SECTION J, COMMUNITY SCIENCE SERVICES

Community Science Services in Bartlesville as Conducted by the Technical Career Advisory Committee (TCAC)

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INTRODUCTORY REMARKS

In December 1963 the Oklahoma Academy of Science approved the formation of a new Section J to be called "Community Science Service" and this brochure is designed to inform interested members how they can participate in its work.

The activities of this section will be confined almost entirely to various localities throughout the State, in contrast to presenting papers at the annual meetings. Occasionally a discussion session where various means of performing science services will be described and discussed may be useful, and this section includes such a description of how a similar service operates in Bartlesville. In general each locality will have a subsection devoted to the performance of actual science service in its community.

To assist you in your thinking as to how you can take part in this section's activities, there are outlined in the following pages some services that have been performed in Bartlesville through an agency known as the Technical Career Advisory Committee (TCAC). This committee was organized about 12 years ago and has carried on most of the services listed in one form or another at various times. It works with the Oklahoma Academy of Science in some projects, but as it was formed before the Community Service concept of the Academy was evolved, it is not a part of the Academy. However, it would be equally effective if it were OAS-sponsored, and this is the basis of the formation of the new Section.

It is hoped that OAS members in several localities will form a subsection of the Community Science Service Section of OAS and start activities along some of the lines indicated. These suggestions are not intended to be restrictive. There are other activities that you may think of and feel are desirable and necessary. You should choose only one or two functions at the start. If you do this and work at them, you will find your interest will grow and with it the number of activities will increase.

In connection with the suggested activities having to do with the schools, it is very necessary to always emphasize that the aim is to assist the efforts of the teachers, not to supplant them. Also, the OAS has a Section E, Science Education, which is primarily concerned with the process of teaching and with curriculum and textbooks. There will be occasions where problems will arise that should be referred to Section E for action. There are distinct services both sections can perform, and they should work in collaboration.

THE TECHNICAL CAREER ADVISORY COMMITTEE, ITS ORGANIZATION, OBJECTIVES AND OPERATION

In 1953 there was a growing awareness of the serious shortage of

scientists and engineers in the United States. Educational institutions and scientific organizations alike were exploring ways and means to meet the problem. The Manpower Committee of the Northeast Oklahoma Section of the American Chemical Society was no exception. One of the members of that committee, Dr. Harold Smith, became convinced that career counseling in all the sciences was needed at the high school and junior high school levels. He proposed that a counseling group be set up in the Bartlesville area to "include not only chemists but engineers, physicists, and other scientists as well". When he was appointed chairman of the ACS Manpower Committee the following January contacts were made with similar committees of two other groups of scientists in Bartlesville—the Bartlesville Engineers Club (BEC) and the Bartlesville Chapter of the American Institute of Chemical Engineers (AIChE). The three committees agreed to work together as a coordinating committee for manpower problems in the Bartlesville area.

The first joint meeting of these three committees took place in February 1954 and plans were made to offer science counseling services to interested students, to arrange for plant trips for interested students, to set up a speakers committee and to maintain a library of pamphlets and literature on vocational counseling. The name Technical Career Advisory Committee, TCAC for short, was selected to identify this joint effort.

The first assignment came two months later; speakers were provided for a Career Day at the Bartlesville High School. Speakers were also provided in other nearby towns as requested. The next major project was the Bartlesville Science Fair. TCAC members agreed that a Science Fair should not impose on, or be a burden on, the science teachers, but that credit should be directed toward students and teachers. To finance the fair, aid from other scientific organizations and clubs would be solicited. In October Dr. Bliss, Director of Oklahoma Science Services, met with TCAC representatives and school officials, and plans for a Science Fair in the spring of 1955 were finalized.

There were 59 exhibits in that first Bartlesville Science Fair. The budget of $150 was provided by five sponsors—the ACS, AIChE, BEC, Tulsa Geological Society and the Bartlesville Chamber of Commerce. The following year winners were sent to the State Fair and in 1957 the TCAC affiliated with the Science Fair International. The winner of that 3rd Annual Bartlesville Science Fair received an expense-paid trip to exhibit in Los Angeles, and affiliation with the Science Fair International has continued.

In 1958 a constitution was adopted. The objectives are: (a) The advancement of science and science education in the area. (b) Advisement of students interested in the study of science, mathematics and engineering. (c) The coordination of work of the sponsoring organizations in disseminating scientific information in the community. (d) The sponsoring of scientific activities in the community especially among students. (e) The encouragement of science students.

By 1958 there were five sponsoring scientific organizations. In addition to the three previously mentioned there were the Bartlesville Chapter of the Oklahoma Society of Professional Enginers and the Society of Plastics Engineers, Inc., Bartlesville-Tulsa Section. Membership in TCAC consists of four members from each of the five sponsoring organizations giving each equal representation. A Vice-Chairman is elected annually who also serves as secretary-treasurer. The Vice-Chairman automatically succeeds to the office of Chairman at the beginning of the following year. With the exception of the Science Fair Manager, all subcommitee chairmen are appointed annually by the incoming TCAC Chairman. An Assistant Science Fair Manager is elected annually and succeeds automatic-

ally to manager the following year. The committees last year were:

Career Counseling	Science Education
Finance	Science Fair
Publicity	Science Seminar
Scholarship and Special Awards	Scholarly Lecture Series

The membership of these subcommittees includes many who are not voting members, so that as many as 60 are involved in committee assignments when science fair committees are included. The Science Fair Manager makes his own appointments. When counselors and speakers at the science seminars are included, the number of Bartlesville engineers and chemists called upon to serve in some way is near 100.

The 20-man TCAC committee meets a minimum of four times annually—usually every other month in the school year. Special advisers from the school system are invited to meet with the committee.

The activities of the various committees will be discussed in more detail below, with the possible exception of the Finance Committee. This committee consists of one member each from the sponsoring organizations together with the TCAC Vice-Chairman. Approximately 100 prospective contributors were solicited last year including technical societies, corporations, civic clubs, and members of the medical profession. Of the $1,137.50 contributed, the largest amount went to finance Science Fair activities. The TCAC share of the Scholarly Lecture Series of $234 was more than taken care of by voluntary contributions at the meetings.

These first 12 years of the TCAC existence have been years of expanding activities. As long as the organization remains sensitive to the needs of the community, it will continue to find the support it requires both in voluntary contributions and manpower.

SCHOOL-RELATED ACTIVITIES OF TCAC

The previous presentations have informed you regarding the purpose, organization and operation of the Technical Career Advisory Committee (TCAC) of Bartlesville, Oklahoma. It is the purpose of this presentation to provide more information on a few of the many directly school-related activities of TCAC.

The Bartlesville school system was represented by Mr. E. J. DenAdel on Mr. H. M. Smith's ACS Northeast Oklahoma Manpower Committee in 1953. In this year Mr. Smith and his committee were instrumental in organizing what has since been known as the Technical Career Advisory Commitee (TCAC).

At its first meeting, which was a joint effort of the several scientific and engineering societies of Bartlesville, its purposes were outlined and the close relationship with the schools established.

The school-related activities proposed as goals at this meeting were: (1) To provide counseling services to high school students and junior high students in grades 8 and 9, (2) to arrange and conduct plant trips for students, (3) to encourage participation in the Oklahoma Junior Academy of Science, (4) to provide lectures on scientific topics on request, (5) to furnish career guidance literature, and (6) to assist in Career Day activities at area high schools. All of these purposes and more have been acomplished, some with more enthusiasm and success than others.

The following will describe some of the activities in these fields.

Career Days—The Bartlesville schools have conducted Career Day or Career Night for many years. In this activity, business and profes-

sional men are asked to describe their career and the personal and educational requirements for success in the field.

The TCAC became a part of the school system's Career Days in 1954 when it offered to provide the speaker in the fields of science and engineering. The TCAC has fulfilled its task each year since then.

Career counseling—Career counseling has been one of the primary objectives of TCAC since its inception and also one of the most difficult of its activities to establish and effectively evaluate. The TCAC has always maintained a clear distinction between counseling and recruitment.

School administrators and science teachers are provided with a comprehensive list of specialists in the various career fields of science and engineering. The men listed have offered their services for individual or group counseling on call. TCAC and its counselors do not pretend to be experts in counseling. The school system has its counselors who know the student and his capabilities, and the TCAC counselor does not in any way supplant professional counseling. The TCAC counselors are, however, men actually working in the field of interest to the student and can describe the career and its educational requirements.

TCAC, with the assistance and encouragement of Mr. Hamon, the superintendent, and Mr. Haley, the principal, has established and conducted individual counseling sessions during the school day. The school makes a survey of the desires of students and TCAC furnishes specialists in the fields of interest.

Awards—The TCAC does not provide any specific awards to school students or teachers outside the field of Science Fairs. However, they do administer tests and select nominees for awards for their member societies or others as requested.

Visiting scientists—The TCAC has, with the cooperation of the schools, arranged for visiting scientist lectures at the public and parochial schools. Until this year TCAC obtained the visiting scientists at the national level through the American Chemical Society. All arrangements were made by the TCAC after selection of the preferred speaker and topics by the school science teachers. This relieved the school administration of arrangements and transportation details. In addition to this the TCAC seminar group in biology also utilized the visiting scientist program conducted by the Oklahoma Academy of Science.

This year the NSF has transferred all the Visiting Scientist Program for high schools to the state academies of science. TCAC has provided the science teachers at the senior high school with speakers, and visiting scientists from this program will be used to supplement the TCAC's Science Seminars.

Science seminars—The program of direct involvement with the schools that we consider the most successful of those administered by TCAC is the Science Seminars, which are conducted generally in 12 to 15 two-hour sessions during each school year. Seminars have been conducted in physics, chemistry, astronomy, biology, and geology.

Of these, physics, chemistry and biology are conducted each year. Geology and astronomy are generally conducted in alternate years.

Some of the history of the organization of the seminars will serve to emphasize the close tie between the TCAC and the schools.

C. R. Ringham of the OSPE suggested in 1957 that TCAC should investigate the possible services they could render the Bartlesville schools in regard to science. He then accepted chairmanship of a committee with

W. J. Wride, H. C. Fowler and B. H. Eccleston to propose activities. This committee met with Mr. George Karch, high school physics teacher, to discuss various means of assisting gifted students. Several items were proposed and at a TCAC committee meeting Mr. Karch and Mr. Earl Hamon, present superintendent of schools, as guests, discussed the proposals. Mr. Hamon reported on a meeting he attended on the topic of the academically talented pupil and suggested that of the several proposed activities, the Science Seminar with the local scientists conducting the lectures be instituted.

To accomplish this a joint committee of representatives from TCAC and the Bartlesville school was established and in 1958 the Physics and Chemistry Seminars were begun.

The announced purposes of the seminars at the time were: (1) To assist students to attain a better understanding of the several scientific disciplines so they might better plan and prepare for their college courses, (2) to provide for and ease the transition from high school to college studies, and (3) to inspire the student and instill in him a quantitative or mathematical approach to the sciences.

The first Physics Seminar consisted of 15 evening sessions, 2 hours each. Five instructors were used, each teaching three periods. The first nine lessons were concerned with mechanics and problem solving. Then followed three on thermodynamics and the last three on the quantum effects of matter.

In the Chemistry Seminar the 15 sessions included the following subjects: colloids, analytical chemistry, infrared, petrochemistry, and polymers.

The science seminars in physics and chemistry have been carried out each year since their inception. The philosophy behind the seminars has evolved as experience was gained and with the changing personnel involved.

As an example, the initial seminars were for the gifted student and attendance was a privilege earned through innate intelligence and achievements in school. As experience was gained it was apparent there was a greater student interest in the seminars and the time and effort involved by the lecturers in preparing an integrated series of lectures to meet the needs of the gifted students was greater than we could ask of our volunteers.

In the present seminars any junior or senior student with an interest is invited and we rely upon the science teachers to encourage those they know will benefit from the seminars.

In 1962 and 1963 seminars in geology were conducted and in 1963 a seminar in biology instituted. The Biology Seminar utilizes the services of the local physicians and of visiting scientists from the Oklahoma Academy of Science.

During the 1960 and 1962 school years a seminar in descriptive astronomy was conducted. This seminar, intended to interest Junior High students, was one of the most popular of the TCAC seminars; it consisted of a well coordinated series of lectures and observing sessions.

In 1961 a series of 16 film-lecture series on our planet Earth was presented for student and parent participation.

In conclusion, it is our opinion that although the students benefit greatly from the efforts of TCAC, a greater benefit accrues to the community. This is accomplished through hundreds of TCAC workers being

intimately associated with the school administration, teachers and the student, and thereby forming a better understanding of the needs and problems of the schools of the community.

TCAC AND SCIENCE FAIR, ADULT SEMINARS AND THE JETS PROGRAM

Science Fair—The Science Fair is a function of the Technical Career Advisory Committee, and as in so many TCAC activities, Harold Smith was instrumental in arranging for the first Bartlesville Science Fair. This was held April 15, 1955, and there were 59 entries. The fair to be held March 1966 will be the 12th *Annual Science Fair.*

TCAC elects a Science Fair Manager who is chairman of the Steering Committee and heads the fair. The fund arrangements are made by a committee set up in the Science Fair, but which collects money for the overall operation of TCAC. The Science Fair actually accounts for 85-90% of the TCAC budget.

The students are approached in late November, or early December; the Liaison Committee explains the program to them (working through the local school systems), and urges the students to sign the "Intent to Enter" forms. This usually produces twice the number who actually display exhibits in the Science Fair. It is unfortunate that the liaison activities in a certain school succeed only to the extent of the demonstrated enthusiasm of the science teachers in that school. If such a teacher pushes to get the Science Fair going, we have activity. In short, we have not found the key to successful liaison with potential fair exhibitors.

In the organization Science Fair discussed here, we have 50 or more active workers, and this doesn't include an additional 15 or 20 judges needed on the day of the judging. Thus, it is a good-size program!

To publicize our fairs, we make up attractive brochures that average 8 to 10 pages and include all the basic facts the students should know; in addition a loose form of "Intent to Enter" is put in this brochure. We ordinarily print 1000 of these brochures.

We use a typical judging card in which we have emphasized creative ability and scientific thought as representing the prime worth of the science fair demonstration, but words mean different things to different people. Judges, in general, tend to give the students more credit than they deserve. I have seen exhibits that we have certified as winning in which there is good evidence that the student was not even able to make a successful demonstration. Nevertheless, because of a judge's personal preferences, these particular exhibits were given number one ratings. It may be said that the answer is in training, and that our judges should be better trained, but I find it difficult to understand how this training could be accomplished. While we may weed out the bad judges from year to year, there is no perfect way of selecting and keeping good judges.

In summary, the science fair program has worked very well in Bartlesville. We have been averaging from 75 to 150 exhibits at the fair for the past few years, but there has been a pronounced increase of exhibits from outside Bartlesville. There has also been a pronounced decrease in the number of students in the physical sciences, senior division. We believe this is largely due to the demands that are made on the time of the students. In our opinion, the quality of the Science Fair exhibits has increased slightly, but certainly the increase isn't of any great magnitude. While we are not suggesting that we are dissatisfied with the quality of these exhibits, we certainly believe it is time that we take a good look at what the present science fair program is doing, and as polished and professional as it presently is, it might well require a complete reappraisal.

The Citizen and the Scientist Series—The Citizen and the Scientist

lectures represent a series of distinguished lectures that are presented by members of the staff of Oklahoma University and Oklahoma State University. TCAC underwrites the program, but the National Science Foundation in effect pays about half of the overall cost. This support is administered by the College of Continuing Education of the University of Oklahoma.

The speakers are set up by the liaison Bartlesville representative and the coordinator of the Citizen and the Scientist Series. The programs are arranged, and the lectures are held in the Bureau of Mines auditorium. The speaker is introduced at 8:00 PM and the program ends about 9:15 PM followed with 15 to 20 minutes of questions. The program has been successful in all phases, and the community has embraced the concept of the lectures with enthusiasm.

JETS—JETS is the Junior Engineering Technical Society. It was launched as an experimental project in 1953 by the College of Engineering of Michigan State University. It is primarily a cooperative effort through which various technical societies work with students to enhance the pre-engineering studies in the local schools.

We consider the JETS a fine program, but exactly what we will accomplish towards encouraging students to become more engineering-oriented, we do not know. This does not concern us a great deal; if JETS opens an avenue to students who might otherwise have participated in an engineering-science activity, then we certainly have a fine program.

An Appraisal of TCAC by the School System

Needless to say the Bartlesville Board of Education and Administrators as well as the faculty were pleased with the prospect of an organization devoted to the promotion of a better understanding and greater interest in science. TCAC was to be a civic organization made up of scientists, offering help and advice to those students who would or could follow careers in science. It has done more than help those destined for a career in science. The goals and objectives have grown and expanded to the point that today it would be reasonable to say that the entire community can and does benefit from the many programs offered and sponsored by TCAC.

With the coming of TCAC, teachers found that they had more time to spend in developing instructional materials for the classroom. Eventually, they, the teachers, came to realize that here was an organization of sincere men, some of whom were experts in various fields of science, willing to share this knowledge with students. Much of the dull unnoticed work that must be done in any school-sponsored program, such as the many committee meetings, the fund-raising programs, the telephone calls, and other small tasks that the teachers are required to do, are now handled by responsible people in the TCAC.

This is the day of organizations. Though all are created with noble aims in view, few survive. Those organizations which attempt to control or impose their own regulations on some other institution find conflict and eventual failure. On the other hand the members cannot be reluctant to give their time and knowledge in fulfilling the purpose or the organization. The members of TCAC are neither reluctant to give help nor are they insistent upon its use. Science seminars, bi-monthly meetings with high school students, are conducted by scientists to inspire, create interest and help with future careers. These seminars have grown from twelve student members selected by records of achievement the first year they were offered to seventy students whose selection was based on interest during the current year. More often than not the high school teacher as well as the students benefit from these discussions about the real prac-

ticed world of science, giving their classroom instruction more meaning.

The Science Fair has become a community affair. The teachers find that the fair is no longer a chore but a real pleasure since TCAC has taken over much of the routine work involved.

TCAC is the kind of an organization that every community needs. It fulfills a need to make use of all adult knowledge and experience in preparing young people for the future.