

**REPORT OF THE REPRESENTATIVE TO THE
AMERICAN ASSOCIATION FOR THE ADVANCEMENT
OF SCIENCE AND THE ACADEMY CONFERENCE**

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Those who attend the annual convention of the American Association for the Advancement of Science (referred to hereafter as AAAS) and the Academy Conference obtain a considerable fund of information and are inspired to greater activity in their scientific careers and to initiating programs for the encouragement of the youth of our country to pursue similar careers. The weakness in the chain, however, is the lack of proper dissemination of the ideas and enthusiasm obtained by the attendants to the convention. I shall therefore attempt to present a detailed background of the AAAS and its activities, the Academy Conference and its relation to the Senior and Junior state academies, and something of the national plan for the promotion of science teaching and science careers.

The AAAS is a society of individual science-minded members, some 53,000 at the present time, dedicated to the advancement of all science and to the service of scientists and society. The association is also a federation of 231 scientific societies and other professional organizations plus 41 state and city academies of science affiliated with it. Over the 108 years of its existence, the original two sections have become 18 sections that embrace all the principal scientific disciplines and education. The AAAS also has a few local branches or chapters. You might say that the Tennessee Academy of Science is a branch or chapter; actually we are an affiliate of AAAS.

The AAAS was founded in 1848, the St. Louis Academy in 1837; the New Orleans Academy in 1853; but nearly all the academies were founded after the Civil War; indeed, a majority were formed well into the twentieth century. Affiliations of city and state academies with the AAAS began in 1919 and since this date the AAAS Council has had a representative of each affiliated society and academy. The AAAS has always regarded the academies of science as fully autonomous, parallel organizations with aims and objectives within their territorial limits, quite similar to its own.

It is true that each Academy of Science within its area functions like a small AAAS in that it is interdisciplinary and is concerned not only with advancing science in various ways but that it seeks to inform the public, which supports science, directly and indirectly, about science. The relationship between AAAS and all the academies has been mutually cooperative and constructive. The Association officers attend academy meetings;

suggest or provide speakers; and tender advice when asked. The academies secure members for AAAS and locally support its work.

The Academy Conference was the brain child of our own late D. John T. McGill who advanced the idea of a federation of academies in 1926. In 1927 it was considered a standing committee on the relations between the academies and between them and the AAAS. The Conference has appointed committees to function during the year between meetings. At the 1932 meeting a committee on Junior Science organizations read a report on high school science clubs in New York. Junior scientist activities and junior academies had been extensively discussed at previous meetings in 1930 and 1931 and this subject has been on the agenda at virtually every meeting since. In 1936 a Conference committee reported on its explorations of ways and means to provide and disseminate source material for science clubs but no satisfactory plans were evolved because finances were especially difficult at that time. The venerable institute, the American Institute of New York, that had operated exhibits of inventions and science fairs since 1828, had just turned over its science fairs on a national scale to Science Service. In 1939 the Conference adopted this plan: In states with an academy of science and a junior academy, it was recommended that science clubs should be referred to as the junior academy, in states with neither, it was suggested that the clubs should become "Associated Science Clubs"; in states with a senior academy but no junior academy, it was recommended that a junior academy should be established. The Conference has had a continued interest in all ways and means to encourage young scientists. It has a standing committee on junior academies.¹

The Academy Conference constitution, adopted in 1951, provides for a committee each year to arrange a Junior Scientists Assembly. This is a specially planned activity for local high school students in the area where the AAAS has its annual meeting. Originally begun with just student exhibits, the last two Junior Scientists Assemblies have concentrated on top-level speakers and panel discussions designed to help those present to consider and enter careers in science. Unfortunately only about 1000 can be accommodated each year and selection must be made for ticket holders.

Groups of science clubs on an organized basis and junior academies of science are comparatively recent movements. Illinois organized the first Junior Academy in 1928 and had its first Science Fair that year. Indiana and Kansas were next in 1930 and at the present time the 41 academies have 24 active

¹Much of this historical data has been obtained from a paper by Raymond L. Taylor, Associate Administrative Secretary, AAAS.

junior academies with several others that could be revived. There is a wide variation in the kinds of activity, the degree of organization, and in the financing. Each year the AAAS awards to each Junior Academy two honorary memberships in the Association.

The formation of the Academy Conference came spontaneously and at the initiative of the academies. The Conference has operated from its beginning with no subsidy from the AAAS. The Conference requests from each academy 1¢ per member per year for operating expenses.

Let us consider the future of Junior Academies. Would we profit by a national federation of Junior Academies? Are there any disadvantages in "one big union" of all junior activities? Each academy is the best judge of how it best can serve science in its own territory. It would therefore seem that the Academy Conference is the logical group that should foster coordination of the work of the Junior Academies or explore how the Junior Academies and other junior activities might cooperate more effectively than at present. The AAAS is deeply interested in bringing sound science to the young people of the nation as evidenced by the work of the AAAS Cooperative Committee on the Teaching of Science and Mathematics, the Junior Scientists Assembly, the Science Teaching Improvement Program (STIP), the expansion of the Traveling Science Libraries for Small High Schools and the Popular Science Books project, yet they feel that it is unwise for AAAS to offer advice on these points unless they are specifically asked.

The AAAS is concerned with the future of state academies. One pertinent facet of the junior academy problem is a continuation of the strength of the senior academies. In a number of state academies paper-reading sessions have declined in number and the general attendance and membership rolls have not gained commensurately with the growth of the scientific population in their areas. National meetings seem to have first claim upon our research papers, yet the basic purpose of academies still remains; it is good for scientists of different fields to come together and discuss problems common to them. The present and continuing shortages of young scientists and of those that teach them requires not only that the academies continue full-scale operations but that they be as strong as possible. More reports on the specialized programs of the AAAS by several Academy Conference representatives might be the fashion for the future.

The 1956 AAAS Convention

It would be impossible here to cover adequately all that transpired at this New York City meeting and an attempt will be made to indicate a few of the pertinent reports of general interest to academy members. The report of the AAAS Committee

on Member Development indicated that while the Association is concerned with education and supply of scientists it should also be concerned with extra-scientific problems of science; of making science known to the outsider. In addition the scientist also needs education concerning what is going on outside his field. At each annual meeting of the AAAS one-half to two-thirds attending come from the surrounding locale; several hundred teachers and students attend on complimentary basis. Scientists exchange reports, chat and enjoy several good addresses dealing broadly with science and society. Many meetings of administrative and governing groups seem to interfere with the convention and might better be scheduled for a separate annual meeting. It is felt that the general program of AAAS should be planned more coherently and over a period of years with students, teachers, industrial leaders and public participating. The local groups such as state academies, science clubs, fairs, etc. should be more closely related to AAAS. Perhaps local chapters could focus real service to communities.. This would also inform Association officials of the wishes and opinions of the members. Local meetings might study "Quality of science teaching in the local high schools" and plan action. The report of this Committee concluded with the thought that business and industry need the service of science and scientists. The Association should appoint a full-time man for development of industrial relations. Perhaps there should be a White House Conference on interrelations of science and the greater public.

Of the AAAS membership 27% are in the Medical Section yet they represent only 5% of the Medical Association. Of the chemists 20% of AAAS membership is represented by 15% of the American Chemical Society; 15% of the membership are biologists and represent only 14% of all biologists; 7% are physicists and represent 6% of their total number. Those attending the annual AAAS meetings (average of last four meetings) were 39% biologists, 24% physical scientists, 22% in Health Sciences. Each annual meeting has an attendance of approximately 3,000.

A report from the Committee on Social Aspects of Science points out that in the new scientific revolution when science holds the promise of making unprecedented improvements in the condition of human life there is an impending crisis in the relationships between science and society. This crisis is generated by a basic disparity: economic, political and social processes have become profoundly dependent upon science, yet the discipline has failed to attain its appropriate place in the management of public affairs. The official state requirements for graduation from high school which calls for one year of general mathematics and for one year of general science cannot be regarded as proper recognition of the importance of science. Science receives an unduly small share of newspaper space; there is not

enough true science in magazines, on radio and television. There has been a disproportionate growth of physical science as compared to biological and social sciences; this reflects the interests and superior financial resources of industrial and military agencies that support science. We therefore embark on new ventures based on chemistry and physics before we are adequately informed of the consequences on life and social processes.

This committee states that there is inadequate progress in basic research; difficulties in scientific communication especially among the divisions of science; there are imposed restrictions on free communication; the recent Conference on Practical Utilization of Recorded Knowledge — Present and Future, held part of its deliberations behind closed doors. Some of our more immediate dangers include Radiation Dangers, Food Additives and Use of Natural Resources.

Academy Conference of 1956

Twenty-seven of the forty-one academies were represented at this meeting. All committees reported and a brief report of the activities of each academy was given by each representative.

One of the outstanding programs of the AAAS is the Science Teaching Improvement Program, and a progress report was made to the Academy Conference by I. E. Wallen, Assistant Director, STIP of the AAAS, as follows:

The brochure "Science Teaching Improvement Program," prepared by the AAAS Cooperative Committee on the Teaching of Science and Mathematics, has provided the basis for the development of the program during the first 15 months of its operation, and will continue to serve as the basic framework under which the program will operate for the remainder of the period of grant received from the Carnegie Corporation.

Activities have been carried out in conferences with scientists on more than 50 college and university campuses, at a number of regional meetings of scientists, called by STIP, and through programs of the Academies of Science, the sections of the Mathematical Association of America (MAA), and other professional societies. Opportunities have been provided for the presentation of STIP to such professional groups as the Division of Graduate Deans of the Association of American Universities, the Division of Liberal Arts Deans of the Association of Land-Grant Colleges, and the Southern Association of Colleges for Women.

Attention is also directed to the Study of the Use of Science Counselors, the project on regional consultants to colleges and universities, and to two special conferences called for the early spring months.

A pilot study on the "Use of Science Counselors" is operated in cooperation with the Universities of Nebraska, Oregon, and Texas, and the Pennsylvania State University. For the study grants were made to the four universities so that they could employ two experienced teachers who would work from the universities as consultants to high-school science and mathematics staff members. The study is intended to establish closer working relationships among secondary-school and college science personnel and state departments of education.

The project on regional consultants to colleges and universities will be inaugurated during the second semester of this school year. Twenty regions,

each with a regional consultant, have been designated. The consultants will be available to visit colleges and universities in their regions and to work with the local staffs. At Northwestern University a regional conference will be held in March with participants including science and mathematics staff members from 25 state colleges in the Chicago area. This conference is planned for exploration of promising practices in science teacher education now in operation and of new methods which might be effectively utilized. The Joint Commission of Education of Teachers of Science and Mathematics, of the American Association of Colleges for Teacher Education (AACTE) and the AAAS, is in the process of preparing a proposal for a national study of ways of improving science teacher education. The two major teaching certification organizations have given representatives of STIP an opportunity to present their point of view, and have made possible the invitation of scientists to participate in programs of Commissions on Teacher Education and Professional Standards at the state level.

Participants in a panel discussion on "What the Federal Government could do for Academies of Science" were J. A. Campbell, Director for Operations, Education in the Sciences, National Science Foundation; Lyell Thomas, University of Illinois, and Mrs. Thelma C. Heatwole, Secretary of the Academy Conference and President-Elect. Mrs. Heatwole presented a summary of the opinions of the Academies of Science on the subject as follows:

1. Sponsor an organization composed of at least one representative of each state academy to serve as an advisory group on problems of mutual interest — most present advisory groups to the federal government lack balance in that many areas of the country are not represented. Let the federal government furnish travel funds for at least one national conference and such regional conferences as may be desirable.

2. "Two years ago The Texas Academy of Science organized a Board of Science Education and included provisions for its organization in our constitution this year. Our board consists of seventeen members, including eleven district representatives from every geographical area of Texas. We feel that the time is long overdue when state academies should be concerned with careful and intense study and effort designed to improve the situation as regards high school and college science teaching. I am certain that our concern is shared by every government agency interested in the problem.

It also seems to me that we who are closest to these problems and are therefore perhaps more in a position to give more effective help are sadly lacking in funds for carrying on this work. We are not able to provide any type of counseling service, we make several trips a year for board meetings in order to contribute to this work and sometimes work for two days, although we must personally bear the entire expense, and we are unable to prepare folders and bulletins which we feel would be a great help, since the Academy does not have adequate funds for such work. This seems particularly unfortunate in view of the large sums available to many government agencies for improving science teaching.

I therefore believe that one of the most important purposes for the existence of a state academy could be more satisfactorily achieved if we could secure financial aid in carrying out the work of this important board of the Academy."

3. Financial aid is needed to enable Museums to offer more nearly adequate salaries to the curatorial, research, and public relations personnel of their respective staffs. Salaries of museum staff members have lagged far behind those of comparable trained personnel in industry and public educational institutions.

Aid in securing materials that would be of importance in presenting new technical developments in various fields of industry, science, medicine, natural history and even material in the history of science. An exchange of such material might be worked out so it would be available to many institutions on a rotational basis, with the Government supplying the original material and underwriting the transportation from one museum to another.

Financial subsidy for the preparation, maintenance and operation of educational exhibits which could be of two categories: (1) Those that would be of permanent or semi-permanent character and could be kept on display or in use for a number of years; and (2) Those that would be timely for a period of a few weeks or months and could then be discarded or transferred to some other museum. More exhibits of this type can be very effective in interesting school children as well as older attendants at the museum.

Funds to underwrite the supervision and conduct of Junior Academies of Science. This phase of the Academy and Museum work is time-consuming, expensive, and dependent on securing the services of exceptional people if the full value is to be obtained for their operation. The returns, in the form of attracting top flight young people into scientific pursuits, are great and well worth the expenditures involved.

4. That consideration be given to the desirability of NSF research grants for teachers in smaller colleges and high schools. Obviously, these people cannot compete with scientists in large institutions. The point of view I have here is that these grants would be concerned with improving science education, more than with high-level research. An active research program, at whatever level it operates, is a desirable adjunct to science teaching. Our small colleges seldom develop research attitudes in students. Such grants might be effectively administered by state academies of science.

5. A great deal could be accomplished with ten million dollars, or even five million a year, prorated to the Academies on the basis of high school populations, in helping high school graduates in need of financial aid to negotiate the hurdles that bar the way to college matriculation. Counseling and assistance in obtaining suitable scholarships would constitute an important part of such a program.

I would urge that in connection with its study of ways and means of reducing the percentage of highly qualified high school graduates who fail to continue on to college, the National Science Foundation give consideration to the feasibility of federal aid in mobilizing the resources of the Academies of Science in support of such a program.

6. More financial assistance should be made available to college science majors (undergraduate as well as graduate). The courses of study of these students are usually so concentrated that they do not have time to "work their way through college". To me there seems to be an inequity between the science disciplines and those of some other disciplines, at least as far as courses of study are concerned.

7. The old idea that "A prophet is not without honor save in his own country" limits the effectiveness of local action to improve science teaching. Participation by the National Science Foundation in such working conferences, either by having a representative attend or through joint-sponsorship, would add much to the prestige of participating in such conferences.

8. The federal government might modify current draft practices to substitute an advanced college degree in science (or its equivalent) for the current military training requirement.

9. An Advisory Committee on Junior Academy affairs with a rotating membership and a paid chairman could help with specific projects valuable to Junior Academies and could serve as a center for the dissemination of information. Information on IGY program could be routed to high

school students and teachers. High school students and teachers could be sent to IGY stations. A few direct stations could be established and radio talks could be given on the developments from their posts.

Dr. Thomas' talk is abstracted as follows:

State Academies are closely tied in with our educational system, both as to membership and interests. They have been especially concerned with the apathy towards science generated in our secondary schools and its relation to our present science manpower shortage. The causes lie within our colleges of education which have virtually controlled education in our secondary schools for several generations. The results of this shortage may now be seen in what we term science manpower shortage. The government will now have to step in and assist in correcting the damage but it must work through our present school systems, with the help of the State Academies and Junior Academies of Science and any other of the national agencies now working on small sectors of the problem.

Dr. Campbell gave a few "ground rules", in a negative sense, as to what the National Science Foundations could do.

1. Not able to accept proposals that are narrow unless can be done as exploratory. Cannot accept proposals if accrue to benefit of individual or small group.
2. Hesitate to underwrite any administrative funds.
3. Only rarely give support to capital cost of equipment.
4. Foundation does not solicit proposals; not a policy or operating agency. Federal agency takes federal funds and does not control money.
5. Do not want to overbalance education in science.

Father P. H. Yancey gave the presidential address on "The Role of the Academies of Science and of the Academy Conference in the Scientific Program" at the annual Conference Banquet. Part of his address follows:

Academies of Science, both state and local, represent the "grass roots" of science in the United States, since they were the first scientific organizations to be established in this country and are closest to the people. Their partial eclipse by the larger and more specialized scientific societies during the last few years has been one of the causes for the scientific manpower shortage which we are suffering today, because the scientists neglected to develop the sources of scientific personnel in our high schools. The academies should, therefore, be strengthened so that they can carry out their twofold role of interpreters of science to the layman and stimulators of scientific interest in the younger generation through the promotion of Junior Academies of Science.

The Academy Conference is planning, jointly with the AAAS, the Oak Ridge Institute for Nuclear Studies, and the National Science Foundation, a nation-wide conference for improving junior academies of science. It is also calling upon all academies to undertake the writing of their history for the ultimate purpose of compiling a definitive history of science in the United States.

Junior Academies of Science

Through the efforts of the Academy Conference and assistance of the Oak Ridge Institute of Nuclear Studies and the AAAS the National Science Foundation granted funds to the Academy

Conference for a conference on Junior Academies of Science in Chicago in February of 1937. One representative from each state plus certain interested individuals were invited. Tennessee was represented by W. W. Wyatt, long-time chairman of Tennessee Junior Academy of Science, and C. L. Baker.

Illinois seems to have the best Junior Academy of Science. There are eight districts with directors and assistant directors. A Junior Academy Council is composed of district directors and chairmen of committees or a total of about 20 members. Each district has an annual meeting. Each district sends news items to the state director who publishes them in a state news bulletin. Sustaining memberships in the Illinois Academy of Science of \$10 are devoted entirely to Junior Academy work. In Ohio the annual budget of the Junior Academy is \$1000.

A science club in a high school is the first step towards creating interest in Junior Academy. A state Junior Academy should be a coherent organization of science clubs.

Over 900 new science fairs have been established in a fourteen state area within recent years largely due to the efforts of the Oak Ridge Institute of Nuclear Studies. It is easier to recruit high school teachers and students and more difficult to enlist the services of the colleges and professional groups. The big problem is getting the public aware of the need for increased interest in science.

The National Science Foundation might underwrite a full-time coordinator, and would welcome proposals from individual state academies for developing Junior Academies, provided the state academies have a plan for assuming responsibility for the continued success of the Junior activity.

The activities of Science Clubs of America, the Future Scientists of America and all other organizations interested and concerned with the development and dissemination of science, should be channeled through the state academies. This might eliminate duplication and coordinate activities of various organizations.

At this Chicago meeting certain proposals were made concerning the development of Junior Academy movement in the United States and they are to be presented to the Academy Conference for consideration at the 1957 convention in Indianapolis, Indiana. These proposals are:

1. That the Academy Conference establish a National Clearing House of information for Junior and Senior Academies.
2. That there be an annual meeting of representatives of Junior Academies held in conjunction with the Academy Conference and AAAS meeting.
3. That Senior Academies give greater recognition to deserving science teachers in the form of distinguished service awards.

4. That Junior Academies should basically represent organizations of science clubs under the sponsorship of senior academies.
5. That the Academy Conference explore ways and means of implementing the employment of a full-time Junior Academy field worker in each state.

In concluding this report on the AAAS and the Academy Conference I should like to point out that the AAAS has been aware of the critical shortage of science teachers and science students for several years. That which you now read in the press regarding science training in Russia is but a summary of the details that have been presented at previous AAAS meetings. The data have been available to the press but as a scientific organization we have failed to get it made public. The public will soon read that there is an increase in scientific manpower and there will be indications that we can now relax our efforts. Let us be sure that the apparent increase is actually an increase comparable to the increase in our population.

One illustration of an address that was distributed to the membership of AAAS and to the press is that of Dr. G. T. Seaborg, the featured speaker at the Silver Anniversary Dinner of the Gordon Research Conference of the AAAS. A few choice quotations from this address are as follows:

"The elementary students at fourth grade level exhibit the greatest interest in science but during the intervening years to college sophomore level they lose this interest due to poor teaching or failure to provide the types of activity that will encourage the student to maintain his motivation towards science."

"The National Science Foundation estimates that U. S. industry as a whole gains back \$20 to \$50 for each \$1 spent on research during the past 25 years."

"Merely to maintain our present economy we shall have to carry out scientific research and industrial development on an accelerated pace. Basic science will have to be given strong support and the intellectual geniuses among us must be discovered, trained, encouraged and rewarded."

"The low birth rate of the depression thirties furnishes only a small fraction of the needed qualified teachers we now need to teach the almost explosive increase in numbers of students. In 1946 there were 6 million school children; in 1966 there will be 12 million".

"Colleges will need 25,000 new faculty members per year. To supply these totals one-half of the recipients of college degrees must accept jobs at teachers. At the present time only 20% do so, and the percentage is likely to decrease rather than increase, particularly among graduates with training in the

sciences. Hence the quality of teaching particularly at the high school level is certain to decrease. Considering the depreciation of the dollar the poorly paid teachers now have a real income less than that of 1940. It is pure fantasy to believe we can effect any real change in our school systems without drastic change for the better in the economic incentives for teachers."

"One quarter of our high schools teach no physics or chemistry or geometry. In many schools the inspiration of gifted, inspiring science teachers has disappeared completely. Students of unusual intellectual endowment are not encouraged or are actually repelled, and if later they develop an interest in science they find their high school preparation is inadequate to permit them to select a science as a major field of study in college."

"We need to do a better job of counseling the young and instilling a better attitude or motivation towards intellectual pursuits in general. We must present a clearer picture of what a scientist actually does and try to convey some appreciation of the fun, the thrill, the inner satisfaction which a scientist usually experiences in his career. Professional men within each community can assist greatly in this problem".

At no time has the challenge for scientific achievement been greater to the Tennessee Academy of Science than now.

NEWS OF TENNESSEE SCIENCE

News-worthy items suitable for this column should be addressed to the News Editor, Dr. Carl Tabb Bahner, Carson-Newman College, Jefferson City, Tennessee

L. R. Hesler, The University of Tennessee, Dean of the College of Liberal Arts since 1934 and Professor of Botany since 1919, will retire at the end of the current year. He plans to continue research on southeastern agarics.

Dr. Howard F. L. Rock went to the University of Tennessee, September 1, 1957, as an instructor in Botany, from the Gray Herbarium, Harvard University.

Dr. A. J. Sharp, head of the U-T Botany Department, has been awarded a National Science Foundation grant of \$15,000 to continue a project on the flora of Tennessee. Dr. Sharp is being assisted in this project by Dr. Royal Shanks and Mr. Harry Sherman.

Miss Barbara Conway, 16, sweepstakes winner in the girls' division of the Chattanooga Regional Science Fair last year, has been offered a three-month summer scholarship to study laboratory techniques at the institute of experimental medicine and surgery at the University of Montreal. The Canadian scholarship was arranged by Dr. Hans Selye, whose theory of stress as the basis of mental and physical illness inspired her exhibit. This exhibit won first place in the Tennessee Junior Science Academy show and fourth place in the National Science Fair competition in California.

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