

## 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 Meyrand, 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 Bullcock, Caddo Parish Magnet H.S., Shreveport.

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

NEBRASKA: Bryan Albert Kliever,

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.

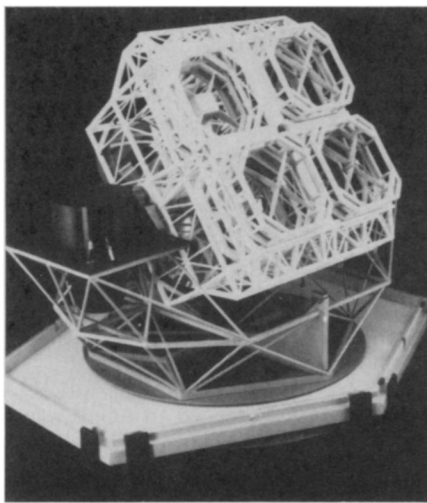
PENNSYLVANIA: William Edward Bies, Mt. Lebanon H.S., Pittsburgh; Clifford Andrew Cuffey, State College Area Sr. H.S., State College; Eric James Hansotte, Shaler Area Sr. H.S., Pittsburgh; Daniel John Zimmond, The Oakland School, Pittsburgh.

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 mount-



Model of proposed four-mirror NNTT.

ing 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).

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

the images would monitor the alignment of the mirrors to see that their light was reaching a common focus. The other would monitor the phase of the reflected waves to keep the different reflections in phase with one another. The apparatus, they say, can maintain the alignment to within a tenth of a second of arc and the phase to better than half a micron, or a fraction of an optical wavelength. The design is being optimized for infrared, where wavelengths run from 1 to a few microns.

According to a NOAO prospectus, the NNTT would cost about \$125 million in 1985 dollars. The only one of the new-generation telescopes actually under construction, the 10-meter Keck Telescope of Caltech and the University of California, is expected to cost something over \$70 million. The University of Texas large telescope project has been slowed by difficulties with the Texas state budget. The University of Arizona project for an 8-meter spin-cast mirror is still in the planning stage. — *D.E. Thomsen*

## Fastest pulsar so far

Astrophysicists have discovered the swiftest binary pulsar yet recorded, with a pulse period of 5.362 milliseconds. Only six of the 400 or so known pulsars are in binary star systems, but these are of particular importance to astrophysicists, because their binary nature allows studies of their dynamics.

The principal discoverer of this pulsar, 1855+09, is David Segelstein of Princeton (N.J.) University. He was assisted by Joseph Taylor, Daniel Stinebring and Lloyd Rawley of Princeton and Aleksander Wolszczan of the National Astronomy and Ionosphere Center's Arecibo Observatory in Puerto Rico. The pulsar is a relatively close neighbor of ours, lying only 1,500 light-years from earth in the constellation Aquila.

Binary pulsars are believed to consist of a neutron star (the actual pulsar) gravitationally bound to a more ordinary star and orbiting their common center of gravity. PSR 1855+09 has an orbital period of 12.3 days.

In another binary pulsar development, Shrinivas R. Kulkarni of Caltech in Pasadena reports the discovery of stars that may be the companions of binary pulsars 0655+64 and 0820+02. Studies of the dynamics of pairs like these could lead to determinations of the exact masses of the neutron stars, an important datum for calculations of the evolution and life histories of these objects. Comparing the timekeeping properties of 1855+09 with those of the fastest pulsar of them all, the 1.6-millisecond 1937+215, could determine whether the universe is pervaded by a background flux of gravitational waves generated by the Big Bang.

— *D.E. Thomsen*

## Fight continues over gene-splice release

Controversy has again cropped up in the attempt of a biotechnology company, Advanced Genetic Sciences, Inc., to spray genetically engineered bacteria on a patch of strawberry plants. The proposed field test, intended to protect plants from frost damage, would be the first deliberate release of genetically engineered microbes into the environment.

The company obtained permission for the experiment from the California Department of Food and Agriculture, following the approval late last year by the federal Environmental Protection Agency (EPA) (SN: 11/23/85, p. 324). But once a specific site — in Monterey County, near Castroville — was proposed, local opposition arose. The exact site has not been publicly disclosed. In addition to the local opposition, Jeremy Rifkin of the Washington, D.C.-based Foundation on Economic Trends again has asked the federal court for a preliminary injunction to delay the field test.

The new opposition includes the Board of Supervisors of Monterey County, which has scheduled a public meeting later in the month to consider blocking the experiment. The Monterey Bay Unified Air Pollution Control District board also objects to the field test, saying that more safety tests are necessary before it will allow the experiment to pro-

ceed. In addition, demonstrators picketed Advanced Genetic Sciences (AGS) in Oakland.

Rifkin told SCIENCE NEWS that AGS plans to spray the bacteria on a test plot in a suburban, tract-house area. The plot's proximity to homes makes crucial the issue of human pathogenicity, Rifkin argues. He cites an AGS statement that some strains of the bacterial species to be released have been associated with diseases in patients who have impaired immune systems.

"We have done toxicological studies that indicate that this strain [the one to be released] would cause no harm to man," counters Douglas Sarojak of AGS. Although some strains may be low-grade pathogens to patients with advanced stages of cancer and other severe immunodeficiencies, people are in constant contact with the species, he says. A typical carrot carries 10 million or more bacteria of this species, he adds.

Sarojak defends the proposed test site. "I would say it is rural, maybe semirural," he says. "It meets all the criteria set by the regulators."

The company plans to defend its plan at the Monterey County public meeting. Sarojak says, "Our proposal has been rigorously reviewed and found approvable." — *J.A. Miller*

## Obesity: If the genes fit . . .

Nature may be far more important than nurture when it comes to obesity, according to a report in the Jan. 23 NEW ENGLAND JOURNAL OF MEDICINE.

A study of 540 Danish adoptees by researchers from the University of Pennsylvania in Philadelphia, the Psykologisk Institut in Copenhagen and the University of Texas Health Science Center at Houston found a strong relationship between the adult weights of the adopted children and those of their biological parents, and no such relationship between the adoptees and their adoptive parents.

"When we started I thought both sets of parents would have an effect," says Albert J. Stunkard of the University of Pennsylvania. "We were very much surprised not by the fact that we found the [biological parent] relationship but by the lack of association between the adopted parents and the adoptees."

This finding runs counter to the results of a study done several years ago by Pierre Biron of the University of Montreal. Looking at families with both adopted and natural children, Biron found that about half of the relative obesity pattern could be explained by environmental factors, and about half

by genetics. The report of no relation at all to environment is "surprising," Biron told SCIENCE NEWS.

At least one animal study, done by Jules Hirsch and his colleagues at Rockefeller University in New York City, showed the same relative influence as in Biron's study. "There is a genetic factor in obesity almost certainly," says Hirsch. While cautioning that he has not yet seen the new study, he comments, "If anyone feels the study shows there are not strong social and psychological determinants, they're probably wrong."

The new study took advantage of the Danish Adoption Register, which contains names and addresses of both the adoptive and the biological parents. The researchers sent health questionnaires to adoptees and their biological and adoptive parents, and analyzed the height and weight data.

The study should not signal to dieters that they are doomed by their genes, Stunkard says. Researchers and dieters alike know some people lose weight more easily than others; while the study offers an explanation, he says, it does not mean overcoming the genetic input is impossible. — *J. Silberner*