



At banquet—Seaborg, Kirby, Tsien, Gomori, White.

Searching for talent

40 high school winners share \$67,500 scholarship fund

Tsien (right) explains thiocyanate bridging at exhibit.



Photos: Freemont Davis

Science is one of the high school studies Roger Tsien likes the least. He finds his courses boring and unchallenging, containing too much theory and too few brass tacks.

But last week Tsien, a month past his 16th birthday, stepped up to take top honors in the 27th annual Westinghouse Science Talent Search. He excelled among the excellent to win a \$10,000 scholarship, which according to his

present plans will send him either to the California Institute of Technology or to Harvard to study chemistry and physics.

Tsien, of Livingston, N.J., will graduate this June at the head of a high school class of 536 students. He won his scholarship over an original field of more than 23,000 high school science students from 50 states, competing for a total of \$67,500 in scholarship money.

Forty finalists in the talent search arrived in Washington Feb. 28 for interviews with judges and leading scientists and to exhibit their projects. Tsien's was one of 10 scholarships given ranging up from \$4,000. The remainder of the finalists received cash awards of \$250 each.

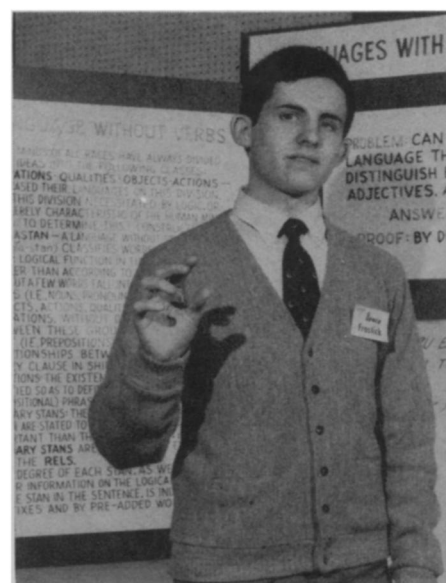
The winners of the two second place \$8,000 scholarships are students at Forest Hills High School in New York



Gomori: mathematics

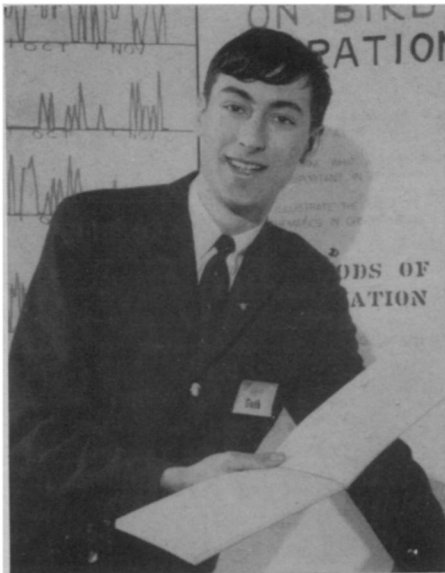


White: biochemistry

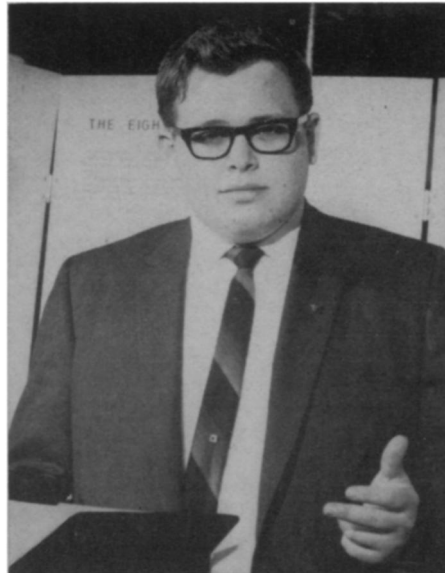


Frostick: linguistics

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Guth: zoology



Spence: particle physics



Parsons: mathematics

City. They are John Gomori, 17, and Perrin C. White, 17. A third finalist from the same school, John A. Goldsmith, 16, was awarded a \$4,000 scholarship.

Gomori's work for the Talent Search was concerned with constructions on equilateral triangles. White investigated the effect of dimethyl sulfoxide (DMSO) on the germination of garden peas.

The work Tsien presented for the Talent Search was done last summer at Ohio University in a Summer Science Training Program. He studied the way in which the thiocyanate ion is oriented when it acts as a bridge in transition metal complexes. It was all brass tacks, and he dirtied his hands to do it.

The study was done under Dr. R. J. Kline of the Ohio University Chemistry Department. Tsien credits Dr. Kline with being the person most influential in the development of his scientific ca-

reer so far. But the young chemist has not waited for others to show him the way. Frustrated often by classes which did not intrigue him, by courses which he found dry, and by chemistry without enough chemicals, several years ago he started his own experimenting at home.

In his own lab he follows meaningful lines of investigation, making the dry theories of the classroom come alive, learning the properties, the feel, of the elements and compounds he is reading about. When he needs apparatus for a project, often he develops and builds it himself. He invented a new kind of stopcock, for instance, made simply from two pieces of plastic tubing.

Tsien's interests are by no means confined to chemistry. He has attempted to write a computer program such that the computer can solve calculus problems theoretically, without recourse to a system of approximations. He has done extensive reading in cosmology,

physics, electronics, calculus and molecular biology. He spends his Saturdays attending classes in acoustics and solid state physics at Columbia University. Hobbies at home include electronics, classical music and piano.

Forest Hills High School in the Queens Borough of New York City has sent a goodly share of finalists to Washington in past Talent Searches, and they have brought back their share of the scholarships. But in all the 27 years of the Talent Search no single high school has done so well as Forest Hills did this year, carrying off second, third, and ninth place honors in the national competition.

Like other New York City high schools, Forest Hills has a special science honors program. About 60 students are selected each year for the program, whose basic idea is to feed a top-quality science education as fast as the kids can take it up.



Rosenberg: solid-state physics



Goldsmith: mathematics



Waddington: astronomy

"For those with the inclination," says Assistant Principal Joseph Tuzza, "there is every opportunity to go as far and as fast as they can."

Gomori listed Forest Hills mathematics teacher Jacob Garfunkel as the most influential person in his development as a mathematician. Garfunkel credits Gomori with "uncanny" intuitiveness, ingenuity and perception in problem-solving; he says Gomori has kept him in after school, rather than vice versa, discussing topics brought up in class.

The easiest and simplest solution to a problem is the one which Gomori prefers; he once developed the derivation of the equation for the distance from a point to a line by a method which took two or three minutes to demonstrate rigorously. The same demonstration by regular methods took his teacher three quarters of a period.

White is the son of Dr. Abraham G. White, director of medicine and professor of preventive medicine at the Columbia University School of Public Health. White says his father and the scientific atmosphere of his home did most to encourage his interest.

He designed a computer program at one point, when it became necessary to handle large amounts of data in some of his experiments. In junior high school he designed and built a machine which searched out light sources, then moved toward them. He found in his project that low concentrations of DMSO stimulate germination, but higher concentrations inhibit it.

Scholarships of \$6,000 went to Bruce L. Frostick Jr., 17, of Richmond, Va., who devised an alternate method of sentence building to produce a language without verbs; Robert W. Guth, 17, of Eureka, Ill., who studied the effects of weather on bird migration; and William L. Spence, 17, of Farmington, Mich., who taught himself particle physics and submitted a project on the quark.

Scholarships of \$4,000 each were awarded to Penelope Jo Parsons, 17, of San Diego, Calif., whose project concerned the algebraic properties of the power set of an N-element set; Jonathan M. Rosenberg, 16, of Pittsburgh, Pa., who devised a project in solid state physics involving analysis of grain boundary motion; Goldsmith, who studied differentiation in denumerable sets; and Bruce A. Waddington, 17, of Long Beach, Calif., who made a visual survey of the long-term atmospheric changes of the planet Saturn. The two scholarship alternates are Jeanne Margolskee, 17, of Lexington, Mass., who studied a recessive gene in mice, and James A. Brown, 17, of Richmond, Va., who proved mathematically that no more than four colors are needed to differentiate countries' maps.



The winners gather on the steps of the Capitol after lunch with Congressmen.

HIGH-ENERGY PROGRAM

Young scientists in Washington

The 40 finalists in the 27th annual Westinghouse Science Talent Search arrived in Washington Feb. 28 and plunged headlong into a high-energy program. The first event was dinner at the Sheraton-Park Hotel, where they were welcomed by E. G. Sherburne Jr., director of Science Service, and Dale McFeatters of Westinghouse Electric Corp. Science Service and Westinghouse conduct the Talent Search jointly.

The next day, Thursday, was taken up with interviews of the contestants by the judges. At lunch in the Rayburn House Office Building the finalists had an opportunity to meet their Representatives and Senators. That evening the winners saw "Room Service" at Washington's repertory Arena Stage.

On Friday the finalists met with leading scientists in their fields. That evening they gathered to hear Dr. Maurice M. Shapiro, chief scientist at the Laboratory for Cosmic Ray Physics of the U.S. Naval Research Laboratory, and Dr. Gordon M. Tomkins, chief of the Laboratory of Molecular Biology of the National Institute of Arthritis and Metabolic Diseases.

The winners exhibited their projects all day Saturday. On Sunday they visited the Capitol and later visited the National Gallery of Art. On Monday the physical scientists visited the National Bureau of Standards while the biologists visited the Walter Reed Army Medical Center. The program ended with the awards banquet Monday night.