded to the need with a plan of action. These pioneers were not only cognizant of the social, political and economic factors affecting education, but also proactive in shaping the foundation for research in science education.

Pioneers such as W.L. Eikenberry, Otis Caldwell, Ralph Powers, Gerald Craig, Florence Billig, Bertha Parks and many others first had the vision, a new perspective, a point of view, concerning the importance of research in the future of science education.

NARST was organized in 1928 at Cambridge, Massachusetts by a group of interested science educators called together by Mr. Eikenberry. At that time, there was a surge of interest in research related to the problems of science teaching. Emerging perspectives of the times formed the nucleus of NARST. Education based upon statistical methods had been apparent since at least the turn of the century. Various people were atrracted by the challenge to use research methods in the study of their own work. Many studies were pursued. Francis Curtis had published in 1926, *A Digest of Investigations in the Teaching of Science* which reported more than 70 investigations in science teaching that had appeared in print prior to 1925. Emerging perspectives of the times permeated this work. Curtis stated that "though primitive indeed, with respect to reliable and valid research techniques, the early studies in our field were and are, nevertheless, of immense importance, for they marked the dawn of a new era in the teaching of science; they broke the trail leading toward a scientific approach to the selection of subject matter, to the assaying of the methods of teaching it, and later, to attaining other important goals of science education."

The stage was set. . . a growth of interest in research related to the problems of science teaching was apparent; yet, the poineers realized that the development of research in this field suffered from a variety of problems. Namely, there existed no national professional organization which represented this renewed research interest in the field of science teaching, no annual meeting of national scope at which to disseminate the results of research studies and no appropriate referred journal for the publication of findings. NARST was organized to meet these needs.

The 1920's must have been an exciting time in science education. It appears that new perspectives for science teaching were not only anticipated but also encouraged by the educational community. The swift economic expansion of the 1920's provided a stimulating atmosphere for educators to rethink science education in this decade of scientific and technological development. New perspectives emerged from the reports of the Committee on the Reorganization of Science in Secondary Schools and presented ways science instruction could contribute to the attainment of the Seven Cardinal Principles of secondary curriculum throughout the decade.

New perspectives emerged in the early '20s when the AAAS, Committee of Place of the Sciences in Education, addressed many problems of science teaching. The Committee debated the problem of science courses, and was quite critical of the science courses used in the training of prospective science teachers at the university. The Committee supported the notion that these courses were useful for the scientists but not suitable for the training of teachers and further emphasized the need to train science teachers. The committee suggested that science courses for prospective science teachers should be organized to include the content of those courses that they will eventually teach. Presently it appears as through we are moving away from this major concern of the 1920's.

This period represented a whole national movement toward a science of education. The construction of objective tools for measurement, utilization of statistics in the interpretation of educational data, and objective educational experimentation greatly influenced the direction of research in science teaching. Again, NARST pioneers played an active role in building a foundation for research in science teaching. They were very perceptive of the social, political and economic factors affecting research in our discipline. This was especially evident in the late 1920's and early 1930's.

The economic crash of 1929 and the resulting depression years produced the expected public reactions against science, technology and education. The loss of more than 130 billion dollars in national income was astounding. People were very much aware of science and implications concerning technology. The public placed much of the responsibility for this devastating economic period on the impact of scientific and technological development. The common opinion was that science was responsible for the unemployment that resulted in America from the mechanization in farming and automation in the factories. The prevalent economic and social crises resulted in a great period of questioning of science, forced education to focus upon the individual students' welfare: social, economic and health. You are familiar with the 1932 NSSE yearbook which included *A Program for Teaching Science*. The report which advocated the development of a comprehensive program of science teaching, grades one through twelve, was greatly influenced by the pioneers of NARST. The 1920s and early '30s were indeed an appropriate time to lay a foundation upon which a future is built.

The period between 1928 and 1961 witnessed an accelerated pace of scientific discovery and scientific questioning; it was a time of increased impact of science on the lives of people and increased importance as a subject in the school curriculum. The 1950's have been characterized as both the "dawn of the space age" and the "dawn of contemporary science education."

It became quite apparent that the scientific revolution, resulting from the accelerated growth of science and technology made the understanding of science imperative in the education of all people. The launching of Sputnik, coupled with numerous reports that supported the belief that America was losing the space battle, stimulated acceptance of greater federal intervention in financing public education. Throughout this dynamic period, many NARST members served on numerous committees and suggested specific

recommendations to improve the quality of science education.

This was also a major turning point in the history of NARST. During the previous decades, the official journal for the organization was *Science Education*. Many NARST members became critical of the focus of the journal and questioned its quality. They were also concerned with editorial control. It was a time of confrontation and questioning; it was a time of major changes in the policy of NARST. *Science Education* was the official publication of NARST until 1963 when the *Journal for Research in Science Teaching* was inaugurated.

Emerging perspectives were very much part of Volume 1, Issue 1, of *JRST* in 1963. Ellsworth Obourn, NARST President of 1963, stated that "the total research effort in science education must somehow find a way to sort out, in an acceptable manner, those basic areas where our knowledge is not secure and complete. Once these areas are identified, means must be found to bring about a concerted research attack on each in turn. We must focus the cutting laser of research on each until we have dissolved the unknown and the light of understanding shines through. Only as our research effort is focused systematically on basic issues can we hope ever to produce a body of tested evidence upon which to erect either a theory or a structure of science teaching."

Since 1963, NARST, through its annual meetings and its official journal *JRST* has presented important accomplishments and nurtured future leaders in science education. Our organization has generated many controversial issues and policies. Our organization has influenced science learning, curriculum and instruction, but *unfortunately* not as much as we would like.

We have attempted to define science education as a discipline; we have questioned science education as a discipline; we have attempted to define the nature of our discipline; we have debated the need for a unifying theory in science education and the need to establish our discipline as legitimate, distinctive, and useful to society in general. We have proposed new questions, new directions and priorities.

About twenty years ago, Ralph Tyler described ways of improving research in science education. In a *JRST* article Tyler discussed eleven areas in pursuit of an overall plan for research.

This included objectives of science education (What to teach?); the teaching-learning process (What is the nature of the school's environment?); the organization of learning experiences; the outcomes of science education (What is actually learned?); the student's development; the development of teachers, the objectives of education for science teachers; the teaching-learning process of teacher education; the outcomes of teacher education, the organization of teacher's learning experiences and the processes of change in programs of science education. Do these sound somewhat familiar?

About 10 years ago, NARST focused on defining our priorities in research in science education. An attempt was made to establish priorities within groups of professional researchers. More than 33% of the NARST members helped in establishing research priorities. The priority for the *preference of practical or applied research* ranked quite high and represented a change in position from the previous 15 years or so.

Science education is an applied field. We are concerned with learning. We want to answer the *what*, the *why*, the *how* individuals learn new ideas, concepts, skills and develop and change attitudes. Educational research is for application. We should methodically show where results can be applied. Of course, this is not to imply that new knowledge is without value for its own sake.

I am frequently asked by non-science educators to identify and describe, various breakthroughs in research in science education. I usually begin by telling the individual that the *what*, the *why*, the *how* takes time, commitment, perseverance, patience, money and new perspectives to answer. Yet, I always attempt to respond to their questions and concerns. I am sure you have also been asked these same questions. In answering these questions, though, we must be both honest with ourselves and hard on ourselves. Our breakthroughs may not be as dramatic as those in the pure sciences and technology. Given the scope of problems and issues confronting science ours may appear to be rather minor. At times our breakthroughs also appear to be as fragmented as a disarticulated animal skeleton waiting for someone to impose order and structure on the separate entities. Our breakthroughs may not answer the *what, why* and *how*. Perhaps because we are not seeking right answers but rather reasonable explanations or a variety of acceptable repsonses to the question. Some critics believe that we are not even asking the right questions! Our breakthroughs, though, are published extensively — wait-time, attitude change, questioning strategies, student interactions, on task behaviors, teaching behavior, pupil behavior, and content and skill attainment — but implemented *unfortunately* in a limited manner.

The program of this 60th Annual Meeting of NARST was very strong and reflected numerous new perspectives for research in science teaching. The program formed a collage of new perspectives form topics such as cognitive learning, attitudes and perceptions, videodisc technology, knowledge and skills of science teachers, problem solving, wait-time, teaching with computers, science textbooks, inservice and preservice education, classroom environment, misconceptions in science, conceptual changes and S/T/S issues. It is quite obvious from the program that NRAST members today are also proactive in shaping the foundation for research in science education through these and similar offerings.

Yet, much criticism has been directed toward our research finding and studies. You know the critics and you know what they are saying — no coherent theory or conceptual framework; our studies are too narrow and flawed in methodology; our results have limited generalizability; and our research is done in isolation — isolated from the social and behavioral areas of science.

Serving as your president has provided me with additional opportunities to interact with the practitioner, the classroom science teacher. Most teachers with whom I interacted stated that they found research findings, in general, to be impractical, not relevant, and difficult to understand. In addition, they believed that most findings would be difficult to implement. It became quite apparent that these challenges continue to be a recurring theme within our discipline.

NARST has paritally responded to these challenges. In a jointly sponsored NSTA/ NARST session at the 34th convention of NSTA in San Francisco, Dr. Paul Hurd adroitly presented the topic "Issues in Linking Research to Science Teaching." Dr. Hurd explored ways in which research in science education can serve teachers better and improve student learning. Isn't this what NARST is all about? Dr. Hurd stated, and I quote "Unless the research in science education is in someway related to the problems of teaching, learning, and curriculum criteria inherent in the reform movement, there is no way to justify its worthiness and no base for absorbing its findings."

Immediate past president of NARST, Dr. David P. Butts, recently focused his energies on where research can be tranlated into meaningful guidelines for action. Dr. Butts and Dr. Robert Howe developed a series of symposia based on the synthesis of *Research of Effective Schooling*. Enhancing the impact of research on schooling practices, formed the theme for the symposia. In 1986, more than

500 NSTA conference participants joined in these symposia and explored ways the total community of students, teachers, administrators, and parents can work together to strengthen the outcomes of schooling.

In addition, NARST is supporting the very successful publication series, "Research Matters...to the Science Teacher." The series presently focuses on more than 18 topics such as using science textbooks, the role of the science laboratory, computer use, student-student interaction, wait-time, problem solving, and cooperative learning in science.

The challenge of linking research to science teaching was reflected in ten research symposia sponsored by NARST at the 1986 NSTA regional meetings and the 1987 national meeting. The symposia, Research Matters...to the Science Teacher, were heavily attended by both science teachers and researchers in science education.

The March, 1987 edition of *JRST* reported on a planning conference on research and science education convened at Berkeley. The results of the conference, attended by science and mathematics educators, mathematicians, scientists, cognitive scientists and curriculum and technology experts, are synthesized by Dr. Marcia Linn in an article, "Establishing a Research Base for Science Education: Challenges, Trends, and Recommendations." One of the four timely recommendations included in the article states that "Research in science education should reflect and respond to real instructional needs. Science education research must develop a body of basic knowledge and methodologies that are relevant to and inform the practice of science education." The article further states that "Research conducted in real educational settings provides new insights into the nature of cognitive and instructional processes, allows for study of the social and cultural factors that influence learning, permits trial and refinement of innovations and is thus far more likely to influence science education practice. Implementation of this recommendation should please those critics who believe that research in cognitive psychology offers little benefit and direct application to science education.

The above symposia, special publications, articles, and conferences are indicative of a new perspective for NARST and for research in science education; the perspective being, linkages, or partnerships, if you will. The focus of partnerships or linkages is the teacher. The essence of teachers as partners implies that the practitioner, the classroom teacher, has much to offer. The teachers provide researchers with relevant information and feedback based on their repertoire of classroom experiences.

It is interesting to note that the Reserach Division of NSTA under the direction of Dr. James Shymansky inaugurated the program, *Every Teacher a Researcher.* Names of teachers are listed in a directory along with those who are interested in working, cooperatively, on a research project or in sharing research ideas. Packets of materials describing designs for suggested classroom research projects are sent to the teachers. Areas of interest include learning styles, interdisciplinary science, problem solving, effectiveness of laboratories, science preparation for college and a variety of others. It is my understanding that teachers have responded to this teacher-researcher linkage in a very positive manner.

Teachers as partners in cooperatively planned research endeavors will help us ask appropriate questions, questions that lead to reasonable solutions to complex problems. It also implies that teachers will keep us honest in our ongoing quest to identify appropriate problems and to solve them It will enable us to provide reasonable recommendations to the practitioner.

Initiating a teacher-researcher partnership is only a beginning. As we explore additional avenues for linkages, we must expand this notion of partnership to one of *ownership.* Ownership relfects a special professional relationship, a relationship that forms a bond or connection between individuals, groups, and systems. It is a relationship that encourages an ongoing investment; an investment whose dividends are accumulated in the classroom of the practitioner; an investment in students in those classrooms who will be prepared to form appropriate judgements in a complex world.

Providing teachers the opportunity to propose problems and to actively participate in a research endeavor, may enhance the feeling of ownership among teachers. NARST is seeking ways to encourage this type of linkage.

Finding linkages to nurture the concept of ownership will continue to challenge those wishing to foster the quality of research in science education. It is a challenge that our pioneer members (Craig, Powers, Downing, Pruitt, Eikenberry) and many others would have accpeted. It is a challenge, along with many other concerns and issues that NARST members will recognize and struggle with and make a part of their research agneda. Why? Because we also wish to leave a legacy in research in science education that continues.

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NARST

NARST News

NARST News is published and mailed to members on the first of the month of March, June, September, and December. Contributions need to be received one month before the publication date. Send contributions to the editor:

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