A STUDY OF THE EDUCATIONAL SCIENCE FAIR CONCERNING ITS PURPOSE, ORGANIZATION, AND VALUE

by

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INTRODUCTION

Fairs have been popular throughout history. Generally they have been occasions to display works or feats of which people were proud. Early in this century some science teachers encouraged their students to undertake individual science projects, then exhibit them before their classmates and fellow students. Between the two world wars, some individual school systems developed citywide science fairs to show the most outstanding projects from each school.[1]

Such showings and exhibits occurred at greatly isolated places until after the second world war. No concerted effort was made to unite or draw together the best projects of talented science students throughout the nation until 1950, when the first national science fair was held in Philadelphia, Pennsylvania. Since then, the number of state, regional, and local science fairs has increased at a rapid rate.[2] The national science fair drew entries from affiliated state and regional fairs. Entry of competitors from several other countries has resulted in the name being changed to National Science Fair-International. It was called the "Olympic Games" for science fair exhibitors.[3]

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[1] Robert G. LeCompte and Burrell L. Wood, Atoms at the Science Fair Exhibiting Nuclear Projects, p. 2.

[2] Arden F. Welte, James Diamond, and Alfred Friedel, Your Science Fair: An Opportunity for Youth, p. 5.

[3] LeCompte and Wood, loc. cit.

STATEMENT OF THE PROBLEM

The purposes of this study were (1) to discover the procedures which have been used in organizing a successful science fair; (2) to determine what values could be derived from having a science fair; and (3) to justify having a science fair by knowing the purpose it was to fulfill.

JUSTIFICATION OF THE PROBLEM

Few co-curricular activities have exceeded the phenomenal growth of the science fair in the United States in recent years. Such a great number of fairs has come into existence that almost every school in the nation has access to and can participate in one.[1] Secondary science teachers have usually inherited the job of organizing or assisting in the organization of their local fair. It was imperative that these teachers knew some of the procedures which have been used successfully, if they were to organize an educationally sound fair with emphasis on the importance of the study of science and mathematics.

METHOD OF PROCEDURE

The method of procedure used in this study consisted of the following items:

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[1]Robert P. Shreve and David Kraus, "A and Z of Science Fairs," The Science Teacher, 24:334, November, 1957.

1. A review of the pertinent literature contained in the Kansas State University library was executed.
2. A review was made of Master's theses obtained through the University inter-library loan plan.
3. Pamphlets and booklets secured from Science Service and the Atomic Energy Commission were reviewed.
4. The writer interviewed Larry J. Meador, chairman of the first science fair to be organized and held in Lincoln County, Kansas.

DEFINITION OF TERMS

Science fair. It is a collection of exhibits each of which is designed to show a biological, a chemical, an engineering, a mathematical, or physical principle; a laboratory or other procedure; an industrial development; or an orderly collection of anything which can be fitted into the broad concept of any branch of any pure or applied science.[1]

Run-off science fair. This is the fair which is held in a single school. It can be held in a classroom or, when more than one classroom in the building has exhibits, the display may be held in some designated area.[2]

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[1]"Fairs: National-Local," Science News Letter, 86: 127, August 22, 1964.

[2]Welte, Diamond, and Friedl, op. cit., p. 5.

District science fair. This fair is held at the school district or county level. Entries may come from some or all of the schools comprising this district.[1]

Regional science fair. This type of fair refers to the sub-state classification. Each region is composed of a number of districts. The entries to this fair are restricted to the best projects of the various local fairs listed above.[2]

State science fair. It includes entries from the entire state and the entries are restricted to only the best projects of the regionals.[3]

National science fair. (It has been renamed National Science Fair-International.) It is a science fair which is national in scope and the entries are restricted to only the very best projects of the regional or state fairs. In order to qualify for national competition, students must be at least sophomores, juniors, or seniors enrolled in secondary schools.[4] This fair has been opened to entries from qualified foreign students.

Project. A definite piece of research which calls for constructive action by the student and involves a learning

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[1]Gladys Hallen (ed.), The Minnesota Journal of Science, p. 8.

[2]Welte, Diamond, and Friedl, loc. cit.

[3]Welte, Diamond, and Friedl, op. cit., p. 6.

[4]Hallen, op. cit., p. 9.

phase of science.[1]

Division. This refers to the categories into which the entries are separated.

Intermediate division. This is the category open to students of grades four, five, and six. The projects are evaluated within each grade level.[2]

Junior high division. This category is open to grades seven, eight, and nine. The projects are evaluated within their own grade level.[3]

Senior high division. This category is open to students in grades ten, eleven, and twelve. There is no grade level distinction made in the evaluation of the projects.[4]

Exhibit. This term as used in the report means to show publicly for the purpose of competition.

REVIEW OF THE LITERATURE

Purpose of the science fair

According to Leonard A. Ford, State Teachers College, Mankato, Minnesota, science fairs were a way to stimulate pupils and teachers in their classroom work. It seemed that the projects were better and the students were more

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[1] Welte, Diamond, and Friedl, op. cit., p. 25.

[2] Ibid., p. 7.

[3] Ibid.

[4] Ibid., p. 6.

enthusiastic when they knew that the results of their work would be seen by others and when they were in competition with their peers.[1]

In the book Teaching Science in Today's Secondary Schools, Thurber and Collette listed the following purposes for having a science fair:

1. To encourage and stimulate interest on the part of young people.
2. To serve as a motivating force for individual projects.
3. To stimulate teachers to do a better job.
4. To utilize the time of youth in a constructive way.[2]

Welte's, Your Science Fair, listed the following educational implications of a science fair:

1. It stimulates the interests of students who have special science talent.
2. It encourages students to express themselves by using skills and interest in science.
3. It identifies and encourages the scientific gifted child.
4. It encourages use and understanding of scientific method.
5. It is a means for students to become aware of the influence of science on human life and thought.
6. It is a means for students to acquire functional knowledge of science.

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[1]Leonard A. Ford, "A Science Fair," School Science and Mathematics, 54:592, October, 1954.

[2]Walter A. Thurber and Alfred T. Collette, Teaching Science in Today's Secondary School, p. 566.

7. It reports to parents and the community about one phase of academic performance of the students.[1]

In an article written by George Haupt for The Science Teacher, he gave the two major purposes of science fairs as being: (1) to encourage and direct creative activities of children, and (2) to identify scientifically talented children.[2]

The authors, deKieffer and Cochran, made the following statement:

> Wherever an exhibit is located, it is designed to serve two purposes: first, as a creative learning experience for students; second, as a method of imparting information concerning a process or an idea.

and they cited some of the educational purposes of displays which served as a creative learning experience:

1. Promote the desire to share experiences.
2. Develop the ability of working together.
3. Provide for individual creative activity.
4. Develop skill in observation.[3]

The educational purposes dealing with the exhibit itself were given by Marjory East to be:

1. It concentrates interest and attention.
2. It shows the basic structure of an idea.
3. It explains abstract ideas by relating them to concrete things.

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[1]Welte, Diamond, and Friedl, op. cit., p. 1.

[2]George W. Haupt, "A Regional Science Fair: Organization and Values," The Science Teacher, 18:35, February, 1951.

[3]R. E. deKieffer and Lee W. Cochran, Manual of Audio-Visual Techniques, p. 76.

4. It brings scattered ideas together to form new concepts.

5. It turns ideas into words.[1]

The Atomic Energy Commission at Oak Ridge, Tennessee offered its facilities to promote local and regional science fairs because it felt that such educational activities were a means whereby potential scientists might be sought out among our American youth; then after they were discovered they could be encouraged to select a science career and obtain advanced training. The Oak Ridge Institute of Nuclear Studies has encouraged more and improved science fairs because it recognized that science fairs:

1. Provide opportunities for all participants and observers to advance in their knowledge and appreciation of science.

2. Are of utmost importance in educational stimulation.

3. Are composed of exhibits to be designed and constructed by elementary and secondary students with interested teachers providing inspiration, information and guidance.

4. Involve many people in the activity.[2]

Types of science fairs

There have been few highly standardized fairs at the level below the regional fair. Subordinate to the regional

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[1]Marjory East, Display for Learning, p. 12.

[2]Dewey E. Large, "Science Fairs Stimulate Science Education," School Life, 37:76, February, 1955.

fair, local fairs, in the form of run-off fairs, were organized to suit the needs of the community. The local fairs could be classroom, department, or district fairs. The rules for exhibits and judging employed in local fairs should conform to the rules and standards which govern regional, state, and national science fairs.

All states have not held a science fair. Instead, winners from the regional fair competed in the National Science Fair-International without going through the channels of state fair competition and elimination. Regional and state fairs have been supported by cooperating groups such as science teachers' organizations, college faculties, professional societies, and collegiate academies.[1]

Before winners from a regional fair were eligible to compete in the National Science Fair-International, that regional fair had to be officially affiliated with it. Only two students from an affiliated regional have been permitted to compete in the national fair. Boys' entries have been judged separately from girls' entries. A teacher chaperone was invited to accompany the regional winner to the National Science Fair-International.[2]

Organization and execution of a science fair

One of the programs of activity in science education

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[1]Hallen, op. cit., pp. 7-8.

[2]Hallen, op. cit., p. 9.

was concerned with the organization of more and improved science fairs. This activity should start in the science class where the greatest benefit would be derived. According to Hollis J. Rogers, the most important science fair was the one held in the local school where students, their teachers, and the community shared the benefits.[1]

The idea for a science fair originated with interested, involved people such as teachers, school officials, or the students in a science club. Permission to have an educational fair must be obtained from the school principal, superintendent, board of education, or whoever was in charge of the school planning the fair. Once permission was granted, the next step was to find a group or organization to act as a sponsor. Sponsorship need not be limited to one organization because sponsors served many different, but useful, purposes. They helped in any way they could to make the whole procedure operate smoothly. Materials were contributed for the construction of exhibits, signs were made, prizes or awards were furnished, and exhibits were set up on the day of the fair by participating sponsors.[2]

According to the Science Fair Manual which was prepared by the Institute of Natural Science under the auspices

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[1]Hollis J. Rogers, "Reviewing and Evaluating the North Carolina Science Fairs," The High School Journal, 39:305, February, 1956.

[2]Science Fair Manual: For Use in the North Carolina Science Fairs, pp. 4-5.

of the University of North Carolina, the following questions should be answered as soon as permission to have a fair is granted:

1. How large will the fair be?
   Will it be limited to a single class, school or the schools of a given district? Can all the students who so wish, enter, or will the individual classes and schools be limited as to the number of participants?

2. Where and when will it be held?
   How much space will be required? Does the space selected have proper facilities? Is the place accessible to the public? Has the proper police and fire protection been considered?

3. Which school grades will participate in the fair?

4. Who will judge the exhibits?

5. What awards will be made?[1]

Procedures. A general chairman and steering committee should be appointed at the first planning meeting. An operation procedure, which might consist of the following arbitrary categories, should be set up by the steering committee:

1. Personnel.

2. Establishing a time table.

3. Publicity and financing.

4. Creation and stimulation of interest.

5. Compiling the list of entrants.

6. Setting up the projects.

7. Judging arrangements.

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[1]Science Fair Manual: For Use in the North Carolina Science Fairs, op. cit., p. 4.

8. Preparation for viewing.
9. Awards.
10. Follow-up procedures.
11. Trouble spots and pitfalls to avoid.[1]

The list could be expanded or cut for the sake of convenience or simplicity. The responsibility for keeping duplication of effort to a minimum rested with the chairman.

Personnel. The Minnesota Journal of Science listed the following possible committees which were originally suggested by Homer Knoss:

1. Lay-out committee.
2. Signs committee.
3. Publicity committee.
4. Awards committee.
5. Registration committee.
6. Guides and assistants committee.[2]

They worked in conjunction with the fair chairman and the steering committee during the organization and execution of the science fair.

Establishment of a time table. Paramount to the success of the science fair was the establishment of a time table. Every necessary function of the fair needed an

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[1]Welte, Diamond, and Friedl, op. cit., p. 11.

[2]Hallen, op. cit., pp. 10-11.

adequate time allotment. The ensuing time schedule suggested by Hallen was useful as a guide in tailoring one to fit each individual fair.

1. At the beginning of the school year:
   The steering committee collected as much available information on science fairs as possible. The chairman wrote to Science Service and the Division of Technical Information of the Atomic Energy Commission for new materials on science fairs.

2. Sometime in October.
   The various committees were appointed and their duties clearly stated, and a chairman named to head each committee.

3. Early in November.
   The publicity chairman sent out announcements to all area schools which stated that a science fair would be held, along with the tentative date so that interested students could look for a project on which to work.

4. In early December.
   Most students were started on projects. A list of ideas for projects was sent to all teachers in case some teachers did not have available information on possible fair projects.

   An announcement was made to all students that the name of their tentative project was due the first part of January.

5. In January.
   The chairman sent out formal entry blanks to area schools. Industrial plant personnel and divisions of the armed forces were contacted and arrangements made for technical displays. Persons who might agree to judge entries were asked. The exact fair date was set.

6. In late February.
   Formal entry blanks were returned to the chairman. They included an explanation of the project and the parent's signature.

7. In March.
   The school and district fairs were held. Two weeks were allowed between the local and regional fair.

8. In late March or early April.
   Local fair winners took their project to the regional fair. Committees prepared and submitted reports to the chairman.[1]

Compiling the list of entries. A tentative list of entries was compiled by the chairman after the deadline for submitting their response was closed. The list gave the chairman a rough estimate of the number of entries to be expected. This list was longer than the final list and was needed for the following purposes:

1. To determine amount of space needed.
2. To determine number of awards needed.
3. To determine who needed formal entry blanks.
4. Specific information could be given to each entrant.
5. Judging criteria could be furnished each entrant.
6. To decide number of judging teams needed.[2]

The final roster of entrants was prepared from the returned formal entry forms. Names of drop-outs were deleted from the roster and their space was allocated to participants. The final roster was compiled using a code-number system:

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[1]Hallen, op. cit., pp. 81-82.

[2]Welte, Diamond, and Friedl, op. cit., p. 29.

1. Each entry blank was identified by a number.

2. All entry blanks were numbered in numerical order.

3. The student's grade was annexed to his number. For example, 4-1; 4-2; 4-3 . . .

4. Students who needed electrical outlets for their project had an e annexed to the code number.

This procedure was followed for entries from grades four through nine.

5. For grades ten, eleven, and twelve, the projects were coded in scientific areas. The initial which designated the category was the prefix of the code. For example: P-1; P-2; P-3 . . . (physics).[1]

Setting up projects. Adequate space to display the exhibits and adequate time to set up the project were two factors of prime importance. Welte's Your Science Fair listed some pointers to follow when displaying the entries.

1. Be sure adequate space is available.

2. Set up the tables as soon as the place is available. Tables were covered with heavy paper and marked off to correspond with entrant code numbers.

3. Like projects should be placed together according to fields and levels because:

   a. They can be viewed with more understanding by the public.

   b. Students are grouped with other students having like interests.

   c. Judges are able to evaluate the projects more accurately.

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[1]Welte, Diamond, and Friedl, op. cit., pp. 30-31.

4. When projects arrive, students should be directed to look for their code number and subsequently set up in the space allotted it.

5. Perforated evaluation forms should be attached to the table in front of the project.

6. Be sure students know the day and time to bring their projects and when they are to dismantle them. Oftimes the latter has been overlooked.

7. Make a floor plan of the exhibit area with each exhibitor's space clearly designated.[1]

Judges. The type of judges selected was an important factor in the fair's success. Specialists in the field they were asked to judge were selected.

Judging was done by a team. Each team was usually composed of three members. The total number of judges needed was based on the number of entries. Judges were informed in advance as to the category of their judging, the meeting place, schedule, objectives, suggestions for judging, date, time, necessary meetings, and responsibilities.

Outstanding people were often very generous of their time because of their interest in helping youth develop into potential scientists. Some sources for individuals who were willing to serve as judges have been found in the following places:

1. Industries.

2. Professional societies of mathematics and science.

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[1]Welte, Diamond, and Friedl, op. cit., p. 32.

3. State and federal agencies.

   a. Game wardens

   b. Refuge managers

   c. Fish and wildlife biologists

   d. County agents

4. High school, college, and university faculties.[1]

Judges were characterized by being trained in a specific science area, acquainted with the science program of junior and senior high schools, recognizant of good techniques of science teaching, interested in young people, and desirous of improving the science work of students.[2]

Evaluation forms aided judges in uniformity of judging and better organization. Projects were generally judged separately and independently first. The judge met and talked with each exhibitor before he gave credit for the work and design that went into the project. The committee-in-charge was careful not to overload the judges with too many exhibits to study critically in the length of time they had to spend at the fair.

Judges were thanked verbally at the fair and also by letter after the fair. The judging received recognition in the public press and the science fair program. Judges were made to feel that their work was important and that it was

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[1] Hallen, op. cit., pp. 18-19.

[2] Science Fair Manual: For Use in the North Carolina Science Fair, op. cit., p. 17.

appreciated. Good human relations were maintained to insure the success of future science fairs.

Publicity. Selling the fair to the public was a function of each fair committee. To avoid repetition all the publicity for a fair should be channeled through a publicity chairman. Some of the media used to advertise the fair were local ratio stations, newspapers, stickers, posters, special announcements in club meetings and public gatherings, and spot television announcements.

Financing. Each fair adjusted its finances to its own situation. Some of the money was furnished by the school district hosting the fair. Most fairs were financed by a sponsoring group. Expenses that occurred in most fairs were travel expenses of advisers, printing, awards, publicity, and judging.

Prizes and awards. Only a limited number of exhibitors were winners. However, most exhibitors received some kind of recognition by the fair committee in the form of inexpensive medals, certificates of merit, or ribbons. In setting up a system of awards most fair committees gave certificates of participation to all entering exhibitors, issued as many first, second, and third place ribbons as possible, and attached seals of merits to certificates as rate recognition. They served as effective awards in place of expensive awards and they were appreciated by exhibitors

and stimulated them to greater efforts in succeeding years.[1]

Winners were always recognized. Winning exhibits were marked so that the public saw them. Most fairs had an awards ceremony. The winners' names appeared in local papers.

Pitfalls and problems. According to Lewis and Copeland many problems were encountered in organizing their first school science fair. Their greatest problem was lack of student motivation. In order to give added motivation for future fairs, the committee decided to give an exhibitor's button to each entrant and certificates and ribbons to the winners in each division. Their most annoying problem was lack of working space. Another problem was finding suitable space large enough to exhibit the projects. Preplanning and cooperative effort solved these two problems.[2]

In an interview with Larry J. Meador, Science Fair Chairman for the first Lincoln County Science Fair, he said that not enough time was allowed between the local fair and the regional fair. Winners did not have time to improve their project for regional competition. He recommended that future local fairs be scheduled three weeks earlier, if possible. He also suggested that the awards committee establish a more

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[1] Science Fair Manual: For Use in the North Carolina Science Fairs, op. cit., p. 19.

[2] Duncan B. Lewis and Margaret E. Copeland, "Our First Science Fair: Problems, Pitfalls and Satisfactions," High School Journal, 39:275-76, February, 1956.

elaborate awards program as a method of motivating students to participate in the fair.[1]

Some other trouble spots which occurred in first time science fairs were (1) to withhold authority from the chairman so that he could not make decisions necessary in conducting the fair; (2) the projects were not protected from the public before they were judged; (3) all students were required to make a project for the fair; (4) exhibits were arranged in a hodge-podge manner; and (5) the inexperienced science fair committee did not do enough research on how to conduct a successful science fair before having it.

Roles of various people

A science fair, in order to be a success, had to be a cooperative endeavor. Many different people were involved in determining its outcome.

The student's role. The student's responsibility was to produce the project. He had to have an interest in a special topic. He needed drive, patience, and the desire of accomplishment to create a finished product. The work on the project was usually voluntary and was done by experimentation and research. Ideas and suggestions could be given to him; but if he received assistance, he acknowledged it.[2]

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[1]Larry J. Meador, Lincoln Junior High School, Lincoln, Kansas, personal interview.

[2]Hallen, op. cit., p. 12.

The teacher's role. Teachers had most of the responsibility for stimulating student interest in doing a science fair project. It took a special kind of science teaching which yielded student work that could be reported in school, area, and national science fairs. Classroom teachers needed to know where to find ideas for projects and to have a list of possible projects filed and available for student use. Teachers and school librarians worked out a list of references which would be helpful to students. Teachers held personal interviews with each student concerning his project. The students were encouraged and motivated to work on projects and carry them through to completion.[1]

The parent's role. Parents have assisted the student by being interested and showing enthusiasm. They listened to the student discuss his project and were a good "sounding board" for ideas. They guided the student by suggesting sources of information and questioning the feasibility of some approaches used by the student. They should not coerce the student to do a project because of honor, glory, or awards he might receive.[2]

The administration's role. It was the duty of the administration to sanction the local science fair. The

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[1]Science Fair Manual: For Use in the North Carolina Science Fair, op. cit., pp. 8-10.

[2]Hallen, op. cit., p. 14.

school administration coordinated the co-curricular schedule of the school calendar to fit the science fair into the total school program.[1]

Values derived from a science fair

Students developed good character traits as a result of working on a science project. Good solid work went into the project which was exhibited at the fair. They learned to work cooperatively with other people. Patience was taught as the idea was worked on and as mistakes were made. They felt the power of public opinion as the people viewed and criticized this bit of handiwork. Expressions of thanks for help from others, polite questioning, and careful letter writing were all concomitants.[2]

During the course of project work the student had educational experiences of lasting importance. He learned to recognize and solve problems, he did research, he acquired an appreciation of science and its applications, he became acquainted with and learned to utilize human and material resources, he developed confidence in himself, he became acquainted with basic educational disciplines, he used exhibits as a means of communication, and he shared his

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[1] Ibid., p. 15.

[2] John Gammons Read, "Fitting Science Fair Activities into the Total Academic Program," High School Journal, 39: 282, February, 1956.

knowledge and experience with others.[1]

A special type of science instruction resulted from participation in science fairs. Class sessions were not periods of parroting text material, but were periods of thinking based on information gained from many sources. Students acquired sound reading habits and study techniques that prepared them for college. The teacher became primarily concerned with the growth and development of the individual, and not in the amount of subject matter covered.[2]

Science fairs motivated bright students to do original thinking and afforded them proper and adequate recognition for academic achievement or excellence.[3] As a result of their science fair participation many of these exhibitors chose a career in science. Potential scientists were discovered and encouraged to select a science career so that there would be enough scientists to meet the nation's requirements.

Science fairs provided an opportunity for junior and senior high school science teachers to meet with their colleagues to see what others were doing and to evaluate their

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[1] Science Fair Manual: For Use in the North Carolina Science Fairs, op. cit., p. 2.

[2] R. W. Lefler, "Educational Implications of Science Fairs," High School Journal, 39:307, February, 1956.

[3] William T. Lunsford, Jr., A Report on the Effects of the Capital Area Science Fair Program in motivating further achievements, accomplishments, and career choices of "superior" and "gifted" children, p. 10.

own work. College scientists had a chance to become acquainted with high school teachers of their area, and the result was a closer cooperation between the two groups.[1] Leonard A. Ford saw a value in science fairs because they allowed students and teachers to enter into a day of excitement and scientific adventure.[2]

The local science fair served to acquaint all the people of the community with the progress of science study in school science classes. It called their attention to the various needs for counselors in certain areas of science, and for help from science consultants who would work with student and teacher in specialized areas of investigation. The public became aware of the contributions of scientists and of the soundness of methods of science because young people in their community were actively interested in scientific investigations. The results of these investigations could be seen at the science fair. After viewing the exhibits the public was more willing to procure needed materials for the science department.[3]

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[1] Hollis J. Rogers, "Reviewing and Evaluating the North Carolina Science Fairs," High School Journal, 38:303, February, 1956.

[2] Leonard A. Ford, "A Science Fair," School Science and Mathematics, 54:592, October, 1954.

[3] R. W. Lefler, "Educational Implications of Science Fairs," High School Journal, 39:306-07, February, 1956.

Haupt noted a shift in motivation. At first students were interested in the awards but as they worked on their projects a deeper drive developed and they sought to perfect their project for satisfaction they received from doing a good job.[1]

Larry J. Meador, Lincoln County Science Fair Chairman, 1964, said in a personal interview that one value derived from their first fair was to bring to the public eye the work that the schools had done in their science program. The development of science was overlooked in favor of other fields of endeavor such as sports and music. It also stimulated the minds of the youth of the community out of what seemed to be a lull in academic interest. The fair focused attention on the schools in a way that had never been done in that community before, namely, in the area of science and mathematics.[2]

SUMMARY AND CONCLUSIONS

Science fairs are a collection of exhibits, each of which is designed to show a scientific principle, a laboratory procedure, or an industrial development. Doing is the key word. Fairs are an extension of classroom teaching.

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[1]George W. Haupt, "A Regional Science Fair: Organization and Values," The Science Teacher, 18:36, February, 1951.

[2]Larry J. Meador, Lincoln Junior High School, Lincoln, Kansas, personal interview.

After the student masters basic scientific knowledge, his next impulse is to share it with others. He can do this through an exhibit designed and constructed by himself, which presents a single, main scientific idea. The exhibit is usually prepared voluntarily by the student.

The successful science fairs vary in magnitude, content, and scope. They are alike by being educationally sound and by emphasizing the importance of science and mathematics. It is necessary to know what purpose or purposes the fair is to serve in order to justify the time, effort, and money spent to hold one.

The organization of a science fair takes careful preplanning and coordinated efforts of many interested people. The preparation for the fair covers a period of months. It is helpful to establish a time table so that every necessary function has an adequate time allotment.

In science fairs, as in athletics or music, top prizes are won by the experienced people. Practice in display techniques and experience in developing a project help in the production of outstanding exhibits. The fair participants learn from being judged. Constructive criticism gives them ideas and suggestions for doing additional research and study.

Many values are derived from participating in a science fair. Studies made indicate that educational fairs help to develop good character traits in students, to improve science instruction, to discover potential scientists, to

give educational experiences of lasting importance, to acquaint the people of the community with the progress of science study in their schools, and to provide science teachers with the opportunity to meet with their colleagues so that they can see what others are doing.

The most important benefit derived from the science fair, because of its educational implication, is the shift in emphasis in science teaching. Science fairs are one cause of the change in teaching techniques from subject centered to child centered. Learning activities are more apt to stress growth and development of the individual.

Science fairs are educationally sound and a tool to use in science instruction. They are not a substitute for good, sound, fundamental teaching practices. They are only a supplement of the formal instructional program. Few co-curricular activities have shown such phenomenal growth as the science fair. It is imperative that science teachers recognize both the capabilities and limitations of the educational fair to assure its continued growth in scope and depth.

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A STUDY OF THE EDUCATIONAL SCIENCE FAIR CONCERNING ITS PURPOSE, ORGANIZATION, AND VALUE

by

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AN ABSTRACT OF A MASTER'S REPORT

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Science fairs should be a part of the secondary school's educational program. These fairs can help to enrich the experiences which students have in science and mathematics classes. The science fair is not a substitute for sound, fundamental teaching practices; rather, it is a supplement of the instructional program.

A science fair is defined as a collection of exhibits, each of which is designed to show a scientific principle, a laboratory procedure, an industrial development, or an orderly collection which can be fitted into any branch of a pure or applied science. Doing is the key word in the preparation of an exhibit. The student uses imagination and initiative to display his ideas, research, and creative ability when he makes a project for an exhibit.

The purposes of this study were 1) to discover the procedures which had been used in organizing a successful fair; 2) to determine what values could be derived from having a science fair; and 3) to justify having a fair by knowing the purposes it could fulfill. Secondary science teachers usually inherit the job of organizing their local fair and it is hoped that this study might be helpful to them.

Research included a review of pertinent books, periodicals, pamphlets, handbooks, and unpublished Master's theses and reports dealing with this problem. The writer obtained the literature from the Kansas State University library, the University inter-library loan plan, Science Service, and the

Atomic Energy Commission. A personal interview was held with Larry J. Meador, chairman of the first Lincoln County Science Fair held in Lincoln, Kansas.

In the review of the related literature the author attempted to discuss the phases pertinent to science fairs. The points covered were: the purpose of the science fair, types of science fairs, organization and execution of a science fair, roles of various people, and values derived from a science fair.

The Atomic Energy Commission and Science Service offered their facilities to promote local and regional science fairs. They felt that educational science fairs were a means whereby potential scientists could be discovered among our youth. These organizations recognized the need which the United States has for an ever-increasing number of scientifically trained personnel, and that this need must be filled by encouraging young people to choose a science career.

Authorities stressed the importance of the educationally sound fair. Careful pre-planning and the coordinated efforts of many interested people were given as necessary factors for a successful fair. They recommended that authority be delegated to the chairman and that a time table be established so that every necessary function had an adequate time allotment. The writers stressed that both extrinsic and intrinsic values were derived from participation in science fairs.