NARST Newsletter

QUARTERLY NEWSLETTER OF THE NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

Spring, 1964

HIGHLIGHTS OF THE ANNUAL MEETINGS

This year the annual meetings were held at the La Salle Hotel in Chicago, Illinois March 21-24. A fine program was arranged by Dr. Fred Dutton including the special session arranged by Bud Obourn to exchange ideas with NARST Patrons. Papers given by representatives of our Patron group are included in this Newsletter.

The annual business meeting was held Monday afternoon. The principal item of business included discussion of our financial needs in view of the deficit last year and expenditures over income of almost $500. Among the possible approaches for improving the financial picture of the Association the following were discussed:

1. Possible increase in the annual dues.

2. Provision for associate memberships which would not require election and would be available to graduate students and other interested individuals. These members would be non-voting and would not be eligible for Fellowship status in AAAS.

3. Increase in the number of Patrons. In this conjunction it is urged that members of the Association who have personal connections with a business establishment or industry which is science based or science related and where a Patron for NARST might be a possibility, are requested to communicate with the Secretary-Treasurer for suggestions on approach. This request does not apply to Authors and Publishers, since a special appeal for this group is being considered.

4. A proposal for financial support of the Journal on an interim basis is being prepared for submission to the National Science Foundation. This would lead in support of the Editorial Office, our largest single expense, until our membership and Patron group enlarges to the point where the Association can be self-supporting.

5. It was suggested that individual NARST members might make contributions to the Association. Two Such contributions have been received and we would welcome additional contributions from those individuals who wish to add support to the Association at this time. They should be sent to the Secretary-Treasurer.

The time and place for the 1965 meetings was discussed. Three undesirable options face those responsible for setting up a meeting time for a national organization.

1. NARST can meet independently of other organizations requiring additional travel time or money for those who attend.

2. It may meet prior to or following another organization which results in the combined meetings covering a full week which is longer than many staff members can afford to be away from their home campuses.

3. The meeting may be scheduled simultaneously but independently of that of another organization. This experiment was tried in Chicago in 1964 with NSTA and has been judged unsatisfactory by most participants.

The Executive Committee has directed that the membership be polled. Will you please indicate your preference for the time and place of the 1965 meeting from the options indicated on the enclosed card.

This year we held our first election by mail ballot, the results of which were tallied by Professor Lefler. He reported that the following individuals were elected:

President:

Dr. Fred Brown, Head
Science and Math. Teaching Center
Michigan State University
East Lansing, Michigan

President-Elect:
Dr. Milton Pella
School of Education
University of Wisconsin
Madison, Wisconsin

Secretary-Treasurer:
Dr. Joseph Novak
Biological Science Dept.
Purdue University
Lafayette, Indiana

Research Coordinator:
Dr. Lloyd Johnson
Office of Education
U.S. Dept. of Health
Education and Welfare
Washington 25, D. C.

Members of Executive Board:
Dr. Phil Johnson
Nature, Science and Conservation Education
Cornell University
Ithaca, New York

Dr. Frederick Fitzpatrick, Head
Dept. Teaching of Sciences
Teachers College, Columbia University
New York 27, New York

We hope to improve communication with the membership during the next year and to extend a contribution that might be made with the Newsletter. We would urge you to prepare news items and mail these to the Secretary or to Dr. Phil Johnson who will prepare the Fall Newsletter, or Dr. Milton Pella who will prepare the Winter Newsletter.

The officers would appreciate suggestions from the membership regarding various phases of the Association's activities and suggestions for the annual meeting. Please forward these whenever items occur to you.

NASA-USOE SPACE SCIENCE CONFERENCE

During the first week of June the National Aeronautics and Space Agency in cooperation with the U. S. Office of Education will jointly sponsor a National space science conference at the International Hotel, Los Angeles, California. The conference is being held for State Administration, and members of the Sub-Committee on Institutes and Conferences of the Cooperative Committee on the Teaching of Science and Mathematics, AAAS.

The purposes of this conference are: (1) to explore further the important role of science education in the Nation's space effort; (2) to develop plans for enriching and modernizing science teaching through the incorporation of space-related materials; (3) to draw closer the person to person professional relations that exist between and among the members of the participating organizations; (4) to provide opportunities for members of the participating organizations to meet and work on their specific problems; and (5) to provide NASA's education staff an opportunity to discuss with representatives of participating organizations those problems of science teaching related to NASA's educational programs.

INTERNATIONAL CONFERENCE ON SCIENCE EDUCATION

There will be a Northern Regional and International Conference on Science Education held at the Banff School of Fine Arts, Banff, Alberta, Canada from September 17-20, 1964. This conference is co-sponsored by the National Science Supervisors Association, the Province of Alberta's Department of Education, the University of Alberta, and the Science Council of the Alberta Teachers' Association. In addition to the States of the northern region (Montana, Idaho, North Dakota, Washington, and Alaska) an international emphasis has been given to the Conference through the participation of delegates and speakers from major science education centers across Canada, the United States, Australia, New Zealand, Japan and other countries.

SHELL COMPANIES FOUNDATION HELPS NARST

The Executive Board of the National Association for Research in Science Teaching takes this opportunity to recognize and express appreciation of the donation by the Shell Companies Foundation of $2,000 to the Association for support of the Journal of Research in Science Teaching by sending copies of the present issue, Vol. 1, No. 4, of the Journal to past and present Shell Merit Fellows, and for the general support of the Association.

The Shell Companies Foundation considers this donation an expression of their appreciation for the contributions of Professors Paul deH. Hurd and Philip G. Johnson, coordinators of the Shell Merit Programs at Stanford and Cornell Universities respectively, for their contribution to improved science teaching generally, and particularly through meaningful association with the Shell Merit Programs.

N.A.R.S.T. MEETING FOR PATRONS

Arranged by Ellsworth Obourn, U.S. Office of Education

The general back-ground of the Panel and its purpose, was given by Dr. Ellsworth Obourn. Essentially, the purpose of this particular Meeting was to serve as means of communication between the Science Educator, and the Scientific Supply House. N.A.R.S.T. had a financial problem confronting them, and because of it, have been unable to work as effectively in Research Projects as they had wished. By extending Patron Membership to commercial organizations, and offering to those organizations something in return, such as guidance in problem-solving and evaluation of materials, an excellent arrangement seemed possible.

Dr. Smedley pointed out in his opening remarks that better communication is needed between Science Education and just about every body else, especially the Scientific Supply Houses. New and thorough methods are needed for testing the new educational materials and techniques still are to be devised. N.A.R.S.T. is one way to organize this.

Jim Irving observed that the Educationist must learn to respect the experts of the Supply Houses and commercial concerns, as well as their own. Making available to teachers some of the problems of the Supply end, such as cyclic buying, would perhaps help to alleviate some of the present problems.

Bill Gamble stated in his opening remarks that if N.A.R.S.T. could be a Clearing House in the solution of problems common to both educator and the supplier, it would be most useful. Criticisms of products and ideas, without certification of a product by a group, however, was necessary. Ethical standards, for use by people from education in industry, especially for sabbatical leave arrangements, should be considered. He further added that it is essential to keep in mind that the educator who goes into industry often has the criticism from his compatriots, and there should be some evaluation of this problem. Whatever the arrangements and form, most important is a workable service with industry which will improve both communications and product evaluations.

The general comments from the Members on the Panel were given. Dr. Claude Gatewood evaluated particularly the comment of cyclic buying, which was made, pointing out that there are many difficulties which require that this kind of buying be done by school systems, whether it is in the construction of school buildings or in the supplying of laboratory materials. The general indication was that there is perhaps a lack of understanding of the complete school problem from the standpoint of the supplier. And it is certainly in discussions at Meetings such as this that these matters are aired, and fully understood.

Dr. Edgar Martin called to the attention of the Group that there are now 42 Research Centers in the United States. These Research Centers are for research and orientation of educational problems. They are scattered across the country, and serve as clearing houses for particular problems and particular teaching difficulties. Mr. Robert Preston, of the Ohaus Scale Corporation, pointed out that the problems which his particular organization has are somewhat different from those of many suppliers, because they are a manufacturer. And because of this, they deal through suppliers, and are, as a result, more remote from the customer than is the supplier. They are interested in having a better understanding of what is needed, and where the trends in education are going. Finally, the general questions which were submitted prior to the Meeting by various Patrons indicated especially a need for better communication in terms of the new trends in science education. This would certainly include what the new programs are, as well as what trends they are setting seem to be.

It is necessary that the suppliers know and understand exactly what the trends in elementary, high school, and college education are going to be. These questions can probably serve as the main guide-lines for the N.A.R.S.T. Program.

Certainly, two problems are paramount in this particular consideration. One is leadership; the other is money. With the present program as N.A.R.S.T. is establishing it, in order that industrial relations can be built more closely through this kind of relationship, the Patron established fund will supply a fair amount of money. It is up to both Industrial Patrons and the N.A.R.S.T. Members to contribute in the matter of leadership. It is further necessary that these leaders be people who are not only able to communicate enthusiastically and effectively, but also people who understand something of the problems on both sides of the fence.

"RELATION OF THE ASSOCIATION WITH IT'S PATRONS"

A. E. Smedley, Welch Scientific Company
Chicago, Illinois

INTRODUCTION

Dr. Obourn - Members of NARST, fellow participants, ladies and gentlemen.

I deem it a privilege to participate in your program and to say a few words FROM THE VIEWPOINT OF AN EDUCATOR.

Even though my present affiliation is with a commercial firm I consider it a distinct honor to be working with educational institutions and associations such as NARST.

For better than eighty years, the paramount interest of The Welch Scientific Company has been devoted to educational progress through the development of better tools for science teaching. Progress can be possible only by the cooperation of educators, associations of this type, and educational institutions.

The lesson America learned from Sputnik was the lesson of the twentieth century technological civilization; namely, that the strength of any nation is dependent directly on the fullest development of its human resources. It is through the toil and tedious efforts of the individual doing research that many of our problems are answered.

PROBLEMS AND POTENTIALS - From the Viewpoint of an Educator

SOME PROBLEMS

SCIENCE EDUCATION IS CHANGING During the last ten years, much effort and a huge amount of money has been devoted to changing American science education - resulting undoubtedly, in rather vast changes. These changes have occurred at all levels - K through secondary and even into the college and university. All of the modifications in science programs are the outgrowths of demands of educators, students, parents, interested citizens, government agencies, science organizations, hysterical critics, and sputnik. Unquestionably, a large number of the changes have been real improvements. In spite of this demonstrable progress, is it possible to conclude that all young people have received improved experiences in science? Singificantly this is not the case, because of the relative small number of school systems which have a well developed K-12 science program in operation in their schools. Even so, today we have an accumulation of science information so vast that no one person can grasp all of it. The effects of the number of new programs in

secondary school science are being evidenced with favorable and also questionable achievement standards.

CURRICULUM EMPHASIS There are differences of opinion among teachers and educators as to what the structure of the secondary schools science curriculum should be. Some think there is too much emphasis being placed on molecular and cellular biology and not enough emphasis on ecology, morphology, conservation, chemistry, physics, and other science information that is needed by the citizen. Some would claim it is the other way around. The present conflict between new concepts and long-familiar principles of biology reflects uncertainty about the most profound attributes of life. In this months issue of the N.E.A. Journal, Dr. Barry Commoner has an interesting article on "Biology Today".

Do we have too much deductive learning and not enough inductive learning in the new courses? Some chemists wonder if the new programs might not emphasize problem solving with too little information being given or required for solving the problem. Physics teachers found that the building of equipment by teachers and students slowed the learning of physics. Science teachers are well aware of the many programs for high ability pupils and science majors but wonder how to create a science curriculum for average and below average ability pupils and non-science majors. Little experimental work has been done in this area. We need more experimentation with science curriculums for the average high school pupil. Approximately, one-third of the high school graduates are flooding the market of our unemployment today.

NEEDS FOR SCIENCE EDUCATION

Are the needs of secondary school pupils for science different today than in the past? The obvious answer is yes, they are different. No force has reshaped living conditions for society as has science and technology. It has shifted most of our population in or near the large cities. We no longer educate large numbers who will become farmers. We no longer have large numbers of pupils who have first-hand knowledge about plants, animals, soil and minerals and their relationship to one another. The majority of our graduates, or those who may drop out, or fade out, are ultimately going into manufacturing plants, sales, offices, and the many service type jobs. Some jobs require lengthy training, others are on-the-job learning situations. Even so, all of them will be concerned with science problems. As voters they will cast their vote on questions of air and water pollution, chemical hazards, national control of education, school taxes, electrical and gas problems, road and street construction, recreation areas, population control, food distribution, advertising of injurious substances, and many other things

of scientific nature. All people need a science education to cope with these problems in today's world of science.

OTHER OBSERVATIONS

Perhaps science and the emphasis on science has been overdone. There are a number of our citizens who feel this rather strongly. Probably this has been caused, if there be some validity to this view, primarily due to the necessity for the efficient manning of our defense mechanisms caused by the world situation.

For this reason, and others already mentioned, we need to take a relook at the science curriculum from the kindergarten through grade twelve. Inexperience, particularly on the part of elementary teachers, and others without recent or with limited training in the technical manipulation of scientific apparatus and equipment, has hindered progress in science education. The type of new media introduced to be used in the retraining of former teachers or in the training of beginning teachers needs careful testing and evaluation.

We need tools for the analysis of good methods in science teaching. We need a clarification and definition of the many terms used in science today, particularly, their application, interpretation and place in the science curriculum of the schools. For example, "Unified Science" an alternate to tradition; "Demonstration Is Teaching", etc. When did a good demonstration in the science laboratory or classroom cease to be an accepted method of teaching? Where does the magic act of a magician (or showman) end and a good science teachers' demonstration begin? Is this an approved and accepted way of motivating children and securing their interest in science? Perhaps this type of operation has a place but to what extent?

SOME POTENTIALS

Our educational socialite is so complex that the average school administrator, educator, and teacher may have limited information beyond his own sphere of interest or subject field. If he is not a member of a particular organization, he may be totally unaware of its existence. Consequently, there are a large number of educators today who are not familiar with NARST. Perhaps there are even some science specialists who are in the same category, not to mention the science teachers.

I would like to mention briefly three points:

1. What are some ways, means, and methods that NARST can better inform educators of their activities?

2. What is the basic information which NARST has, can or should obtain which would be most helpful to educators?

3. How can NARST continue to strengthen the relationship between scientists, science educators, teachers and other facets of the total educational program?

FIRST - Inform Educators of Activities:

This isn't easy and has many implications. Your publication of course, does not reach the majority of educators; hence your best story or media of information misses this target. What percentage of science educators, science teachers and others interested in research in science teaching does it reach? Some additional media through which to inform these people about your organization should be investigated and utilized. Perhaps brief articles in other periodicals or publications might be a source. From this should come leads and inquiries from interested and concerned persons about your organization, its work, and even suggestions for needed research in the science teaching field.

SECOND - Basic information which could be most helpful to educators: The lag of time between the completion of any research project and its true evaluation and disemination to the proper sources presents a problem. Educators consistently are asking: Do you know of any recent studies on K-6 science program, subject content, equipment, methods, etc? At what ages do children learn science concepts better? Are there any studies of evaluation on the many textbooks used in science? How successful are some of the new programs in PSSC, BSCS, ChemStudy, ChemBond, ESI, and many others? Do we have research to support the success or failure in any case? What is the value of semi-micro chemistry vs. traditional chemistry? Pertinent research on methods in all the science areas is most important to the educator. Perhaps a brief of some type put out annually by the association to educators would help.

THIRD - Relationship between scientists and science educators: This perhaps is best established by NARST, at present. This 37th annual meeting, affiliation with AAAS and the Council for Research in Education is evidence. The number of papers from sources submitted and presented here, many of which will be published in your journal is, of course, of real value. The personal association of your members with members of other organizations, exchange of ideas, discussion of trends, etc. is another good example of rapport.

The continued efforts of the organization and its members in this association can do perhaps, as much as anything to strengthen these relationships.

There is another avenue which has already been used to some extent, but probably could be pursued more vehemently with productive results. This is, cooperation and affiliation with various commercial concerns, to aid in the work and publicity program of your organization. I am sure there isn't a reputable commercial organization which would not support you if given the objectives and plans for your undertaking.

"PROBLEMS AND POTENTIALS FROM THE VIEWPOINT OF THE FACILITIES AND EQUIPMENT INDUSTRIES"

James Irving,
Scientific Apparatus Manufacturers Association
Chicago, Illinois

Opening Statement:

My part in this discussion will try to deal wholly with the possible potentials of the user/manufacturer relationship. Most problems are created through our joint failure to appreciate these potentials. Hence, most of my remarks will be dedicated to a positive approach which, in the long run, will no doubt eliminate all problems -- knowing full well that in most instances of the industry's 60 years' experience with educational and practicing scientists such problems have indeed been very limited.

1. Fundamentally, we are all interested in producing the most advantageous and profitable laboratory working environment for both students and teacher. The literature is overflowing with highly worthwhile educational specifications for various classrooms and laboratories.

   These educational specifications must in turn be translated into apparatus, instrument and scientific laboratory furniture specifications that will do the best possible job. May I strongly stress, then, the importance of following these well thought through specifications developed by the educational scientist through to the ultimate purchase of such facilities.

   It would appear to the manufacturer as a horrible waste of time, money and effort on the part of the educator to develop rigid specifications and then in the last analysis end up by "buying low bid" to the detriment of the entire science program.

2. Great things in the field of science education can be accomplished by adopting and practicing the "team buying" concept. This means that the administrator, science department head, the school business manager or purchasing agent and the architect, where already retained, should purchase laboratory facilities and equipment as a team rather than giving this assignment to any specific person on the school's administrative level.

3. Better science programs are readily available to buying teams who, at starting, establish realistic budgets. Such budgeting faces up to the realities of the particular school situation and most always assures the buyer of getting the finest quality of equipment available at the established budget criteria. This will not only add to the potential of the school's science program, but at the same time will save needless embarrassment for school purchasing teams who sometimes do too much "pie in the sky" thinking and later find they are caught in a financial frenzy -- ending up their purchasing assignment by having to obtain low quality facilities. All SAMA members are always very happy to assist in arriving at budgetary estimates that will give the user the most science teaching potential for the school dollar.

4. Manufacturers continually emphasize the many advantages of placing orders during their "slow manufacturing periods." By eliminating the vicious June order/August installation cycle, the user can gain many worthwhile advantages, once again leading to a better and more effective science teaching program.

   Some of these significant advantages include saving money, allowing ample time for changes where necessary and most certainly having the laboratory ready for the school's opening in September.

5. The industry is happy to furnish consultation of its room planning specialists to all who ask, without charge -- and best of all this involves no further obligation on the part of the potential buyer. It is strongly suggested, too, that architects be brought into the picture just as soon as possible, to work with the industry's room planning specialists. Experience of many years has shown that "self-design" may be satisfying and ego-inspiring to the user, but usually ends up in a wasteful, inefficient and costly installation -- not to mention, of course, a poorer science teaching program.

6. Once again, experience has shown that keeping the science laboratory furniture out of the total building contract gives the user many advantages which he fails to receive if the furniture contract happens to be a part of the total building contract. The potential of the user working directly with the scientific laboratory furniture manufacturer is great indeed, and in the last analysis gives much greater assurance of the laboratory making a contribution to the science education program. In short, the user automatically has a thorough control over the job.

Hence, the industry strongly recommends too, that the purchase be handled through the school's own buying agency or as a prime contract under the jurisdiction of the architect.

While there is still no substitute for the equipment in the minds of the men and women running these laboratories; perhaps the above suggestions may make for an even more thorough utilization of the teaching scientists as they work with young people every day and consistently improve science education in America.

COOPERATIVE MATERIAL DEVELOPMENT

William Gamble, President,
Ward's Natural Science Establishment, Inc.

There is a good deal of agreement that the role of education is to develop young people who will be able to cope with the problems of their lives in a manner successful to themselves and society. Each one of the words of such a definition bears careful scrutiny, but certainly one of the key words is "cope". If there is any trend, it seems clear that the curricula that are being developed have as their primary purpose the development of problem-solving ability.

Probably our common ground of meeting tonight is our desire to create better tools for the teachers of science to utilize in their jobs of stimulating young people. These tools or materials that we are hoping for would probably have three characteristic elements:

1. In themselves they would be scientifically accurate.

2. They would carry with them materials to assist the teacher in their utilization.

3. They would allow for student participation to develop that degree of intellectual curiosity needed for the development of the young person.

What is the state of the art at the present time? How good are the filmstrips and the films, the overhead projectuals, the models, the books, the charts, the equipment? Do they in fact satisfy our requirements or do we need significant additions, subtractions, improvements, and deletions? Depending on our feelings, on this central question will lie the success or failure, I believe, of any cooperative effort between a group such as the National Association for Research in Science Teaching and its Patrons.

If we look back over the past record of material development and are dissatisfied, there are perhaps a number of steps to be taken in the future to improve materials.

First and foremost would be the opportunity for creative people in the educational community who are interested in material development being able to work for a definite length of time with particular business groups who are interested in the same things. A year's work of this kind, for instance, can accomplish a great deal more than what we have thought of in the past as consulting. It gives the creator a much greater opportunity to work in depth and to put his or her individual stamp on the final product to a degree not possible through ordinary or casual consulting.

Immediate problems present themselves in such a suggestion. First of all the problems of compensation. In this area of compensation, royalty agreements, and the like, it might be interesting for a group like the National Association for Research in Science Teaching to explore, not with the idea of developing some specific code, but perhaps with the idea of evolving some ethical guidelines, for it is here that a gap exists: between private gain and public good.

We all know that a certain stigma can attach to a person who enters into a commercial relationship and exposes himself therefore to serious pressures and criticisms. We know a very real problem exists for individuals who have worked on specialized developmental projects at government expense, associating themselves with commercial situations. Perhaps because of these difficult relationship problems, many of the people who are in possession of the professional information required for material development are outside of the private enterprise system.

Where projects have been developed with public funds there is often another roadblock: the distribution of the materials developed. This leads to situations where we have movie projectors without films, new 8mm cartridge projectors without any cartridges, overhead projectors without a wide variety of projectuals, etc.

Still another problem in the area of a sabbatical leave to industry would be the question: - Can a person be excused from his regular teaching duties and allowed to go and work privately in industry and then return to teaching work without loss of either tenure, prestige, or seniority? These are but a few of the questions that could be usefully looked at.

Another useful step that might be taken would be for an organization such as the National Association for Research in Science Teaching to act as a sort of clearing house between those people who are interested in material development from the teaching angle, and those who are interested in the development of such materials from a commercial angle. Rosters of people interested in particular projects could be maintained along with information from commercial people on projects that they are interested in.

Still another possible area of cooperation would be in the evaluation of materials developed by private concerns. This is not to say certification. I personally am extremely leery of any suggestion that products be certified as good, bad, or indifferent by an academic group, since the possibilities of compromise are so great in this area that I personally believe that it should be left alone.

However, in the area of evaluation - educated criticism we might call it - there is the possibility to bring about improvement of material. To give a recent example of my own experience I might tell about some of the problems of the Dyna/Vue system of overhead transparencies. This idea was conceived by Dr. Robert Gering of Wells College. He has come to Ward's for a year to develop this program. Mr. John Youngpeter of our Educational Services Department gathered together a team of people to evaluate the work as it was done. These individuals helped us where the text was unclear and where the visual concepts needed strengthening.

However, the facts of the matter were that we still had initial difficulty with the product because in actual use there were some problems with the ink that we used, and also some problems with the size of the lettering. The evaluation was extremely helpful but it was not sufficiently critical. I am not for a moment suggesting that originators of material of this kind are not fully responsible for what they have done and that they can, in fact, shift the blame to other people. However, a source of critical evaluation would certainly be extremely useful.

Although I can only speak for Ward's Natural Science Establishment, it is my belief that there is a great capacity for cooperative material development between educators and the scientific supply and publishing industries. It should be possible to organize a considerable portion of this capacity for the betterment of material development.