

GENERAL SCIENCE

Bringing Up a Scientist

Parents of top young scientists advise that children meet working adult scientists. One father suggests a home life in which a child's emerging viewpoint is tested by family debate.

By SHIRLEY MOORE

"LET YOUR CHILD reach for the moon; he may be on his way before you know it!" the mother of one top science student says.

For a special survey, this mother and the parents of 39 other top science students described the methods they used in guiding their children toward excellence in science. The parents' children were all 1960 winners of the 19th Science Talent Search recently conducted by Science Clubs of America for the Westinghouse Science Scholarships and Awards.

One of the fathers, a physics professor, said it is very important to give a young person the sort of home life "in which his emerging viewpoint is continuously tested by friendly debate." The father added: "A child must be accompanied in his interests; he must not be either led or pushed."

Most of the parents agreed. Never push, they said. But be ready to go along with children's ideas and schemes. Four-fifths of the mothers and fathers agreed on the value of encouraging science-prone youngsters to improvise equipment.

For example, one mother cautioned against supplying special materials and tools until the child asks for them and shows clear evidence of his ability to make use of the devices he already has.

Another parent suggested that a new camera or microscope sometimes should be postponed until the young experimenter has thoroughly explored all the possibilities of the old one. Two-thirds of the mothers and fathers advised emphasis on research for the pure joy of the search, not mainly for honors and prizes.

Kits Thought Valuable

Half of the parents considered experimental kits and similar materials valuable. The mother of one of the nine girl winners said kits should be chosen which will offer a challenge, not merely pat answers.

More than half of the parental group advised that young people with potential science ability should be actively exposed to working adult scientists. However, one parent suggested that this should not be done before their self-development and confidence has been established by creative use of their own devices, materials and tools.

The parents mentioned 84 teachers who exerted potent influence on these student-scientists from the age of 7 to 17. The height of teacher inspiration was in the years from 12 to 17. There were 42 mentions of scientists whose help and example were very effective during the period between 13 and 17 years of age.

In 32 cases parents also designated themselves, or each other, as important influences throughout their children's lives.

Other individuals who were mentioned included adult friends, classmates of their children, leaders of science clubs, Scout troops and camp groups, and advisers of library and museum organizations.

Toys and play materials that contributed to their children's development were listed by the parents as follows: Chemistry sets for over 50% at ages ranging from six to 12, construction sets for 40% at ages from four to ten, and educational kits and science toys for 25% from one to 14 years of age. Another 18% mentioned microscopes. But 12% mentioned no particular play materials as having been significant.

The parents listed 37 textbooks and semi-technical books on specific fields of science that absorbed their children from the time they could read until the present and 15 children's series and general books on science, popular at pre-school ages and at six, eight and nine years old. From the pre-school level until 10 years of age, encyclopedias were important to six youngsters.

Fiction and science fiction each stirred the imagination of four young people.

Books ranging from almanacs to Darwin's *Origin of the Species* impressed the pre-

scientists, with Dr. George Gamow's books claiming their enthusiasm at such early ages as 11, 13, 14, and 15.

Such magazines as *Scientific American*, *SCIENCE NEWS LETTER* and *Natural History* have been valuable to a large number of the students. Visits to museums, observatories and planetariums, and professional, industrial and university laboratories were also important.

One-half or more of the young scientists found experience and inspiration in science fairs and science clubs, while Boy and Girl Scouts, mathematics contests and National Science Foundation summer programs for high school students helped several.

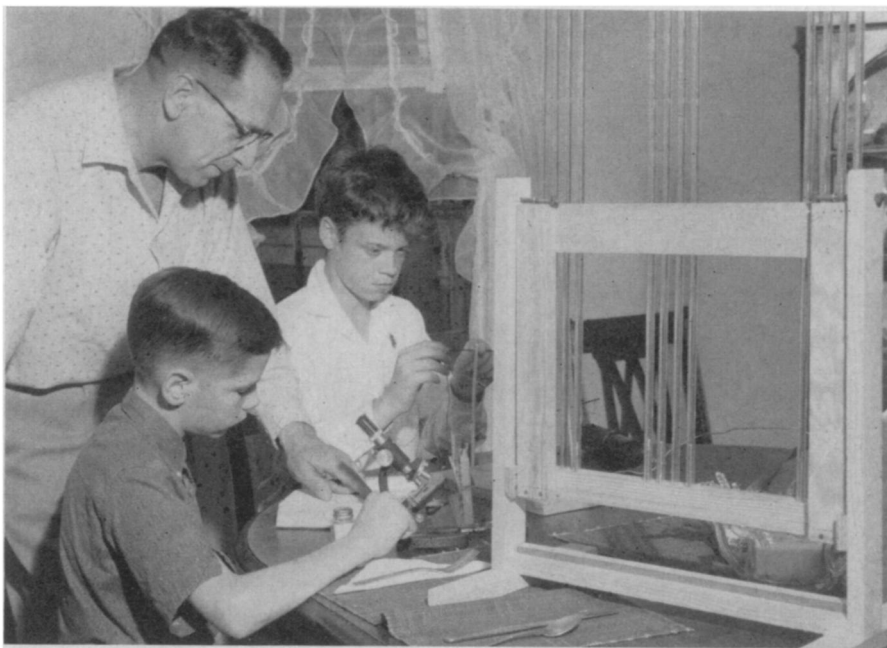
Educational TV Stimulates

Educational television courses stimulated the interest of 40% of this group, according to their parents. Mothers and fathers of 25% felt that television in general had little or no effect upon the development of their children.

Nearly universally reported hobbies were collections of everything from rocks, insects and stamps to skunks; sports; photography; reading and music. But parents also listed chess at five and ten years of age, paleontology at six, astronomy at seven, microscopy at eight and mathematics at nine and ten.

It is evident that the parents of these developing scientists practiced the precept of one of the mothers who said:

"The parents' attitude that the entire world is fascinating is most important."



DINING ROOM TABLE SCIENCE—This scientist-father enjoys helping younger generation scientists over the "rough spots" in their projects. Science moves into the dining room as his son and a friend work on experiments. The importance of such companionable "going along" with the interests of children was emphasized in a *SCIENCE SERVICE* study of the parents of the 40 winners of the 19th Science Talent Search.

And four-fifths of the parents said aspiring young scientists should be encouraged to enjoy activities quite outside of science.

"Don't panic if he is considered 'odd' as long as he is not unhappy," says one parent, "but encourage him to broaden his interests and contacts to avoid becoming too solitary."

Such broadening insures against a child's "becoming too one-sided in personality," as another parent put it.

Still another parent added that all developed talents are valuable for future use and will combine in the young person's eventual main interest.

Highlights abstracted from additional suggestions offered from what some of the parents would call "hindsight wisdom" include:

1. Show confidence in your children's abilities and leave them alone to work out their projects.

2. Never underestimate what they might be able to accomplish.

3. Don't be a "good housekeeper" at the expense of your child's prize collections.

4. Combat the "work versus fun" concept by letting them know that you find work a vital part of your life.

5. Make home a place of warmth, stability, democracy, continuity.

6. Expose children to alert minds as well as to challenging printed materials.

7. Use infinite patience in listening and always show keen interest in any topics they want to discuss.

8. Provide space for adequate storage and use of scientific equipment.

9. Provide quiet time, alone.

Encourage children to be individualistic. As one couple said, "conformity to stereotyped ideas, we feel, can be stifling to the budding scientific personality. A strong sense of integrity, dependability and character should be stressed. Discipline and self-discipline should be emphasized from early childhood.

Science News Letter, June 4, 1960

PUBLIC HEALTH

Air Pollution Linked to Ills

MANY DEATHS from heart disease and cancer may be related to air pollution.

Two analytical statisticians from the Department of Health, Education and Welfare in Washington, D. C., reported the relationship at the annual meeting of the Air Pollution Control Association in Cincinnati, Ohio.

Richard Schiffman and Emanuel Landau presented information based on a study of 163 standard metropolitan areas that were ranked in terms of potential air pollution levels. Those with highest air pollution had a greater number of deaths from various diseases than the national average.

Chronic rheumatic heart disease, arteriosclerotic heart disease, including coronary, and non-rheumatic chronic endocarditis were three that showed mortality increase

in 20 standard metropolitan areas studied.

Similarly, cancer of the esophagus and stomach caused more deaths in 20 metropolitan areas with high air pollution than the national average, while cancer of the trachea, bronchus and lung showed comparable mortality increases.

The need for further study to show types of industries, fuels used and other factors related to air pollution and morbidity was emphasized.

Other investigators minimized the "overwhelming importance" of cigarette smoking as a prime cause of cancer, which has been alleged by many researchers. They said that frequency of lung cancer started on the European continent before cigarette smoking became popular.

Science News Letter, June 4, 1960

ARCHAEOLOGY

Valuable Sites Protected

VALUABLE archaeological sites uncovered by freeway-building operations in California are being protected by a unique co-operative program among two state agencies and the University of California at Los Angeles.

The program involves the State Division of Highways, Division of Beaches and Parks and the UCLA Archaeological Survey. The Survey is headed by M. B. McKusick.

Here is the problem: Several years ago it became apparent that the vast California highway building program might bury forever many of the sites of California's prehistory and early history unless something was done to record and preserve some of the remains. The problem was particularly acute in southern California, whose coastal region, the site of major highway programs, is archaeologically rich.

Here is the way it is being solved: Whenever possible the UCLA Archaeological Survey is furnished with maps on which projected rights-of-way are plotted.

The right-of-way is then explored by an archaeological crew.

Occasionally a few sites are missed during the initial survey or there is not time for thorough study before highway construction starts.

When a bulldozer turns up evidence of a missed site the word is flashed to Sacramento and then back down to UCLA.

Shortly afterward a special "emergency" archaeology crew is in the field retrieving ancient cultural remains from the path of the roadbuilders.

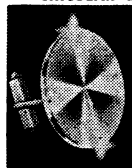
A similar program is being negotiated by UCLA with pipeline building organizations.

Science News Letter, June 4, 1960

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