NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

THE LOS ANGELES HILTON HOTEL
LOS ANGELES, CALIFORNIA
MARCH 17-20, 1975
OFFICERS FOR THE ASSOCIATION

1974 – 1975

PRESIDENT
Robert E. Yager
The University of Iowa
Iowa City, Iowa

PRESIDENT-ELECT
Ronald D. Anderson
The University of Colorado
Boulder, Colorado

SECRETARY - TREASURER
Paul E. Bell
The Pennsylvania State University
University Park, Pennsylvania

IMMEDIATE PAST PRESIDENT
Wayne W. Welch
The University of Minnesota
Minneapolis, Minnesota

RESEARCH COORDINATOR
Stanley L. Helgeson
Ohio State University
Columbus, Ohio

EDITOR, JOURNAL OF RESEARCH IN SCIENCE TEACHING
David P. Butts
The University of Georgia
Athens, Georgia

BOARD MEMBERS
Mary Budd Rowe (1975)
The University of Florida
Gainesville, Florida

Paul Westmeyer (1975)
Florida State University
Tallahassee, Florida

Marvin Druger (1976)
Syracuse University
Syracuse, New York

Richard L. Sagness (1976)
The University of South Dakota
Vermillion, South Dakota

Betsy Ann Balzano (1977)
State University College
Brockport, New York

James R. Okey (1977)
Indiana University
Bloomington, Indiana
PROGRAM COMMITTEE

Ronald D. Anderson, Chairman
Paul C. Beisenherz
Paul Eggen
John F. Schaff
Stanley L. Helgeson
Richard L. Sagness

The University of Colorado
Louisiana State University, New Orleans
The University of North Florida
The University of Toledo
Ohio State University
The University of South Dakota

LOCAL ARRANGEMENTS COMMITTEE

George C. Turner, Chairman
Gerald Garner
Joseph Carter
William Mocnik

California State University, Fullerton
Los Angeles Unified School District
Anaheim Unified High School District
Carson High School

FUTURE MEETINGS OF NARST

1976 April 19-23 Las Vegas (AERA)
1977 March 28-31 Cincinnati (NSTA)
1978 April 11-15 Toronto (AERA)
1979 March 19-22 Atlanta (NSTA)
THE NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

THE NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING (NARST) was founded for the purpose of promoting research in science education at all educational levels, and for disseminating the findings of this research in such ways as to improve science teaching. NARST is incorporated as a non-profit corporation in the state of Minnesota. The official quarterly publication of the Association is the JOURNAL OF RESEARCH IN SCIENCE TEACHING. The major areas of concern are experimental and analytical research studies (theoretical or applied) encompassing curriculum development and organization, evaluation, learning theory, teacher education, programs for both the talented and underachievers, and methods of instruction in the sciences. Surveys of current practices, enrollments, and course offerings represent other interests.

NARST annually meets concurrently with the American Education Research Association one year, and on days just previous to the National Science Teachers Association meetings the next year. At these meetings research papers in the areas listed above are presented along with symposia, on topics of interest to teachers and educational research workers.

NARST cooperates with the ERIC Science, Mathematics, and Environmental Education Information Analysis Center (SMEAC) located at The Ohio State University to conduct and publish reviews of research in science education at the elementary, secondary and college levels and to compile and publish the abstracts of papers presented at the annual meeting. The current NARST Research Coordinator is Associate Director for Science Education at the Center.

The constitution of NARST specifies that membership shall be drawn from those active in research in science education and those outstanding in science educational leadership such as teachers, supervisors and curriculum developers. Associate membership is available to students and to all persons who are interested in and want to support the purposes of the organization. Associate members receive all publications and newsletters of the Association but do not have voting privilege. They may, of course, participate fully in all meetings of the Association.

The Association maintains a Placement Information Service which, each year, provides lists of positions available and of personnel seeking employment. Prospective employees and employers are urged to use these lists to arrange contacts and interviews. Placement information is made available by mail early in each calendar year and at the annual meeting. Applications for membership, payment of dues, and correspondence related to the business operations of NARST should be mailed to the Secretary-Treasurer.
### Presidents of NARST

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Year</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>W.L. Eikenberry</td>
<td>1952</td>
<td>Betty Lockwood</td>
</tr>
<tr>
<td>1929</td>
<td>W.L. Eikenberry</td>
<td>1953</td>
<td>J. Darrell Barnard</td>
</tr>
<tr>
<td>1930</td>
<td>W.L. Eikenberry</td>
<td>1954</td>
<td>George C. Mallinson</td>
</tr>
<tr>
<td>1931</td>
<td>Elliot R. Downing</td>
<td>1955</td>
<td>Kenneth E. Anderson</td>
</tr>
<tr>
<td>1932</td>
<td>Elliot R. Downing</td>
<td>1956</td>
<td>W.C. Van Deventer</td>
</tr>
<tr>
<td>1933</td>
<td>Francis D. Curtis</td>
<td>1957</td>
<td>Waldo W. Blanchet</td>
</tr>
<tr>
<td>1934</td>
<td>Ralph K. Watkins</td>
<td>1958</td>
<td>Nathan S. Washton</td>
</tr>
<tr>
<td>1935</td>
<td>Archer W. Hurd</td>
<td>1959</td>
<td>Thomas P. Fraser</td>
</tr>
<tr>
<td>1936</td>
<td>Gerald S. Craig</td>
<td>1960</td>
<td>Vaden W. Miles</td>
</tr>
<tr>
<td>1937</td>
<td>Walter G. Whitman</td>
<td>1961</td>
<td>Clarence H. Boeck</td>
</tr>
<tr>
<td>1938</td>
<td>Hanor A. Webb</td>
<td>1962</td>
<td>Herbert A. Smith</td>
</tr>
<tr>
<td>1939</td>
<td>Ralph Powers</td>
<td>1963</td>
<td>Ellsworth S. Obourn</td>
</tr>
<tr>
<td>1940</td>
<td>Otis W. Caldwell</td>
<td>1964</td>
<td>Cyrus W. Barnes</td>
</tr>
<tr>
<td>1941</td>
<td>Harry A. Carpenter</td>
<td>1965</td>
<td>Frederic B. Dutton</td>
</tr>
<tr>
<td>1942</td>
<td>G.P. Cahoon</td>
<td>1966</td>
<td>Milton O. Pella</td>
</tr>
<tr>
<td>1943</td>
<td>Florence G. Billig</td>
<td>1967</td>
<td>H. Craig Sipe</td>
</tr>
<tr>
<td>1944</td>
<td>Florence G. Billig</td>
<td>1968</td>
<td>John M. Mason</td>
</tr>
<tr>
<td>1945</td>
<td>Florence G. Billig</td>
<td>1969</td>
<td>Joseph D. Novak</td>
</tr>
<tr>
<td>1946</td>
<td>C.L. Thiele</td>
<td>1970</td>
<td>Willard J. Jacobson</td>
</tr>
<tr>
<td>1947</td>
<td>Earl R. Glenn</td>
<td>1971</td>
<td>Paul D. Hurd</td>
</tr>
<tr>
<td>1948</td>
<td>Ira C. Davis</td>
<td>1972</td>
<td>Frank X. Sutman</td>
</tr>
<tr>
<td>1949</td>
<td>Joe Young West</td>
<td>1973</td>
<td>J. David Lockard</td>
</tr>
<tr>
<td>1950</td>
<td>N. Eldred Bingham</td>
<td>1974</td>
<td>Wayne W. Welch</td>
</tr>
<tr>
<td>1951</td>
<td>Betty Lockwood</td>
<td>1975</td>
<td>Robert E. Yager</td>
</tr>
</tbody>
</table>
Registration Information

Registration for the Meeting will be conducted at the Check Room on the Ballroom floor of the Los Angeles Hilton Hotel. Both persons who have preregistered, and those who have not will be able to obtain the following at the registration table:

- Book of Abstracts of Papers
- Registration Badge
- Ticket to the Luncheon
- Ticket to Training Sessions of Choice

The registration fee for members and non-members is $10.00; Associate Members can register for $6.00. The annual luncheon, which includes the presentation of the annual JRST award and the Patron's Award for proposed research will cost $7.50. The training session fee is $3.00 which covers the cost of the materials which will be distributed as part of the sessions. Please note that the training sessions were not included on the preregistration materials distributed prior to the convention. Thus, people who preregistered will still need to select the desired session and make their $3.00 payment when they pick up their other registration materials.

Placement Service

A placement desk and bulletin boards will be set up in the registration area. This will provide for the posting of information about jobs available and personnel seeking employment. Interested parties may post information and addresses on the bulletin board, and arrange interviews on their own. In addition a limited number of copies of an updated NARST PLACEMENT INFORMATION BULLETIN will be available.

Coordinator of Placement:

Dr. Marvin Druger
Center for Science Education
101 Heroy Building
Syracuse University
Syracuse, New York 13210

All sessions are on the Ballroom floor of the hotel.
FORTY-EIGHTH ANNUAL MEETING OF THE
NATIONAL ASSOCIATION FOR RESEARCH
IN SCIENCE TEACHING

March 17-20, 1975
The Los Angeles Hilton Hotel
Los Angeles, California

Sunday, March 16
7 - 10 pm EXECUTIVE BOARD MEETING
Presiding: Robert E. Yager
The University of Iowa
Iowa City, IA 52242

Monday, March 17
9 am - 5 pm REGISTRATION
8:30 am - 12 EXECUTIVE BOARD MEETING
Presiding: Robert E. Yager
1:30 - 2:30 pm GENERAL SESSION ONE
Presiding: Robert E. Yager
Speaker: Dr. Michael Scriven
The University of California
Berkeley, CA 94720
"The Crucial Place of Values Education and Evaluation Education in Science Education"

2:45 - 4:15 pm CONCURRENT SESSION ONE
Assembly East A. Informal Discussion with Michael Scriven
Presiding: Richard L. Sagness
The University of South Dakota
Vermillion, SD 57069

Assembly Center B. Teacher Education
Presiding: Betsy Ann Balzano
State University College
Brockport, NY 14420
"Rotating Peer Supervision: Implementation and Evaluation of Its Effect on the Inner-Direction and Internal Control Constructs of Teacher Trainees"

Elizabeth G. Armstrong
The University of Hartford
West Hartford, CT 06117

and

George T. Ladd
Boston College
Boston, MA 02167

"A Comparative Study to Determine the Effects of Two Methods of Elementary Science Instruction on The Attitudes of Prospective Elementary Science Teachers"

H. Marvin Bratt
The Ohio State University
Marion, OH 43302

"The Effect of Teacher Training in Individualizing Science Instruction on Pupil Achievement and Attitudes"

Donald W. Humphreys
Temple University
Philadelphia, PA 19122

and

Jerry Brown
Temple University
Philadelphia, PA 19122

"The Effect of Science Process Training on Preservice Elementary Teachers' Process Skill Abilities, Understanding of Science, and Attitudes Toward Science And Science Teaching"

Joseph P. Riley II
The University of Delaware
Newark, DE 19711

Mission: C. Paper Set: Urban Science Intern Teaching Project

Presiding: Paul Beisenherz
Louisiana State University
New Orleans, LA 70122

"USITP: An Overview"

George C. Turner
California State University
Fullerton, CA 92634
"USITP: The Education Program"
Frank Collea
California State University
Fullerton, CA 92634

"USITP: Field Experiences"
William Mocnik
Carson High School
Los Angeles, CA

"USITP: Reflections from a First-Year Participant"
Charles Noyes
Adams Junior High School
Los Angeles, CA

"USITP: Doctoral Research Study"
Elizabeth Nuckolls
El Camino High School
Los Angeles, CA

New York
D. Discussion Paper
Presiding: Robert L. Shrigley
Pennsylvania State University
University Park, PA 16802

"The Effects of Selected Entering Behaviors and Different Cognitive Levels of Behavioral Objectives on Learning and Retention Performance in a Unit on Population Genetics"
Elaine J. Anderson
The University of Wisconsin
Madison, WI 53706

and H. Seymour Fowler
Pennsylvania State University
University Park, PA 16802

Reactors: Jean Beard
San Jose State University
San Jose, CA 95192

Marvin F. Wideen
Simon Fraser University
Burnaby 2, British Columbia
4:15 - 5:45 pm  
CONCURRENT SESSION TWO

Assembly East  
A. Instruction: Self-Paced

Presiding: Robert B. Collagan  
Morgan State College  
Baltimore, MD 21212

"An Evaluation of Student Characteristics as Related to Cognitive Achievement in an Individualized High School Biology Program"

David L. Littlefield  
Deerfield High School  
Deerfield, IL 60015

and Louis A. Gatta  
Deerfield High School  
Deerfield, IL 60015

"The Effects of Self-Pacing Science Methods Instruction on Attitudes and Achievement of Preservice Teachers"

Luis A. Martinez  
Florida International University  
Miami, FL 33144

and Richard L. Campbell  
Florida International University  
Miami, FL 33144

"An Evaluation of Student Attitudes, Achievement, and Learning Efficiency in Various Modes of an Individualized, Self-Paced Learning Program in Introductory College Physics"

Carl J. Naegele  
Cornell University  
Ithaca, NY 14850

and Joseph D. Novak  
Cornell University  
Ithaca, NY 14850

"An Analysis of Individualized Learning System Chemistry"

William Torop  
WestChester State College  
WestChester, PA 19380

Assembly Center  
B. Environmental and Life Sciences

Presiding: John E. Czirr  
Austin Peay State University  
Clarksville, TN 37040
"Academic Year Resident Outdoor Education and Environmental Attitudes"
Paul S. Markovits
Syracuse University
Syracuse, NY 13210

"The Effect of the Teachers' Curricular Bias, The Kind of Curriculum Studied As Well As Their Interaction on Students' Achievement in High School Biology"
Pinchas Tamir
Hebrew University
Jerusalem, Israel

"Progress In Environmental Science"
John H. Trent
The University of Nevada
Reno, NV 89507

Mission
C. Curricular Approaches
Presiding: Diane R. Conradson
San Jose State University
San Jose, CA 95192

"Model for State-Wide Studies: A Profile of Earth Science Teachers and Programs in Public Secondary Schools of Pennsylvania"
Whitman Cross II
Temple University
Philadelphia, PA 19118

"A Strategy for Disseminating Elementary Science Curricula"
Jerry G. Horn
University of South Dakota
Vermillion, SD 57069

and Arlen R. Gullickson
University of South Dakota
Vermillion, SD 57069

"A Study of Relationships Among Selected Teacher Variables and Expressed Preferences for Student-Centered, Non-Direct Science Education"
Edwin L. Shay
Worthington High School
Worthington, OH 43085
"Assessing Conflicts of Educational Philosophies Between Science Teachers and National Science Curricula"

John T. Wilson
The University of Iowa
Iowa City, IA 52242

New York D. Discussion Paper

Presiding: Marvin Druger
Syracuse University
Syracuse, NY 13210

"A New Dimension in Selecting Science Teachers"

Miles A. Nelson
The University of Wisconsin
Madison, WI 53706

Reactors: Glenn D. Berkheimer
Michigan State University
East Lansing, MI 48824

Jacob Blankenship
The University of Houston
Houston, TX 77004

Tuesday, March 18

8:30 - 10 am CONCURRENT SESSION THREE

Assembly East A. Learning Theory: Piaget

Presiding: Irvin T. Edgar
Pennsylvania Department of Education
Harrisburg, PA 17126

"A Perspective on Formal Thought Development"

Eugene L. Chiappetta,
The University of Houston
Houston, TX 77004

"A Study of Abstract Preferences in Problem Solving Tasks and Their Relationship to Abstract Ability and Formal Thought"

David L. Dunlop
The University of Pittsburgh
Johnstown, PA 15904

and

Frank Fazio
Indiana University of PA
Indiana, PA 15701
"The Teaching and Transfer of Seriation Strategies Using Non-Visual Variables with First Grade Children"

Michael J. Padilla
Michigan State University
East Lansing, MI 48823

"Strategies Used by First Grade Children in Seriating Objects on Length and Weight"

Edward L. Smith
Michigan State University
East Lansing, MI 48823

Assembly Center B. Symposium: Evaluation of Implementation Projects Supported by the National Science Foundation

Presiding: Harold Anderson
The University of Colorado
Boulder, CO 80203

Chairperson: Wayne W. Welch
The University of Minnesota
Minneapolis, MN 55455

With: Harry Fehrenbacher
Northwest Regional Educational Laboratory
Portland, OR 97204

"Reactions by the Funding Agency"

Charles R. Wallace
National Science Foundation
Washington, DC

"Collaborative Elementary Projects"

Arlen Gullickson
The University of South Dakota
Vermillion, SD 57069

"Reactions by a Project Director"

Jerry Horn
The University of South Dakota
Vermillion, SD 57069

"Accessible Schools"

Robert A. Reineke
The University of Minnesota
Minneapolis, MN 55455
"Off-Campus Teacher Centers"
Jane E. Stoller
The University of Minnesota
Minneapolis, MN 55455

"Summer Workshops"
Victor L. Willson
The University of Minnesota
Minneapolis, MN 55455

Mission C. Instrument Development
Presiding: Lynn W. Glass
Iowa State University
Ames, IA 50010

"Towards a Generalized Interaction Analysis System for Science Classrooms"
Robert K. Crocker
Memorial University of Newfoundland
St. John's, Newfoundland

"The Development of the Science Processes Test"
Robert R. Ludeman
Andrews University
Berrien Springs, MI 49104

"Construction and Validation of a Biology Interest and Attitude Inventory"
J. Gregory Quinn
Beaver College
Glenside, PA 19038

New York D. Discussion Paper
Presiding: Ronald G. Good
Florida State University
Tallahassee, FL 32306

"Some Effects of Training Preservice Teachers in Science Teaching Strategy Analysis"
Russell H. Yeany, Jr.
Southern Illinois University
Carbondale, IL 62901

Reactors: Robert W. Howe
Ohio State University
Columbus, OH 43210

James Okey
Indiana University
Bloomington, IN 47401
10 am - 12 CONCURRENT SESSION FOUR

RESEARCH TRAINING SESSIONS

A $3.00 fee is required for attendance at these sessions to cover the cost of materials. Registration for these sessions is at the Convention Registration Table in the Check Room.

A. EXPERIMENTAL DESIGN AND ANALYSIS

Presiding: Roger Olstad
The University of Washington
Seattle, WA 98105

Chairperson and Instructor: Arthur White
Ohio State University
Columbus, OH 43210

B. EVALUATION

Presiding: William Snyder
Florida State University
Tallahassee, FL 32306

Chairperson and Instructor: Eva Baker
The University of California
Los Angeles, CA 90024

C. DEVELOPMENT AND USE OF ATTITUDINAL INSTRUMENTS

Presiding: Paul Westmeyer
The University of Texas
San Antonio, TX 78212

Chairperson and Instructor: Arlen Gullickson
The University of South Dakota
Vermillion, SD 57069

Instructors: Paul Geisert
The University of Wyoming
Laramie, WY 82071
Rita Peterson
California State University
Hayward, CA 94542

D. DEVELOPMENT AND USE OF CLASSROOM OBSERVATION INSTRUMENTS

Presiding: Paul Eggen
University of North Florida
Jacksonville, FL 32216

Chairperson and Instructor: Patricia Blosser
Ohio State University
Columbus, OH 43210

Instructors: Thomas P. Evans
Oregon State University
Corvallis, OR 97331
Delivee Wright
The University of Nebraska
Lincoln, NE 68508
1 - 2 pm  GENERAL SESSION TWO
Presiding: Robert E. Yager
Speaker: Dr. David Berliner
Far West Laboratory for Educational Research
San Francisco, CA
"Studying and Defining Effective Science Teaching"

2:15 - 3:45 pm  CONCURRENT SESSION FIVE
Assembly East  A. Informal Discussion with David Berliner
Presiding: John F. Schaff
The University of Toledo
Toledo, OH 43606
Assembly Center  B. Instruction
Presiding: Stanley L. Helgeson
Ohio State University
Columbus, OH 43210
"A Comparison of Individualized Group Instruction in a
Sixth Grade Electricity Unit"
Charles Anderson
Westlake High School
Austin, TX 78751
and David P. Butts
The University of Georgia
Athens, GA 30602
"Concept Formation as a Function of Instructional
Procedure"
J. Dudley Herron
Purdue University
Lafayette, IN 47907
"Science Concept Learning: Needed Lines of Research"
Alan M. Voelker
Northern Illinois University
DeKalb, IL 60115
"The Effect of Intensive Instruction in Cue Attendance
and Hypothesis Generation Upon Open Exploration Be-
behavior of Low and High Ability Ninth Grade Students"
Emmett L. Wright
The University of Maryland
College Park, MD 20740
C. Teacher Behavior

Presiding: Richard D. Kellough
California State University
Sacramento, CA 95819

"A Comparison of Ratings of Elementary Science Teaching Competencies by Teachers and Teacher Educators"

Carl F. Berger
The University of Michigan
Ann Arbor, MI 48104

"The Relative Effectiveness of the Science Programs of Inservice and Preservice Teacher Training Institutions"

Victor Y. Billeh
American University of Beirut
Beirut, Lebanon

and

George Zakhariades
Famagusta Gymnasium for Boys
Cyprus

"The Effect of Performance Based Teacher Education Training on Some Humanistic Behaviors of Science Teachers"

Leopold B. Smigelski
The University of Iowa
Iowa City, IA 52242

"Lessons Taught by Students in Training to Become Biology Teachers Simultaneously Evaluated by Their Peers and by Their Students"

David R. Stronck
Washington State University
Pullman, WA 91163

New York

D. Discussion Paper

Presiding: Thomas G. Teates
Virginia Polytechnic Institute
Blacksburg, VA 24061

"An Investigation to Empirically Determine Which Instructional Procedures Produce Optimum Student Growth"
Reactors: Rita Peterson  
California State University  
Hayward, CA 94542  

J.A. Easley, Jr.  
The University of Illinois  
Urbana, IL 61801  

3:45 - 5:15 pm  
CONCURRENT SESSION SIX  

Assembly East  
A. Instruction ISCS  

Presiding: Donald W. McCurdy  
The University of Nebraska  
Lincoln, NE 68508  

"A Study of Parents' Attitudes Toward Supplemental Report Cards Which Identify Objectives Accomplished By ISCS Students"  
H. Vincent Bardsley  
Pennsylvania State University  
University Park, PA 16802  

"The Effects of Pairing and Pacing on Learning Rate in ISCS Classrooms"  
Dorothy L. Gabel  
Indiana University  
Bloomington, IN 47401  

"A Comparison of Intermediate Science Curriculum Study and Traditionally-Taught Seventh-Grade Science Students on Performing Tannenbaum's Science Processes"  
William S. Murrie  
Perryville Junior High School  
Perryville, MO 63775  

"An Empirical Study of ISCS and Individualization"  
Michael Szabo  
Pennsylvania State University  
University Park, PA 16802  

and  
Charles Beehler  
Rosetree Media Schools  
Media, PA
Assembly Center

Panel

Presiding: David Ost
California State University
Bakersfield, CA 93309

"Do Science-Related Social Issues Belong in Science Courses?"

Panel Members:

- Hans O. Anderson
  Indiana University
  Bloomington, IN 47401

- Fletcher G. Watson
  Harvard University
  Cambridge, MA 02138

- James Robinson
  Biological Sciences
  Curriculum Study
  Boulder, CO 80302

- Allen Vegotsky
  Biomedical Interdisciplinary Curriculum Project
  Berkeley, CA 94704

Mission

C. Attitude Surveys

Presiding: Wayne Schade
Educational Service Center Region XIII
Austin, TX 78721

"Cognitive Style as a Factor in the Science Achievement of Preservice Elementary Teachers"

James L. Shanks
California State University
Northridge, CA 91324

"The Correlation of Selected Affective Behaviors with Cognitive Performance in a Biology Course for Elementary Teachers"

Ronald D. Simpson
The University of Georgia
Athens, GA 30602
"Dogmatism and The Beliefs of Preservice and Inservice Elementary Science Teachers"

Barbara M. Strawitz
Louisiana State University
Baton Rouge, LA 70803

"Role Specific Pupil/Science Teacher Interpersonal Compatibility and Science Attitudes"

Robert A. Vargo
Syracuse University
Syracuse, NY 13210

and
Larry E. Schafer
Syracuse University
Syracuse, NY 13210

New York D. Discussion Paper

Presiding: Lowell A. Seymour
Union District
Pollock, SD 57648

"An Investigation of the Teacher Behavior of Wait-Time During An Inquiry Science Lesson"

Thaddeus W. Fowler
The University of Cincinnati
Cincinnati, OH 45221

Reactors: Mary Budd Rowe
The University of Florida
Gainesville, FL 32601

John P. Smith
The University of Washington
Seattle, WA 98105

Wednesday, March 19

8:30 - 10 am CONCURRENT SESSION SEVEN

A. Instruction

Presiding: Gene F. Craven
Oregon State University
Corvallis, OR 97331

"The Effects of Two Differing Questioning Strategies on The Achievement and Attitudes of Elementary Pupils"

Lance E. Bedwell
Department of Public Instruction
Springfield, IL 62706
"The Effect of the Position and Cognitive Level of Questions on Learning From An Activity-Centered Module"
Glenn C. Markle
The University of Cincinnati
Cincinnati, OH 45221

"Levels of Questions Asked by Elementary School Teachers Involved in Teaching SCIS Material"
George Moriber
Brooklyn College
Brooklyn, NY 11210

"The Effects of Sequencing Selected Instructional Strategies on the Attitudes and Open-Mindedness of Preservice Elementary Science Teachers"
Thomas L. Bogut
The Ohio State University
Mansfield, OH 44906

Assembly Center B. Symposium
Presiding: Ronald K. Atwood
The University of Kentucky
Lexington, KY 40506

"Symposium on Scientific Literacy Within the Framework of Science"
Participants: Michael L. Agin
Michigan Technological University
Houghton, MI 49931
Calvin W. Gale
Michigan Technological University
Houghton, MI 49931
William R. Ogden
East Texas State University
Commerce, TX 75428

Mission C. Attitude Surveys
Presiding: Duane Smith
Pennsylvania State University
Middletown, PA 17057

"An Assessment of Value Preferences of College Students with Reference to Environmental Chemistry"
"A Flexible Scheduled Cluster Program: Its Effect on Cognitive Learning and Attitude Development"

Harold Friend
Queens College
Flushing, NY 11354

and

John Merone
Oceanside Junior High School
Oceanside, NY

"The Effects of Activity-Oriented Science Instruction on Children's Attitudes Toward Science and School"

Harold H. Jaus
Purdue University
West Lafayette, IN 47906

"Possible Influences on Student Attitudes Toward Involvement with Science: Curricular, Demographic, and Personal Factors"

Byron E. Moore
Southwestern College
Winfield, KS 67156

and

Arnold Moore
Youngstown State University
Youngstown, OH 44503
Reactors: O. Roger Anderson
Columbia University Teachers College
New York, NY 10027

Jack E. Sherman
The University of Colorado
Colorado Springs, CO 80907

9:30 – 11:30 am JRST Editorial Advisory Board Work Session
Buffalo Room

10 – 11:30 am CONCURRENT SESSION EIGHT

Assembly East A. Student Assessment
Presiding: Victor J. Mayer
Ohio State University
Columbus, OH 43210

"The Reception of Elementary Students to Inquiry Science"
John B. Bath
Syracuse University
Syracuse, NY 13159

"The Mathematics Skill Test (MAST) and College Freshmen"
Rita T. Denny
Lamberton Alternative High School
Philadelphia, PA 19151

"Evaluation of a Practical Procedure for Sequencing Pictorial Classification Tasks in Science"
William G. Holliday
The University of Calgary
Calgary, Alberta

and Louise A. Partridge
The University of Calgary
Calgary, Alberta

"What Behavioral Objectives Do Physics Tests Actually Measure: Part II"
R.G.E. Mitias
Ohio University
Athens, OH 45701

Assembly Center B. Symposium
Presiding: Ronald K. Atwood
The University of Kentucky
Lexington, KY 40506
"Symposium on Scientific Literacy: II. Scientific Literacy and Planning for Alternative Futures"

Participants:
- Michael L. Agin
  Michigan Technological University
  Houghton, MI 49931
- John F. Disinger
  Ohio State University
  Columbus, OH 43210
- Calvin W. Gale
  Michigan Technological University
  Houghton, MI 49931
- George T. O'Hearn
  The University of Wisconsin
  Green Bay, WI 54305
- Rodney L. Doran
  S.U.N.Y.
  Buffalo, NY 14214
- Victor M. Showalter
  Ohio State University
  Columbus, OH 43210
- David Lockard
  The University of Maryland
  College Park, MD 20742
- James T. Robinson
  Educational Development Center
  Newton, MA 02160
- John W. Renner
  University of Oklahoma
  Norman, OK 73069
- Ilene Joyce Swartney
  Buffalo State University College
  Buffalo, NY 14222
- Hans O. Andersen
  Indiana University
  Bloomington, IN 47401
- Linda Knight
  Monroe County High Schools
  Bloomington, IN 47401

Mission:
C. Symposium

Presiding:
- David Lockard
  The University of Maryland
  College Park, MD 20742

"Natural Laboratories: Opportunities for Research in Classrooms Using New Curricula"

Participants:
- Terri L. Loomis
  Educational Development Center
  Newton, MA 02160
- Victor M. Showalter
  Ohio State University
  Columbus, OH 43210
- John W. Renner
  University of Oklahoma
  Norman, OK 73069

New York
D. Paper Set

Presiding:
- Ilene Joyce Swartney
  Buffalo State University College
  Buffalo, NY 14222

"Cooperative (University/School) Secondary Science Teacher Preparation"
- Hans O. Andersen
  Indiana University
  Bloomington, IN 47401

"Evaluation of an Early Experience in Science Teaching"
- Linda Knight
  Monroe County High Schools
  Bloomington, IN 47401
"Systematic Observation as a Technique for the Assessment and Improvement of Student Competencies"

Paul Repicky
Baylor College of Medicine
Houston, TX 77025

"Instrumentation Focusing on Formative Evaluation Aspects of an Inservice Teacher Preparation Model"

Harold Harty
Indiana University
Bloomington, IN 47401

11:45 - 12:30 pm  BUSINESS MEETING  Garden Room East
Presiding: Robert E. Yager

ANNUAL LUNCHEON
12:30 - 2:15
Garden Room West
Presiding: Robert E. Yager, President
Patron's for 1974-75, George O'Hearn
The JRST Award, J. Dudley Herron, Chairman
The NARST Patron's Award, James Joseph Gallagher, Chairman
Vaden W. Miles Memorial, Clarence H. Boeck, Chairman
Past President's Recognition
Recognition of New Officers
Installation of New President
2:30 - 4 pm

CONCURRENT SESSION NINE

Assembly East
Presiding: Burton Voss
The University of Michigan
Ann Arbor, MI 48104

A. Discussion of Research Design Award Paper

Assembly Center
Presiding: K.M. Kalra
Maple Ridge, British Columbia

WEDNESDAY

B. Paper Set

"Studies of Learning Environments and Outcomes
(Project LEO): Comparative Studies of Affective and
Cognitive Learning Under Two Quantitatively Defined
Teaching Strategies: Part III"

"Relationships Between Cognitive Characteristics and
Self Perceptions in Elementary School Children"

James A. Shymansky
The University of Iowa
Iowa City, IA 52242

"Relationships Between Cognitive Characteristics and
Problem Solving Strategies in Elementary School
Children"

Charles C. Matthews
Florida State University
Tallahassee, FL 32304

"Relationships Between Classroom Behavior and Cognitive
Development Levels in Elementary School Children"

Ronald G. Good
Florida State University
Tallahassee, FL 32304

"Relationships Between Classroom Behavior and Self
Perceptions in Elementary School Children"

John E. Penick
Loyola University
Chicago, IL 60611

Mission

Presiding: Charles A. Wall
Salisbury State College
Salisbury, MD 21801

C. Panel

20
"Openness and Accountability: A Look at the Issues And Related Research Questions"

Joseph A. Abruscato
The University of Vermont
Burlington, VT 05401

and
Jack Hassard
Georgia State University
Atlanta, GA 30303

D. Learning Theory: Ausubel
Presiding: Paul W. Welliver
The Pennsylvania State University
University Park, PA 16802

"The Effectiveness of a Comparative Advance Organizer in the Learning and Retention of Metric System Concepts"

Keith A. Kennedy
St. Cloud State College
St. Cloud, MN 56301

"The Effects of Utilizing Three Types of Advance Organizers for Learning a Biological Concept in Seventh Grade Science"

Stephen B. Lucas
Edinboro State College
Edinboro, PA 16412

and
H. Seymour Fowler
Pennsylvania State University
University Park, PA 16802

"Analysis of Creative Ability to Terms of Ausubel's Cognitive Psychology"

Joseph D. Novak
Cornell University
Ithaca, NY 14850

"An Investigation of Children's Concepts of Natural Phenomena"

Richard M. Rowell
Cornell University
Ithaca, NY 14850

4 - 5:30 CONCURRENT SESSION TEN

Assembly East A. Empirical Studies
Presiding: William LeShier
University of Kansas
Lawrence, KS 66044
"A Study of the Relationship Between Collective Bargaining Impasse and the Attitudes of Biology Students in Two Urban Community Colleges in Michigan"

Edwin A. Arnfield
Macomb County Community College
Warren, MI 48065

"Retention Studies Since 1960"

Darrell D. Young
S.U.N.Y.
Buffalo, NY 14222

"An Instrument Designed for Observation of Inquiry in Elementary Science Education"

Harold A. Swigart
College of Charleston
Charleston, SC 29401

"The Construction of a Pictorial Classroom Test in Biology and an Evaluation of Administering the Test by Four Different Procedures"

Charles D. Reese
Paul D. Camp Community College
Franklin, VA 23851

Assembly Center B. Symposium

Presiding: Edward C. Lucy
Georgia State University
Atlanta, GA 30303

"How Can a Predetermined Set of Process Content and Learning Outcomes Be Developed for Elementary Science Teaching: The Florida Elementary Science Assessment Project"

Participants: Jack Hassard
Georgia State University
Atlanta, GA 30303

David S. Butts
The University of Georgia
Athens, GA 30601

Ted Colton
Georgia State University
Atlanta, GA 30303

Lou Gardner
Georgia State University
Atlanta, GA 30303

Mildred Graham-Greaney
Georgia State University
Atlanta, GA 30303

Ashley Morgan
Georgia State University
Atlanta, GA 30303
Mission

C. Symposium

Presiding: Victor A. Perkes
The University of California
Davis, CA 95616

"The Role of Redundancy and Code Information in Memory and Intelligence: An Analysis of the New Piagetian Model"

Participants:
Gene W. Moser
University of Pittsburgh
Pittsburgh, PA 15260

Barbara Biglan
University of Pittsburgh
Pittsburgh, PA 15260

Chick O. Empfield
Lock Haven State College
Lock Haven, PA 17745

Janice Skraly
St. Angela Merici School
White Oak, PA 15131

Mary E. Sweeney
University of Pittsburgh
Pittsburgh, PA 15260

New York

D. Paper Set

Presiding: Robert E. Ziegler
Elizabethtown College
Elizabethtown, PA 17022

"Research Related to Piaget's Paradigm"
Darrell G. Phillips
The University of Iowa
Iowa City, IA 52242

"An Investigation of Specific Concepts of Space and Time in Children from Grades One Through Six"
Gaylen Carlson
California State University
Fullerton, CA 92634

"Bilingualism and the Development of Logical Structures"
Mohammed A. Kishta
The University of Jordan
Amman, Jordan
"A Study of the Structure of Piagetian Logical and Infralogical Groupings Within the Concrete Operational Period of Cognitive Development"

Graham W. Dettrick
Gippsland Institute of Advanced Education
Churchill, Victoria, Australia

"The Relationship of Moral and Cognitive Modes of Thought in Second and Fifth Grade Children"

Eileen M. Mays
Indiana University Northwest
Gary, IN 46408

Buffalo
E. Presentation of the Two Honorable Mention Research Design Award Papers
Presiding: Ann Howe
Syracuse University
Syracuse, NY 13210

7 - 10 pm
EXECUTIVE BOARD MEETING
Boston Room
Presiding: Ronald D. Anderson
The University of Colorado
Boulder, CO 80302

Thursday, March 20
8:45 am
GENERAL SESSION, AETS PROGRAM
Presiding: S.L. Giulani
San Diego, California
Moderating: David Butts
The University of Georgia
Athens, GA 30601

"As Teachers, What We Want From You--Science Teacher Educators"

Reaction Panel: Robert Holman
Baytown, Texas
Virginia Way
Colorado
Robert Howe
Ohio
Addison Lee
Austin, Texas

Jointly sponsored by AETS, NSSA, CESI, and NARST
NARST PROGRAM STRUCTURE

This listing of program parts and the following definitions are offered as a means of assisting members with understanding the structure of this program. In addition all members are invited to make specific suggestions for each of these program parts for future meetings. Letters to the officers, in particular the president-elect, are always a welcomed means of communicating suggestions.

1. GENERAL SESSIONS - Researchers of national prominence are asked to address the NARST membership concerning topics and issues of general concern. Such analyses of where we have been and where we are going are features of the annual meeting each year. The presentations will be published in JRST. The expenses for the speakers are provided by ERIC/SMEAC.

2. CONTRIBUTED PAPERS - Many individual members are anxious to share results of their individual research efforts with other members. A series of concurrent sessions where such Contributed Papers can be scheduled represent a major part of the NARST meetings. Generally such papers are restricted to a fifteen to twenty minute presentation which includes audience questioning as well.

3. PAPER SETS - Several related studies originating from a common research center or line of research can be structured as a set of from three to six separate but related reports. Such a grouping of papers often allows for common elements of design or approach to be presented once instead of several times. A Paper Set grouping can also allow for a division of a single report which represents a major research development in terms of time, number of workers, and/or geography.

4. DISCUSSION PAPERS - Some research reports may merit more time and consideration by the membership than do others. Discussion papers represent intriguing, exciting, and perhaps controversial reports of research submitted by NARST members. An entire session is scheduled for each paper, where participants can carefully analyze and discuss the paper. Before audience participation begins, two reactors will present their viewpoints with respect to the paper under discussion. Copies of the paper will be available at the Registration Table. Members can secure a copy of the paper that interests them, read it, and attend the particular session ready to "discuss" the issues, the analyses, the results, and the interpretations.

5. SYMPOSIA - Areas of current research or research needs are identified and papers prepared addressing defined issues. Symposia include persons with varying backgrounds, positions, and research interests. In addition to presentations concerning research in a given area, interaction among the symposium presentors, other discussants, and the audience is anticipated. Varying views, approaches, data reports, and data interpretation are desired features for Symposia.

6. PANELS - There are many debatable issues in science education. Panels are frequently constituted as a result of positions taken by members. Such Panels provide a mechanism for debating issues and involving interested members in such discussions of views.
7. INFORMAL DISCUSSION - Time is scheduled in the program for members to meet with one another concerning topics of interest. One important function of such sessions is the opportunity for members interested in new positions to confer with faculty members from institutions with staff vacancies.

8. TRAINING SESSIONS - NEW THIS YEAR - Members may choose one of four two-hour training sessions which have been scheduled concurrently. They are devoted to topics of basic importance for conducting disciplined inquiry of particular types.

MECHANISM FOR PLANNING NARST PROGRAMS

According to the NARST By-Laws, the Program Committee is a Standing Committee consisting of the Research Coordinator, the President-Elect (as chairman of the Committee), and four members (each with rotating two-year terms). This Program Committee is charged with planning the program format for the Annual Meeting. This planning includes preparing the Call for Papers, evaluating the contributions suggested by the members for all program elements, and preparing the program copy for distribution to members.

The Call for Papers is included in a Newsletter (and, at the option of the Secretary-Treasurer, a special mailing) to all members. The call for Papers includes a questionnaire which serves as a cover sheet for multiple copies of a summary of the contributed paper or other program feature. Such copies are not to include names of the investigator or other means of identification. These copies of the summaries are number-coded with the cover sheets being filed until after all program planning and summary evaluation has occurred.

Members of the Program Committee read and rate each paper submitted for possible use on the program. Following this independent rating, the Committee meets as a group. The separate ratings are summarized and any disagreement among the Committee members making the ratings are then discussed thoroughly. All papers are eventually recommended for inclusion in the program structure or rejected. Sometimes the final decision regarding borderline situations is made based upon the program structure (i.e., number of papers within a particular classification, total number of concurrent sessions planned, needed balance in terms of topics). The names of contributors remain unknown to all persons making ratings until all decisions are made. This "blind" evaluation of papers, panels, and symposia is an important feature in structuring the NARST Annual Meeting.
You are cordially invited to become a member of the

NATIONAL SCIENCE TEACHERS ASSOCIATION
1742 Connecticut Avenue, N.W.  Washington, D.C. 20009

Zero in on NSTA journals with elementary, regular, or college membership.

*Science and Children.* Eight annual issues directed to elementary school teachers.

*The Science Teacher.* Nine annual topical issues for the science teacher and the
general scientific and educational community.

*Journal of College Science Teaching.* Five annual issues of current approaches to
teaching science in the first two years of college.

Receive brand new NSTA instructional aids, reports, and monographs with
comprehensive or life memberships.

Attend area and national NSTA conventions at a member discount.

Next on the horizon.

Los Angeles NSTA National Convention
Man, Science, Society: An Alliance of Hope
March 20-24, 1975

the professional organization dedicated to the advancement and
improvement of the teaching of science at all educational levels
Here is a new, more effective way to teach science...

Pupils want to learn because they see how much science means to them.

TEACHING SCIENCE IN ELEMENTARY AND MIDDLE SCHOOLS

for both prospective and in-service teachers is a basic, concise, illustrated guide to selecting, organizing, planning, teaching, and evaluating science activities for children from kindergarten through grade eight.

Based on Piaget's theory of concept development, the author relates scientific concepts to a vast array of stimulating and challenging experiences, demonstrations, and projects. The book offers methods for modifying pupil attitudes, skills, and behavior. Guiding principles of how to teach, what to teach, techniques of involving the student in problem solving, and how to know that pupils are learning are given for different science curricula. Teachers can see at once where a particular concept currently being taught or developed fits into the school's overall science program.

"I consider the writing excellent, the approach innovative...most useful for teachers and teachers of teachers."

—KENNETH E. ANDERSON, University of Kansas

DAVID McKay COMPANY, INC., 750 Third Ave., New York, N.Y. 10017

Entire book in 2 colors. Profusely illustrated. $11.95
Concepts in Science.

The most widely used elementary science program.

And now better than ever.


A new edition of the most complete, most comprehensive, most flexible science program available.

It's updated, streamlined, simplified. The metric system is now used throughout, followed by the English equivalent. New investigations cover the entire range of pupil abilities. New photographs reflect children's widening interest. And an entirely new component — Concepts in Science PLAs™—offers every child an additional chance to succeed.

Each of the PLAs (Pupil's Learning Activity self-initiated) provides related probes that any child—science-prone or science-shy—can perform on a completely self-directing basis.

Concepts in Science, Newton Edition. It gives you new ways to use the most widely used science program.

Harcourt Brace Jovanovich

New York 10017 San Francisco 94109 Chicago 60648
Atlanta 30309 Dallas 75235

Concepts in Science Newton Edition

Paul E. Brandwein, Elizabeth K. Cooper,
Paul E. Blackwood, Elizabeth R. Hone,
Margaret Cotton-Winslow, Thomas P. Fraser,
and Morsley Gidding, authors.

Arthur L. Brooke
Harcourt Brace Jovanovich
707 Third Avenue, New York, NY 10017

Please send me complete information.

Name ____________________________

Position _________________________

School __________________________

School Address ____________________

City __________________ State ______ Zip ______
NATIONAL ASSOCIATION FOR
RESEARCH IN SCIENCE TEACHING

The University of Colorado
School of Education
Boulder, Colorado 80302

ROBERT T. WARD
GRADUATE SCHOOL OF ED.
U. OF CHICAGO, 5835 KIMBORK AVE.
CHICAGO, IL 60637