

GENERAL SCIENCE

Science Threshold Crossed Early

Ninety percent of a group developed interest in science before senior high school. Some were interested before entering first grade, Shirley Moore reports.

► NEARLY ALL of the nation's potential supply of scientists arrive at the threshold of a professional future in science before they have been taught any senior high school science or mathematics. About half of them have started to develop as scientific thinkers and doers by the time they are fifth graders.

Continuing studies of promising student-scientists and further experience in introducing grade schoolers to science have shown the adult world that large numbers of very young scholars take to science as naturally as they wade into an inviting mud puddle.

The younger age group also may produce excellent science projects when they are given a chance. Group projects usually are more successful during the earlier grades, but astonishingly competent work has been accomplished by "loners" whose absorbedly careful investigation is a sort of preview of the attitude characteristic of adult research scientists.

During the current year more and more requests for information and advice on conducting elementary and junior science fairs have been received at National Science Fair-International headquarters at Science Service in Washington, D. C.

Share Work With Others

It appears that, at any age, the completion of a piece of meaningful work generates an understandable yen to share it with other people. So the science fair program continues to spread rapidly from senior to junior high schools, and then through the elementary grades all the way to nursery school.

A cumulative SCIENCE SERVICE study of 1,306 finalists at the annual National Science Fairs reveals some facts that may have far-reaching significance in educational planning and opportunities provided for children by their parents and the community:

Half of this group already had developed their initial interest in science before the close of the first quarter of the fifth grade year.

Ninth grade found almost 90% of these potential scientists oriented toward science—before they had been introduced to senior high school courses in physics, chemistry, biology and mathematics.

Twelve years of age, or seventh grade, is the high point on a bar graph of reported ages of the initial sparking of interest, with about 13% of the total group having started out at this age.

The graph shows that fifth and eighth grades are well seasoned with potential scientists, for 12% of the finalist group

recorded their beginnings at 10 years of age and another 12% at 13.

Almost 10% started to be novice scientists as 14 year olds, probably in ninth grade.

A gradual increase in numbers of beginners is recorded for each age from two through seven, with 14% interested before they entered first grade at six years of age. A sharp jump is evident at eight years old, or third grade.

Two low points in the graph suggested possibly important differences in personal characteristics and/or educational practices at the ages of nine and 11, or fourth and sixth grade.

It is most interesting to note that in a University of Minnesota study, supported under the Cooperative Research Program of the U. S. Office of Education, the development of creativity in children also showed a sharp drop during the fourth grade year. This was followed by a slow recovery on the part of most children during the upper elementary grades, but some seem to have lost their creative talents permanently, reported Dr. E. Paul Torrance of the bureau of educational research at the University of Minnesota.

The corresponding slump during fourth

grade in initial interest in science has been reported to the U. S. Office of Education by SCIENCE SERVICE, and also an additional low point during sixth grade which was not found in the creativity study.

The University group now is investigating the fourth grade drop in creative characteristics and activities in the hope of discovering exact causes. SCIENCE SERVICE will continue its studies also and will attempt to correlate its data with studies of the physical and psychological development of children.

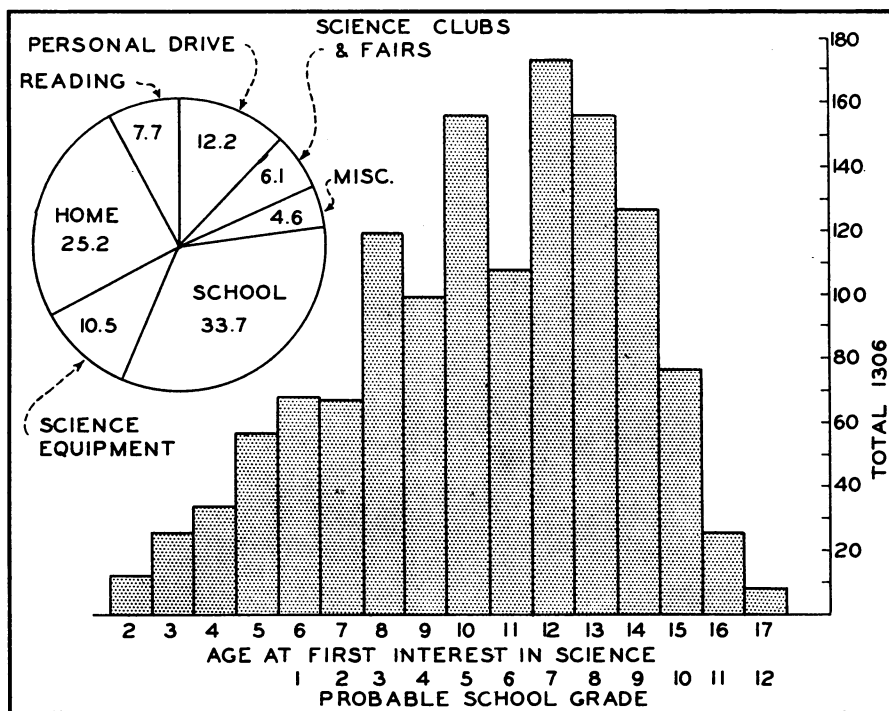
Until more definite answers are found, it may be conjectured that the cause lies in the rebellion against adult authority and the conformity to interests and activities of classmates that the Gesell Institute describes as being characteristically important among nine year olds.

Eleven Is Difficult Age

The Institute has found 11 to be a seething, critical, fiercely competitive, obstreperous age. Possibly the turmoil is too overpowering to allow the blossoming of new intellectual interests and abilities.

On the other hand, some of the fruitful sources of science-mindedness are known. The SCIENCE SERVICE studies of 1,306 outstanding high-school-aged scientists yielded these mainsprings of response to science:

More than one-third, 33.7%, said that school activities, courses, laboratories and teachers were most directly influential.



ORIGINS OF SCIENCE INTEREST—The ages and sources of interest in the sciences are shown in this graph of the results of a SCIENCE SERVICE study of 1,306 finalists at National Science Fairs.

One-fourth, 25.2%, were started at home by their parents or other family members, family activities, attitudes and expeditions.

Various sorts of self-generated drive launched 12.2% who described irresistible curiosity, imaginative speculation, compelling need to know "why" and similar traits as having been their prime movers.

Science equipment that provided opportunities to explore for themselves captured the interest of 10.5%.

Reading books, magazines, newspapers, scientific journals and papers, advertisements, encyclopedias and textbooks started 7.7%.

PSYCHOLOGY

Factor X of Leadership

► THERE IS a mysterious "factor X" essential for leading men.

Regardless of circumstances, from leadership of an infantry squad in battle, handling a field army, to directing an office project, success depends to a considerable degree on the amount of this factor an individual has. Special traits are required for each kind of leadership, but underlying all is "factor X."

Determination of its nature and distribution is the objective of several psychological research projects now underway that were reported at a conference at the U.S. Naval Academy in Annapolis, Md., by Dr. Luigi Petrucci of the Office of Naval Research, sponsor of the conference.

The old idea that leadership ability was a combination of intelligence, courage and capacity to plan ahead, the "great man" theory of history, no longer can be accepted, as an adequate explanation, Dr. Petrucci said.

All these qualities are important, to dif-

Science clubs and science fairs stimulated 6.1% to want to know more about a specific subject or about science in general.

The final 4.6% reported a miscellany of "first causes" such as museums, national parks, professional laboratories, planetarium programs, television productions, community activities, etc.

Such guideposts as these suggest many different routes that may be made freely accessible to children and young scientists. If they then choose to travel these roads, the destination of some of them may well be the scientific community.

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ferent degrees in different situations, he pointed out, but any combination of them still does not define factor X. The brave, intelligent, understanding man still may be a poor leader of other men.

Summation of all these qualities, he said, "still is far smaller than the part contributed by some unknown factor X." The object of contemporary research is exploration of the composition of this factor. Traditional methods and concepts are being systematically applied, but do not promise solution. From somewhere must come new concepts.

"We know some of the characteristics of factor X. First, it is dynamic and organic, it follows principles of growth and development. Second, it is dependent on persons, situations and interactions. It is purposive and dualistically oriented towards tasks and persons.

"A new leadership theory must incorporate the old characteristics as a minimum."

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MEDICINE

Cancer Mistaken in X-Ray

► DIAGNOSIS of lung cancer may be difficult or impossible from X-ray pictures alone.

A study of ten different shadow forms lung cancer may take on an X-ray plate was shown at the American Academy of General Practice scientific assembly in Miami Beach, Fla.

Dr. Robert W. Jamplis of the Palo Alto, Calif., Clinic warned in the exhibit that masquerades may take the form of simple pneumonia, tuberculosis, obstructive emphysema such as might be experienced from a peanut becoming lodged in the windpipe, and other diseases. A dark round spot may go unnoticed because it looks like a nickel or a quarter in a shirt pocket.

Correct diagnosis should be made promptly by other methods, Dr. Jamplis reported, because any benign-appearing lesion must be suspect. Early surgery is the best treatment for lung cancer.

The economics of medicine was discussed in a panel on the pros and cons of social security methods of financing medical care.

Dr. John S. DeTar of Milan, Mich., moderator of the panel, told SCIENCE SERVICE that the Academy was in general agreement with the American Medical Association, although probably no official stand will be taken.

"Both the AMA and the AAGP are in favor of the individual doing as much as he can for his own medical care," Dr. DeTar said. "Next, the community, then the state, and as a last resort the Federal Government should step in."

Standing virtually alone in favor of social security methods of financing medical care was Leonard Woodcock of Detroit, Mich., who is vice president of the United Auto Workers.

Representing the American Farm Bureau Federation was Roger Fleming, secretary-treasurer and director of the Washington, D.C., office. The Farm Bureau policies for 1961 are that the "need for medical insurance should be met by expansion of existing private insurance programs without Federal subsidy."

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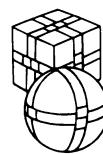
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