

## Young astronomer wins talent search



*E. Sterl Phinney III*



*Scott T. Cohen*



*Mark A. Gubrud*

Inspired by an article in an astronomy journal, a 16-year-old Leverett, Mass., high school student decided to build a simple drive mechanism for making extended photographic exposures of star clusters—a project that eventually won for him the first place award in this year's Science Talent Search. His prize—a \$10,000 college scholarship—was presented in Washington this week by the program's sponsors, Science Service, Inc., and Westinghouse Electric Corp.

The young astronomer, E. Sterl Phinney III, used his apparatus to study so-called "open clusters" of stars in our galaxy. By taking pictures on ordinary 35 millimeter black and white film, using various color filters, he was able to determine the distance, age, brightness and temperature of stars in five clusters, from which he deduced information on their evolution. In describing one cluster with very massive stars, for example, he concluded: "Since fat stars, like fat people, tend to die young, the cluster must be very young."

Besides his interest in science, Phinney plays first clarinet in the Western Massachusetts District Band, and enjoys wood carving and hiking. He hopes to pursue a career in astronomy and plans to attend either Harvard or California Institute of Technology.

The second-place award, an \$8,000 scholarship, was won by Scott T. Cohen, 16, a student at Bronx High School of Science. His project was application of modern number theory to some theorems of the ancient Pythagoreans. Since olden times, mathematicians have been intrigued with the properties of certain numbers that are said to be "amicable"—number pairs that obey very restrictive rules applied to the sum of their divisors. Discovery of these pairs and of theorems concerning them usually depended on "guess and check" methods and Cohen's contribution was to devise original proofs for several of these theorems.

Cohen has been chosen as one of 24 students to train for this year's Interna-

tional Mathematics Olympiad in Austria; 8 members for the American team will be selected from the training group later this year. He hopes to study mathematics at Harvard.

Another \$8,000 scholarship, for third place, went to Mark A. Gubrud, of Columbia, Md. He addressed himself to a practical problem interesting many professionals in a highly competitive field: how to make holograms of ordinarily lit objects. Most holograms—three-dimensional pictures recorded as wave-interference patterns of light—require the use of a laser to illuminate the subject, a distinct disadvantage when it comes to making photos of large objects or animals whose eyes could be damaged by the beams. Gubrud believes he has partially solved the problem by generating the light interference patterns using a camera with constantly moving film and lenses. Ordinary white light could be used to illuminate the subject, and he hopes that some-

day the idea can be applied to production of full-color holograms. The 16-year-old student is an amateur radio operator and hopes to study physics in college.

Three students won \$6,000 scholarships. William A. Schwartz of Massapequa, N.Y., traced protein transport across cell membranes of bacteria and found that peptides are apparently ingested intact before being broken down into amino acids as food for the bacteria. Joel Fajans of Teaneck, N.J., designed and built a computer graphics station upon which a user can draw using a light pen. Diane H. Wooden, of Rockville, Md., devised a new method for counting stars on photographic plates to detect regions of interstellar dust that might have otherwise been missed.

Four students won \$4,000 scholarships: Alice Chow, of Corona, N.Y., for work on inheritance; David J. Boothby of Acton, Mass., for study of number theory; George D. Yancopoulos, of Elmhurst, N.Y., for a project involving regeneration in single-celled organisms; and Rebecca A. Kurth of Los Angeles, Calif., for determining the vector of pollination for the Bird of Paradise flower.

At a luncheon honoring the Talent Search winners, Emilio Q. Daddario, director of Congress's Office of Technology Assessment, encouraged his young audience to enter their careers in science with an appreciation of larger issues. "Technology set into motion with the best intentions," he warned, "can produce side effects neither expected nor desired." What is needed instead is careful assessment—what he called "today's technological imperative"—not pressing forward to the limits of technological ability so much as pursuing knowledge on how best to apply that technology. □

## Integration and science achievement

A singular exception has been discovered to the general trend of declining science achievement scores around the nation: During the period of most rapid desegregation in the South, both black and white students there showed slower declines in science achievement scores than students in other areas. The scores of one group—Southern 9-year-old blacks—actually improved.

These results, issued this week by the Education Commission of the States, are based on a study covering the period 1969 to 1973, during which the proportion of blacks attending heavily segregated schools (less than 10 percent white students) dropped from 70 percent to about 20 percent. In the rest of the country during that period, only relatively small changes in school racial composition took place.

While scores for blacks in the rest of the country were dropping even faster than the average—as much as 5.1 percent for

13-year-olds—their scores in the South declined far less than the average—some 1.1 percent for 13-year-olds. By comparison, the scores for Southern white 13-year-olds declined 1.2 percent, against a 1.8 percent decline elsewhere.

The changes, however, do not nearly compensate for initial inequalities in achievement between the races or between the regions involved. Southern whites and blacks of all ages remain behind their counterparts elsewhere in science achievement test scores, with older students (17-year-olds) showing the least regional difference. The older students of both races, however, had the worst relative scores of any age group, throughout the nation: In 1969, black 17-year-olds nationally answered an average of 33.9 percent of the questions correctly compared to 47.2 percent for whites; in 1973, black scores had dropped to 32.0 percent and white scores had dropped to 44.5 percent. □