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 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 the talented and underachievers, and methods of instruction in sciences. Surveys of current practices, enrollment, and course offerings represent other interests.

NARST 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. Patron membership is available to individuals and organizations who would like to contribute more than the basic dues to support the work of our organization.

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 interview. 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 Executive Secretary.
PROGRAM COMMITTEE

Roger G. Olstad, Chairman  University of Washington
Carl F. Berger  University of Michigan
Stanley L. Helgeson  Ohio State University
John J. Koran  University of Florida
Laura C. Trout  Indiana University
Russell Yeany, Jr.  University of Georgia

LOCAL ARRANGEMENTS COMMITTEE

Ted W. Fowler, Co-Chairman  University of Cincinnati
Glenn C. Markle, Co-Chairman  University of Cincinnati
George Roger Courts  University of Cincinnati
Linda S. Fowler  University of Cincinnati
Frederick D. Williams  University of Cincinnati

FUTURE MEETINGS OF NARST

1978  With AERA  Toronto
1979  With NSTA  Atlanta
1980  With AERA  New Orleans
1981  With NSTA  New York
REGISTRATION INFORMATION

Registration for the Meeting will be conducted in the fourth floor foyer of the Netherland 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

The registration fee for members and non-members is $20.00 which includes a banquet ticket to the annual luncheon. The annual luncheon program contains the presentation of the annual JRST award, the Patron's Award for proposed research and a special program planned in honor of our 50th Anniversary Meeting.

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. For further information, interested parties should see or contact NARST's Coordinator of Placement:

Dr. Alan M. Voelker  
Northern Illinois University  
DeKalb, Illinois 60115
NARST OFFICERS

1976-1977

PRESIDENT
O. Roger Anderson
Teachers College - Columbia University
New York, New York

PRESIDENT ELECT
Roger G. Olstad
University of Washington
Seattle, Washington

IMMEDIATE PAST PRESIDENT
Ronald D. Anderson
University of Colorado
Boulder, Colorado

EXECUTIVE SECRETARY
Paul Joslin
Drake University
Des Moines, Iowa

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

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

BOARD MEMBERS

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

J. W. George Ivany (1979) Memorial University
St. Johns, Newfoundland, Canada

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East Lansing, Michigan

James R. Okey (1977) University of Georgia
Athens, Georgia

James J. Gallagher (1978) Michigan State University
East Lansing, Michigan

Ronald J. Raven (1974) State University of New York
Amherst, New York
PRESIDENTS OF NARST

1928  W. L. Eikenberry  1953  J. Darrell Barnard
1929  W. L. Eikenberry  1954  George C. Mallinson
1930  W. L. Eikenberry  1955  Kenneth E. Anderson
1931  Elliot R. Downing  1956  W. C. Van Deventer
1932  Elliot R. Downing  1957  Waldo W. Blanchet
1933  Francis D. Curtis  1958  Nathan S. Washton
1934  Ralph K. Watkins  1959  Thomas P. Fraser
1935  Archer W. Hurd  1960  Vaden W. Miles
1936  Gerald S. Craig  1961  Clarence H. Boeck
1937  Walter G. Whitman  1962  Herbert A. Smith
1938  Hanor A. Webb  1963  Ellsworth S. Obourn
1939  Ralph Powers  1964  Cyrus W. Barnes
1940  Otis W. Caldwell  1965  Frederic B. Dutton
1941  Harry A. Carpenter  1966  Milton O. Pella
1942  G. P. Cahoon  1967  H. Craig Sipe
1943  Florence G. Billig  1968  John M. Mason
1944  Florence G. Billig  1969  Joseph D. Novak
1945  Florence G. Billig  1970  Willard J. Jacobson
1946  C. L. Thiele  1971  Paul D. Hurd
1947  Earl R. Glenn  1972  Frank X. Sutman
1948  Ira C. Davis  1973  J. David Lockard
1949  Joe Young West  1974  Wayne W. Welch
1950  N. Eldred Bingham  1975  Robert E. Yager
1951  Betty Lockwood  1976  Ronald D. Anderson
1952  Betty Lockwood  1977  O. Roger Anderson

1976 PATRON MEMBERS

O. Roger Anderson
Cyrus Barnes
Battelle Memorial Institute
Ralph W. Lefler
Robert E. Yager
H. Craig Sipe

1976 SUSTAINING MEMBERS

Henry A. Burnett
Donald G. Peterson
Hans O. Andersen
FIFTIETH ANNUAL MEETING OF THE
NATIONAL ASSOCIATION FOR RESEARCH
IN SCIENCE TEACHING
March 22-24, 1977
Netherland Hilton Hotel
Cincinnati, Ohio

March 22
Tuesday
8:00 - 5:00 REGISTRATION Fourth Floor Foyer

Tuesday
8:00 - 12:00 EXECUTIVE BOARD MEETING Parlor G
Presiding: O. Roger Anderson
Teachers College
Columbia University
New York, New York 10027

Tuesday
1:00 - 2:15 GENERAL SESSION ONE Pavilion
Presiding: O. Roger Anderson
Teachers College
Columbia University
New York, New York 10027

"Science Teaching and Students' Images of the Future:
Some Suggested Implications"

E. Paul Torrance
University of Georgia
Athens, Georgia 30602
Tuesday
2:30 - 4:00
Parlor L

CONCURRENT SESSION ONE

A. Learning Theory

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

"Content Specific Cognitive Growth and General Cognitive Growth and its Relation to the Theories of David Ausubel and Jean Piaget"

Gerald S. Friedman
Cornell University
Ithaca, New York 14850

"The Relationship Between Cognitive Styles and One Type of Logical Reasoning"

Patricia M. Heller
University of Michigan
Ann Arbor, Michigan 48109

"A Comparison of Student Preferences and Actual Performance in Problem Solving Tasks within a Piagetian Setting"

David L. Dunlop
University of Pittsburgh at Johnstown
Johnstown, Pennsylvania 15904

and

Frank Fazio
Indiana University of Pennsylvania
Indiana, Pennsylvania

"The Effect of Instructional Mode on School Achievement of Concrete and Formal Operational Students"

John J. Rostovac
California State University Long Beach
Long Beach, California 90801
"A Study of the Relationship Between Cognitive Development and Achievement in College Physics: A Statistical Search for a Theoretical Framework"

Russell M. Agne
University of Vermont
Burlington, Vermont 05401

and

H. Daniel Cohen
University of Vermont
Burlington, Vermont 05401

Donald F. Hillman
University of Vermont
Burlington, Vermont 05401

Tuesday
2:30 - 4:00
Parlor M

B. Perceptions

Presiding: Mitchell E. Batoff
Jersey City State College
Jersey City, New Jersey 07305

"A Possible Explanation of Declining Test Scores or 'Learning Less Science But Enjoying It More'"

Wayne W. Welch
University of Minnesota, Minneapolis
(On-leave 1976-77)
University of Washington
Seattle, Washington 98195

"Changes In Curiosity Behavior From Childhood to Adolescence"

Rita W. Peterson
California State University
Hayward, California 94542

"Perceptions of Scientific Literacy"

Lawrence L. Gabel
The Ohio State University
Columbus, Ohio 43210
"Superstitions Among Ugandan Adolescents: Their Possible Scientific Explanations And Relation To The Science Curriculum"

Catherine D. Namuddu
Teachers College, Columbia University
New York, New York 10027

"A Compendium of Values Clarification Research in Environmental Education at S I U C - Kindergarten through Middle School"

Audrey N. Tomera
Southern Illinois University
Carbondale, Illinois 62901

Tuesday
2:30 - 4:00
Parlor N
C. Philosophical Analyses Paper Set

Presiding: Paul C. Beisenherz
University of New Orleans
New Orleans, Louisiana 70122

"Philosophical Analysis and Science Education: A Fruitful Partnership"

"Philosophical Analysis and Science Education Research: Introduction and Recapitulation"

Douglas A. Roberts
The Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

and

Brent Kilbourn
The Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

-4-
"Analyzing Science Teaching: The Quality of the Intellectual Experience and the Concept of Intellectual Independence"

Hugh Munby
Queen's University
Kingston, Ontario, Canada K7L 3N6

"Analyzing Arguments for Objectives in Science Education"

Graham W. F. Orpwood
The Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

"Applying Philosophical Analysis to Science Teaching: Strategies for Inservice Work with Teachers"

Thomas L. Russell
The Ontario Institute for Studies in Education
Ottawa, Ontario, Canada K2E 6L8

"Identifying World Views: Mechanism and Potential Consequences for Science Students"

Brent Kilbourn
The Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

Tuesday
2:30 - 4:00
Parlor 0

D. Curriculum Dissemination Paper Set

Presiding: Kenneth D. Moore
University of Tulsa
Tulsa, Oklahoma 74104
"Differences In How Elementary Science Teachers Learn To Use Their Curricula and Their Satisfaction With That Curricula"

Donald N. Nimmer
The University of South Dakota
Vermillion, South Dakota 57069

"The Efficacy of Part-Time Consultants to Support Curriculum Dissemination"

Jerry G. Horn
The University of South Dakota
Vermillion, South Dakota 57069

"The Impact of Short Term High Intensity Efforts to Disseminate Elementary Science Curricula"

Arlen R. Gullickson
National Science Foundation
Washington D.C.

"Dissemination of Educational Information Through Various Media Channels"

Donald N. Nimmer
The University of South Dakota
Vermillion, South Dakota 57069

Tuesday
4:15 - 5:45
Parlor L

CONCURRENT SESSION TWO
A. Testing & Achievement

Presiding: William B. McIlwaine
Millersville State College
Millersville, Pennsylvania 17551

"A Likert-Type Scale to Assess Attitude Toward Metric Measurement Conversion"

Robert L. Shrigley
The Pennsylvania State University
University Park, Pennsylvania 16802
and

Cecil R. Trueblood
The Pennsylvania State University
University Park, Pennsylvania 16802

"Development of a Test of Scientific Reasoning"

Cornelius J. Troost
Brock University
St. Catharines, Ontario, Canada

"Development of An Instrument to Measure Beliefs About Science Teaching"

Linda Jones
California State University, Northridge
Northridge, California 91330

"A Science Skills Test: Development and Field Testing"

Gerald L. Abegg
Boston University
Boston, Massachusetts 02215

and

Romualdas Skvarcius
Boston University
Boston, Massachusetts 02215

"Changes in Grade 12 Chemistry Achievement Patterns in Ontario after Establishment of a Modern Course of Study"

Alexander Even
The Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

Tuesday
4:15 - 5:45
Parlor M

B. Piaget Paper Set

Presiding: F. David Boulanger
University of Illinois at
Chicago Circle
Chicago, Illinois 60680
"Piagetian Schema and Formal Thought"
George J. Pallrand
Rutgers University
New Brunswick, New Jersey 08903

"The Development of Correlational Reasoning and Hypothesis Testing Ability"
Richard J. Bady
Rutgers University
New Brunswick, New Jersey 08903

"Sex Differences in Formal Reasoning"
Michael D. Piburn
Rutgers University
New Brunswick, New Jersey 08903

Tuesday
4:15 - 5:45
Parlor N
C. Systems Dynamics Training Session
Presiding: Martin L. Goodson
Alabama A & M University
Normal, Alabama 35811

"System Dynamics: Strategies and Materials"
Nancy H. Roberts
M.I.T., Sloan School
Cambridge, Massachusetts

Tuesday
4:15 - 5:45
Parlor O
D. Science Enrollments Symposium
Presiding: Ronald D. Anderson
University of Colorado
Boulder, Colorado 80309

"Uninformative Enrollment Data"
Panel Discussion

Chairman  Flectcher G. Watson
Harvard University
Cambridge, Massachusetts 02138

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<td>Biological Sciences Curriculum Study</td>
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Open Discussion
Tuesday
7:30 - 9:00
Parlor H
OPEN MEETING OF INTERNATIONAL MEMBERS
International members and others interested are invited to meet to discuss matters of mutual concern.

Presiding: George Ivany
Memorial University
St. Johns, Newfoundland, Canada

March 23
Wednesday
8:00 - 5:00
REGISTRATION Fourth Floor Foyer

Wednesday
8:30 - 9:30
Parlor L
CONCURRENT SESSION THREE
A. Curriculum

Presiding: Harold R. Hungerford
Southern Illinois University
Carbondale, Illinois 62901

"Cognitive Preferences in Biology of Students Participating in a Secondary Science Training Summer Program"

Vincent N. Lunetta
The University of Iowa
Iowa City, Iowa 52242

and

Pinchas Tamir
Hebrew University
Jerusalem, Israel

"The Development and Implementation of the Levels of Use Observational Inventory (LoUOI): An Instrument to Aid in the Adoption of an Innovation Process"

Joel A. Colbert
University of Kansas
Lawrence, Kansas 66044

-10-
"Does More Time Yield More Learning?"

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

Wednesday
8:30 - 9:30
Parlor M
B. General Research

Presiding: Martha K. Piper
University of Houston
Houston, Texas 77004

"The Philosphic Consistency of Science Teachers' Opinions About the Structure of Scientific Laws and Theories"

Ronald E. Rowe
Beaver College
Glenside, Pennsylvania 19038

"Cognitive Dissonance as a Means of Effecting Changes in School Related Attitudes"

Robert L. Steiner
The Ohio State University
Columbus, Ohio 43210

"The Acquisition of the Conservation of Number by Preschool Children Using Didactic and Alternative Example Methods of Instruction to Examine Aptitude X Treatment Interaction"

Albert W. Strickland, III
Indiana University
Bloomington, Indiana 47401
"The Relative Effectiveness of Teacher versus Administrators Curriculum Conferences as Agents of Change"

Euwé van den Berg
University of Iowa
Iowa City, Iowa 52242

and

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

Wednesday
8:30 - 9:30
Parlor N

C. Complex Scientific Problem Solving Paper Set

Presiding: Joy S. Lindbeck
University of Akron
Akron, Ohio 44313

"The Wooley Mammoth as a Computer-Based Complex Problem-Solving Tool"

Michael Szabo
The Pennsylvania State University
University Park, Pennsylvania 16802

"A Multiple Discriminant Analysis Study of Scientific Problem-Solving Ability in a Computer-Based Learning Environment"

Thomas Rhoades
Anne Arundel County Schools
Annapolis, Maryland 21401

"A Comparison of Individual and Dyadic Performance on a Computer-Based Science Problem-Solving Task as a Function of Mental Ability"

Melissa Berkowitz
The Pennsylvania State University
University Park, Pennsylvania 16802

-12-
Wednesday
8:30 - 9:30
Parlor 0  D. Ausubel-Piaget Models Symposium

Presiding: Joseph D. Novak
Cornell University
Ithaca, New York 14853

"Ausubelian and Piagetian Models for Science Education Research"

Participants:

Anthony Lawson
University of California
Berkeley, California

Ronald Raven
State University of New York
Amherst, New York 14260

Warren Wollman
University of North Carolina
Greensboro, North Carolina

Joseph D. Novak
Cornell University
Ithaca, New York 14853

Wednesday
9:45 - 10:45
Parlor L  CONCURRENT SESSION FOUR

A. Instruction

Presiding: Michael J. Padilla
University of Victoria
Victoria, B.C., Canada

"Differential Learning Effects of Varied Numbers of Instructive Questions"

William G. Holliday
University of Calgary
Calgary, Alberta, Canada

-13-
"Effects of a Compensatory Reading Version of ISCS Level III Instructional Materials on Science Achievement"

Charles E. Greene
Fitchburg Public Schools
Fitchburg, Massachusetts 01420

and

Michael Szabo
The Pennsylvania State University
University Park, Pennsylvania

Lester Golub
The Pennsylvania State University
University Park, Pennsylvania

"The Effect of Intensive Instruction in Hypothesis Generation Upon Hypothesis Forming and Questioning Behaviors of Ninth Grade Students"

Chris A. Pouler
Prince George's County Public Schools
Hyattsville, Maryland 20782

and

Emmett Wright
University of Maryland
College Park, Maryland

"Predictions of Achievement and Success in ISCS - Level II"

Thomas E. McDuffie
Saint Joseph's College
Philadelphia, Pennsylvania 19131

Wednesday
9:45 - 10:45
Parlor M

B. Classroom Environment Symposium

Presiding: Marcia C. Linn
University of California
Berkeley, California 94720

-14-
"A Free Choice Environment: Advantages in the Classroom"

Marcia C. Linn
University of California
Berkeley, California 94720

Herbert D. Thier
University of California
Berkeley, California 94720

Warren Wollman
University of North Carolina
Greensboro, North Carolina 27412

Jane B. Bowyer
Mills College
Oakland, California 94613

Benjamin Chen
Ben Gurion University
Israel

Wednesday
9:45 - 10:45
Parlor N

C. Teacher Control Paper Set

Presiding: James R. Campbell
St. John's University
Jamica, New York 11439

"An Experimental Study of Teacher Control in Sixth Grade Science Classes"

I. "Background and Experimental Design"

Robert K. Crocker
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

Roda P. Amaria
Glenn W. Clark

-15-
II. "Science Process Achievement"

Roda P. Amaria
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

and

Helen Banfield
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

Robert K. Crocker

III. "Pupil Preferences"

Douglas B. Sheppard
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

and

Robert K. Crocker

Roda P. Amaria

IV. "Pupil Perceptions"

Glenn W. Clark
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

and

Gary Rumboldt
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

Robert K. Crocker

V. "Summary Discussion"

Robert K. Crocker
Memorial University of Newfoundland
St. John's, Newfoundland, Canada
Wednesday
9:45 - 10:45
Parlor 0

D. College Science Teaching Paper Set

Presiding: Robert J. Vanden Branden
Drake University
Des Moines, Iowa 50311

"A Study of Sex-bias in College Science Teaching"

Linda J. Kelsey
University of Iowa
Iowa City, Iowa 52242

and

Kathleen M. Filkins
University of Iowa
Iowa City, Iowa 52242

"A Comparative Study of Student Behavior in Upper and Lower Level Laboratories in Five Science Disciplines"

John E. Penick
University of Iowa
Iowa City, Iowa 52242

and

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

"The Role of Teaching Assistants in Upper and Lower Level Laboratories in Five Science Disciplines"

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

and

John E. Penick
William C. Kyle
University of Iowa
Iowa City, Iowa 52242
"Some New Techniques in Collecting and Analyzing Classroom Behavior Data"

Jay D. Wortman and John E. Penick
University of Iowa
Iowa City, Iowa 52242 James A. Shymansky

Wednesday
11:00 - 11:45 BUSINESS MEETING
North Hall

Presiding: O. Roger Anderson

50TH ANNIVERSARY LUNCHEON

Wednesday March 23
12:00-2:15 Pavilion

Presiding: O. Roger Anderson
Teachers College
Columbia University
New York, New York

Introductions
The JRST Award Presentation - Calvin W. Gale
Chairman
The NARST Patron's Award Presentation - John T. Wilson
Chairman
Past President's Recognition

Recognition of New and Past Officers
Recognition of Program Committee
Installation of New President
Special 50th Anniversary Program

"NARST--A GOLDEN ANNIVERSARY"

Willard J. Jacobson
Teachers College
Columbia University
New York, New York

-18-
Wednesday
2:30 - 4:00
Parlor L

CONCURRENT SESSION FIVE

A. Learning Factors

Presiding: Francis Lawrenz
State University College at Buffalo
Buffalo, New York
(On-leave 1977-78)
National Science Foundation
Washington, D.C.

"A Study of Risk Taking Characteristics of Learners and Science Achievement Resulting From Alternative Methods of Instruction"

Larry F. Guthrie
Indiana University Northwest
Gary, Indiana 46408

and

Gerald H. Gearhart
Kouts Elementary School
Valparaiso, Indiana 46383

"An Analysis of the Relationship of Students' Self Concepts in Science to Their Mental Abilities, Sex, and Measures of Achievement in Science"

Rodney L. Doran
State University of New York
Amherst, New York 14260

and

Burt A. Sellers
State University of New York
Amherst, New York 14260

"The Effectiveness of Generalizing Cues on Learning From Graphical Material"

Paul D. Eggen
University of North Florida
Jacksonville, Florida 32216

and

Donald Kauchak
University of North Florida
Jacksonville, Florida 32216

Sandra Kirk
University of North Florida
Jacksonville, Florida 32216
"An Analysis of Cognitive Style Profiles and Related Science Achievement Among Secondary School Students"

William R. Ogden
East Texas State University
Commerce, Texas 75428

and

Patricia M. Brewster
Mesquite Independent School District
Mesquite, Texas 75149

"An EEG Study: Hemispheric Brain Functioning of Six to Eight Year Old Children During Piagetian and Curriculum Tasks"

R. Harter Kraft
Ohio State University
Columbus, Ohio 43220

Wednesday
2:30 - 4:00
Parlor M

B. Awards Papers Presentation

Presiding: Calvin W. Gale
Michigan Technological University
Houghton, Michigan 44931

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

"JRST Award Paper"

Title and Author to be Announced

"Patron's Award Paper"

Title and Author to be Announced

-20-
Wednesday
2:30 - 4:00
Parlor N

C. Piaget

Paper Set

Presiding: Gerald L. Abegg
Boston University
Boston, Massachusetts 02215

"Piaget's Grouping Model and its Relevance to Research in Science Education"

Darrell G. Phillips
University of Iowa
Iowa City, Iowa 52242

"An Investigation of the Development of Six Topological Piagetian Groupings in Pre-School, Kindergarten, and Second Grade Children"

Herbert G. Cohen
Arizona State University
Tempe, Arizona 85281

"An Investigation of Piaget's Groupings: Seriation and Projective Space"

Gordon E. Odegaard
Mount Vernon High School
Mount Vernon, Washington 98273

"Six Major Logical Groupings of Concrete Operational Thought"

David L. Camp
Bowman-Gray School of Medicine
Winston-Salem, North Carolina 27103

"The Performance of Secondary School Students on Piaget-Type Tasks of Projective and Euclidean Space"

Carole J. Reesink
University of Iowa
Iowa City, Iowa 52242
Wednesday
2:30 - 4:00
Parlor O

D. Teacher Preparation Symposium

Presiding: Doris Trojcak
University of Missouri
St. Louis, Missouri

"Measuring Effectiveness in Science Teacher Preparation Programs"

"Using Learner Performance to Measure Science Teacher Effectiveness"

James R. Okey
University of Georgia
Athens, Georgia 30602

William R. Zeitler
University of Georgia
Athens, Georgia 30602

"Evaluating Teachers Using Teacher Performance"

David P. Butts
University of Georgia
Athens, Georgia 30602

William R. Capie
University of Georgia
Athens, Georgia 30602

"Establishing Links Between Teacher Behavior and Learner Outcomes"

David H. May
University of Georgia
Athens, Georgia 30602

Joseph P. Riley
University of Georgia
Athens, Georgia 30602

"Evaluating Science Teacher Preparation Programs by Assessing Teachers and Pupils"

Russell H. Yeany, Jr.
University of Georgia
Athens, Georgia 30602

Reactors: Carl Berger
University of Michigan
Ann Arbor, Michigan

Howard L. Jones
University of Houston
Houston, Texas
CONCURRENT SESSION SIX
Wednesday 4:15 - 5:45
Parlor L

A. Historical Studies Symposium

Presiding: Willard J. Jacobson
Teachers College
Columbia University
New York, New York 10027

"Historical Studies in Science Education"

Participants:

Willard J. Jacobson
Teachers College
Columbia University
New York, New York 10027

Leo E. Klopfer
University of Pittsburgh
Pittsburgh, Pennsylvania 15260

Roger W. Bybee
Carleton College
Northfield, Minnesota 55057

Alan M. McCormack
Box 1528 Peace Arch Plaza
Blaine, Washington 98230

Wednesday 4:15 - 5:45
Parlor M

B. General Research

Presiding: Frederick P. Deluca
Iowa State University
Ames, Iowa 50011

"The Immediate and Long Term Effect of Intensive Instruction Upon Basic Inquiry Skills"

Emmett L. Wright
University of Maryland
College Park, Maryland 20742

"Language Acquisition as a Byproduct of Science Instruction"

Mary Ellen Quinn
Edgewood School District
San Antonio, Texas 78230

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and

Carolyn Kessler
University of Texas at San Antonio
San Antonio, Texas 78230

"Psychomotor Abilities of Science and Non-Science High School Students"

Rodney C. Doran
State University of New York
Amherst, New York 14260

"The Effects of Cuing on Mathemagenic Behavior in a Medical Terminology Course"

Barbara B. Braverman
National Technical Institute for the Deaf
Rochester, New York 14623

and

Judy Egelston Dodd
National Technical Institute for the Deaf
Rochester, New York 14623

"The Development and Use of an Energy-Environment Assessment Instrument"

Frank Fazio
Indiana University of Pennsylvania
Indiana, Pennsylvania 15701

and

David L. Dunlop
University of Pittsburgh at Johnstown
Johnstown, Pennsylvania 15904

Wednesday
4:15 - 5:45
Parlor N

C. Teacher Education

Presiding: John P. Smith
University of Washington
Seattle, Washington 19895

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"An Investigation of Two Approaches for Education in Science of Preservice Elementary School Teachers"

Donna L. Siemro
Governors State University
Park Forest South, Illinois 60466

"Assessing the Difference of Teacher Behavior Among Three Elementary Science Curricula (ESS, SAPA, SCIS)"

naihua Chang
The University of Iowa
Iowa City, Iowa 52240

and

John T. Wilson
The University of Iowa
Iowa City, Iowa 52240

"The Effects of Instruction in Science Process Skills on Reading Comprehension of Pre-service and In-service Elementary Teachers"

Richard L. Campbell
Florida International University
Miami, Florida 33125

and

Emma W. Rembert
Florida International University
Miami, Florida 33125

"The Effects of Micro-Teaching on the Attitudes of Pre-service Elementary Teachers Toward the Teaching of Science"

Steven P. Bergel
South Country School District
Brookhaven, New York

and

Seymour H. Fowler
The Pennsylvania State University
University Park, Pennsylvania
Wednesday
4:15 - 5:45
Parlor 0
North Hall

D. Research Priorities Symposium

Presiding: Stanley L. Helgeson
Ohio State University
Columbus, Ohio 43210

"Priorities for Research in Science Education"

David P. Butts       David May
William Capie        James Okey
Ellen Fuller         Russell Yeany
The University of Georgia
Athens, Georgia 30602

"Analytical Study of the Research Priorities of Science Educators"

Russell Yeany       William Capie
The University of Georgia
Athens, Georgia 30602

"The Relationship Among Science Educators' Research Priorities and Demographic Variables"

Russell Yeany       James Okey
The University of Georgia
Athens, Georgia 30602

"Critique of Results"

Gary Bates
Teachers College, Columbia University
New York, New York 10027

Edward Smith
Michigan State University
East Lansing, Michigan 48824

Paul Koutnik
Illinois Institute of Technology
Chicago, Illinois 60616

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Wednesday
5:45 - 7:00  SOCIAL HOUR  Continental Room

March 24
Thursday
8:00 - 12:00  REGISTRATION  Fourth Floor Foyer

Thursday
7:30 - 10:00  EXECUTIVE BOARD MEETING  Parlor G

Presiding: Roger G. Olstad
University of Washington
Seattle, Washington 98195

Thursday
9:00 - 10:30  CONCURRENT SESSION SEVEN  Parlor L

A. Learning Theory: Piaget

Presiding: Marvin Druger
Syracuse University
Syracuse, New York 13210

"Measurement of Logical Thinking: An Electronic Equivalent of Piaget's First Chemical Experiment"

Frederick P. Deluca
Iowa State University
Ames, Iowa 50011

"The Development and Validation of a Classroom Test of Formal Operations"

Anton E. Lawson
University of California
Berkeley, California 94720

-27-
"The Construction of an Instrument to Measure Proportional Reasoning Ability of Junior High Pupils"

Orville G. Ruud
Bloomington Public Schools
Bloomington, Minnesota 55431

"The Validation of Two Science-Centered Incident Batteries Which Distinguish Concrete and Formal Reasoning"

John W. Renner
University of Oklahoma
Norman, Oklahoma 73019

"The Role of the Proportionality Schema in Introductory High School Chemistry"

Heide Kass
University of Alberta
Edmonton, Alberta, Canada T6G 2G5

and

Alan E. Wheeler
University of Alberta
Edmonton, Alberta, Canada T6G 2G5

Thursday
9:00 - 10:30
Parlor M

B. Instruction

Presiding: John Butzow
University of Maine
Orono, Maine 04473

"An Experiment in Science Instruction with Fifth Grade Children in Spanish-English Bilingual Schools"

John R. Juarez
University of Washington
Seattle, Washington 98195
"The Influence of Spatial Abilities, Aptitudes, and Attitudes on Success in Geology"

Osborne B. Nye, Jr.
Syracuse University
Syracuse, New York 13210

and

Larry E. Schafer
Syracuse University
Syracuse, New York 13210

James C. Brower
Syracuse University
Syracuse, New York 13210

"An Exploratory Study of Teacher Interventions in Elementary Science Laboratory Groups"

Wayne F. Oakley
Department of Education
Province of Newfoundland
St. John's, Newfoundland, Canada

and

Robert K. Crocker
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

"The Effects of Diagnostic Testing and Remediation on Science Achievement and Retention"

Joe C. Long
University of Georgia
Athens, Georgia 30602

and

James R. Okey
University of Georgia
Athens, Georgia 30602

Russell H. Yeany, Jr.
University of Georgia
Athens, Georgia 30602
"Application of Bales Interpersonal Model to Science Teaching"

Gary C. Bates
Columbia University
New York, New York 10027

Thursday
9:00 - 10:30
Parlor N

C. Competency Based Teacher Education
Paper Set

Presiding: Alan M. Voelker
Northern Illinois University
DeKalb, Illinois 60115

"Surveying Changes in a Competency-Based Teacher Education Program"

"Cognitive Gains Assessed by a Self-Made Instrument for a Competency-Based Teacher Education Program"

Otis Lawrence
Governors State University
Park Forest South, Illinois 60466

"Correlating Beliefs About Science and Science Teaching with Preferred Learning Styles"

Leon J. Zalewski
Governors State University
Park Forest South, Illinois 60466

"Comparison Between Elementary Science Education and Non-Science Education Majors"

Donna Siemro
Governors State University
Park Forest South, Illinois 60466
"The Difference Competency-Based Science Teachers Make: Student Variables"

Eugene Nuccio
Governors State University
Park Forest South, Illinois 60466

"Changes in Teacher Attitudes and Behaviors with Time in the Classroom"

John Hockett
Governors State University
Park Forest South, Illinois 60466

Thursday
9:00 - 10:30
Parlor 0
D. Teacher Education Paper Set

Presiding: Barbara Strawitz
Louisiana State University
Baton Rouge, Louisiana

and

James P. Barufaldi
University of Texas
Austin, Texas 78712

"Attitudinal Changes and Open-Mindedness of Pre-service Elementary Teachers Following a Science Methods Course"

Martha K. Piper
University of Houston
Houston, Texas 77004

and

Linda Hough
University of Houston
Houston, Texas 77004

"The Effects of an Elementary Science Methods Course on the Attitudes of Preservice Teachers Toward Science"

Lowell J. Bethel
University of Texas
Austin, Texas 78712

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and

Martha Piper
The University of Houston
Houston, Texas 77004

William G. Lamb
Delta State University
Cleveland, Mississippi 38733

"The Effects of Methods Course Components on Elementary Education Majors: Replication and Extension"

William G. Lamb
Delta State University
Cleveland, Mississippi 38733

and

Martha Piper
The University of Houston
Houston, Texas 77004

Lowell J. Bethel
University of Texas
Austin, Texas 77025

Thursday
10:45 - 12:00

GENERAL SESSION TWO

Pavilion

Presiding: Roger G. Olstad
University of Washington
Seattle, Washington 98195

"Science and Fate Control"

Mary Budd Rowe
University of Florida
Gainesville, Florida 32601
Thursday
1:30 - 3:00
Room 602
North Hall

CONCURRENT SESSION EIGHT
A. Teacher Education

Presiding: Ellen S. Simmons
Teachers College
Columbia University
New York, New York 10027

"Relationships Between Science Teacher Needs and Selected Teacher Variables"

Kenneth D. Moore
The University of Tulsa
Tulsa, Oklahoma 74104


Eugene L. Chiappetta
University of Houston
Houston, Texas 77004

and

Alfred T. Collette
Syracuse University
Syracuse, New York 13210

"Attitude Changes of Teachers Trained and Selected as Model Science Teachers"

Dorothy L. Gabel
Indiana University
Bloomington, Indiana 47401

"The Effects of Studying a Question Classification System on the Cognitive Level of Preservice Teachers' Questions"

Joseph P. Riley
University of Georgia
Athens, Georgia 30602

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"Estimation of the Reliability and Validity of Rating Science Teacher Behaviors"

Masood S. Ashrafi  
University of Iowa  
Iowa City, Iowa 52242

and

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

Thursday  
1:30 - 3:00  
Room 615

B. Journal of Research in Science Teaching Editorial Board Meeting (open to all registered conference members)

Presiding: David P. Butts  
University of Georgia  
Athens, Georgia 30602

Thursday  
p.m.

Association for the Education of Teachers in Science has several sessions in their program planned for this afternoon of special interest to NARST members. Please consult the AETS program for details.

March 25  
Friday

In conjunction with other science education organizations, several joint sessions have been arranged for your interest.

Friday  
8:00 - 9:00  
227 Convention Center

Joint NARST/AETS Session

Presiding: Jacob W. Blankenship  
University of Houston  
Houston, Texas

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"A Consideration of the Ethical Implications of Questions Asked in Science Teacher Education Research"

Ronald D. Anderson
University of Colorado
Boulder, Colorado 80309

and

J. W. George Ivany
Memorial University
St. Johns, Newfoundland, Canada

Friday Joint NARST/NSTA Session
10:45 - 12:00
210 - 212
Convention Center

Presiding: Sylvia K. Shugrue
District of Columbia Public Schools
Washington, D.C.

Ellsworth Scott Obourn Memorial Lecture

B. F. Skinner
Harvard University
Cambridge, Massachusetts 02138

Friday Joint NARST/AETS/NSSA/CS3 Session
3:00 - 5:00
201 Convention Center

Presiding: Ertle Thompson
University of Virginia
Charlottesville, Virginia 22803

"Who Speaks for Science Education?"

Marjorie H. Gardner
University of Maryland
College Park, Maryland 20742

and

Robert W. Howe
Ohio State University
Columbus, Ohio 43210

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Douglas S. Reynolds  
State Education Department of New York  
Albany, New York 12224

James R. Wailes  
University of Colorado  
Boulder, Colorado 80309

Reactors:  
F. James Rutherford  
New York University  
New York, New York 10003

N. S. F. Representative unidentified  
at this time.
NARST PROGRAM STRUCTURE

This listing of program format and the following definitions are offered to clarify the structure of this program. In addition, all members are invited to make specific suggestions for modification of format or inclusion of topics in 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.

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 paper 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. 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.

5. 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.
6. 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 NARST members from institutions with faculty vacancies.

7. TRAINING SESSIONS - These sessions are devoted to topics of basic importance for conducting disciplined inquiry of particular types. They are to contain a thorough and sophisticated treatment of a research methodology, including training in the basic procedures to be used.

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.

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