Talent Search winners announced

Michael Faraday built his own electrical equipment; Ernest O. Lawrence invented the cyclotron; Robert Hooke developed the compound microscope. Inventive researchers who design and build their own instruments in order to poke more effectively into unexplored fields are part of a long tradition in science. Several winners in this year's 45th Annual Science Talent Search show the same kind of spirit and ingenuity.

One high school student developed a new type of photometer for measuring brightness changes in variable stars. Another, to study the chemical characteristics of certain molecules, converted a mass spectrometer designed only for qualitative results into a more sophisticated machine. Still another designed and constructed an instrument for diagnosing color blindness.

The same kind of creativity shows up in projects devoted to the study of the effects of vitamin C on regeneration in the brown planarian (a type of flatworm), the invention of a bottom-mounted device for generating electricity from ocean waves, investigating the behavior of fruit flies and many other topics.

The 40 winners, 30 boys and 10 girls, are invited to Washington, D.C., to attend a five-day, all-expenses-paid session of the Science Talent Institute, beginning Feb. 27. They will compete for $140,000 in Westinghouse science scholarships and awards. The competition is conducted by Science Service, Inc.

This year's winners, selected from 1,219 entries, are:

ALABAMA: Yoriko Saito, Homewood H.S., Homewood.

ARKANSAS: Todd Harrison Rider, Ole Main H.S., North Little Rock.

CALIFORNIA: Andrew Lawrence Feig, University H.S., Los Angeles; Kelvin Lee Wong, South Pasadena H.S., South Pasadena; Kenneth Chuan-Tsing Yao, Homestead H.S., Cupertino.

CONNECTICUT: Mary Elizabeth Meyerand, Glastonbury H.S., Glastonbury.

FLORIDA: Wendy Kay Chung, Miami Killian Sr. H.S., Miami; Gerald Steven McAlwee, Melbourne H.S., Melbourne; Erica Lorraine Wickstrom, Chamberlain H.S., Tampa; Joanna Sue Zoltewicz, Gainesville H.S., Gainesville.

GEORGIA: Traci Ann Griffith, Marietta H.S., Marietta.

INDIANA: Mark David Owens, Marquette H.S., Michigan City.

LOUISIANA: Christopher Allen Bullock, Caddo Parish Magnet H.S., Shreveport.

MICHIGAN: Daniel Dongyuel Lee, Houghton H.S., Houghton; Matthew Joseph Okasinski, Dearborn H.S., Dearborn.

NEBRASKA: Bryan Albert Kliewer, Henderson H.S., Henderson.

NEW HAMPSHIRE: Conrad James Poelman, Laconia H.S., Laconia.

NEW YORK: Jessica Louise Boklan, Roslyn H.S., Roslyn Heights; George Jer-Chi Juang, Benjamin N. Cardozo H.S., Bayside; Chris John Katopis, Bronx H.S. of Science, New York; Mark Huan-Fu Kuo, Bronx H.S. of Science, New York; Leonard John Landesberg, South Side H.S., Rockville Centre; David M. Lazoff, Hillcrest H.S., Jamaica; Jung-Pu Lin, Forest Hills H.S., Forest Hills; Eli Muraidekh, Benjamin N. Cardozo H.S., Bayside; Andrew Henry Oliff, Bronx H.S. of Science, New York; Carl Hyun-suk Park, Stuyvesant H.S., New York; Serap Ayse Savari, Benjamin N. Cardozo H.S., Bayside; Manu Sanjay Saxena, Beach Channel H.S., Rockaway Park; Mariann Meier Wang, Stuyvesant H.S., New York; Mark Arden Winograd, Midwood H.S., Brooklyn; Wei-Jing Zhu, Brooklyn Technical H.S., Brooklyn.

OHIO: Allen Wallis Ingling, Buckeye Valley H.S., Delaware; Anh Tuan Nguyen-Huynh, University H.S., Chagrin Falls.

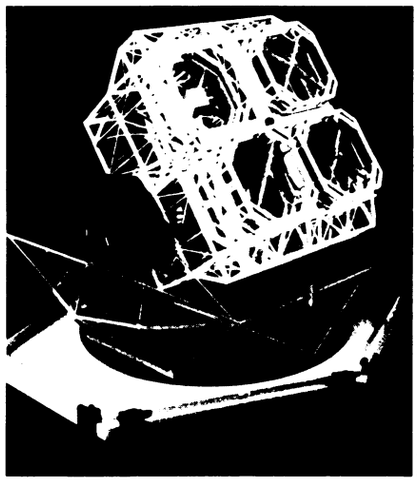
PENNSYLVANIA: William Edward Bies, Mt. Lebanon H.S., Pittsburgh; Clifford Andrew Cuffey, State College Area Sr. H.S., State College; Eric James Hansotte, Shaler Area Sr. H.S., Pittsburgh; Daniel John Zigmond, The Oakland School, Pittsburgh.

VIRGINIA: Virginia Angelica Felton, T.C. Williams H.S., Alexandria; John Ma Pierre, T.C. Williams H.S., Alexandria. □

NNTT's next generation: Harmonizing a quartet of large telescopes

The National New Technology Telescope (NNTT) is the National Optical Astronomy Observatories' (NOAO's) entry in what may be the coming generation of large telescopes. The NNTT, a proposed multiple-mirror telescope, would employ four separate mirrors to act together to simulate a single mirror 15 meters across, or to act separately. At a recent meeting in Houston of the American Astronomical Society, the NNTT's planners announced significant developments in its design, and the director of the project, Jacques M. Beckers, described successful tests of a new method for making the mirrors act in concert.

The plan, as it has evolved since 1984 when NOAO decided that the NNTT should be a multiple-mirror telescope, envisions four mirrors, each of 7.5 meters diameter, hung in a common altitude-azimuth mounting. In this mounting the telescope rotates in horizontal and vertical planes. The more usual equatorial mounting, in which the telescope rotates vertically and in the plane of the celestial equator, makes it easier to follow stars across the sky. However, the telescope has to be hung at an angle to the vertical, and in the case of an arrangement as bulky as the NNTT, an equatorial mounting would impose torques and shears that the system couldn't sustain. As does the housing of the existing Multiple Mirror Telescope, the entire building housing the NNTT would rotate horizontally (telescopes usually rotate inside their buildings).



NOAO

Model of proposed four-mirror NNTT.

Each of the 7.5-meter mirrors would be bigger than any telescope mirror now existing. Earlier concepts of the NNTT had generally foreseen a larger number of smaller mirrors, but recent progress in spin-casting of large mirrors, pioneered by Roger Angel of the University of Arizona in Tucson (SN: 2/16/85, p. 106), has made the larger mirrors seem practical.

Together the four mirrors would simulate a single mirror 15 meters across, for imaging purposes. For interferometric work they would be the equivalent of a 21-meter baseline. Working together, they would cast their reflections into a single image. To get them into such harmony and keep them in it, telescope operators use an artificial star, a test light source. In the existing Multiple Mirror Telescope, reflections of the artificial star by the six mirrors are brought to a common focus, and the mirrors are adjusted until the image of the test source is acceptable.

The new method of coalignment that Beckers and K.L. Shu and S. Shaklan of NOAO reported at the meeting uses "optical bridges" to link the mirrors in pairs. Each mirror would be linked to each of the other three by such a bridge. Reflections of a xenon test light from each pair of mirrors would be taken into the bridge linking them, and there combined at a central mirror to give two images. One of