

GENERAL SCIENCE

STS Winners' Projects

Interests in chemistry, practical applications of mathematics, architecture and bacteriology are shown by the research projects of eight of the Science Talent Search winners.

➤ TWO 17-YEAR-OLD high school seniors who studied metal processes have won trips to Washington.

Mary Helen Gloss, of Nazareth Academy in LaGrange Park, Ill., studied chelation, the process in which a molecule combines with a metal ion to form a closed ring structure. Some of the effects of chelation studied were a change in the acidity of the metal ion solution and/or that of the chelating agent, the dissolving of a precipitate, and the change in the color or intensity of the color.

The relative stability and the formula of the chelates formed were tabulated from her observations.

Mary Helen plans to study nuclear physics at St. Louis University.

The present cyanide process for recovery of silver from chloride ores requires extensive tankage due to low solubilities and long holding time, so Kenneth Lyons of Boulder City (Nev.) High School developed a process based on extraction of silver chloride from zinc chloride solutions and reduction of fused silver chloride by molten zinc. He says the faster reactions and higher concentrations require less tankage, and costs are lowered.

Mary Helen and Kenneth are among the 40 top winners in the 23rd Annual Science Talent Search, conducted by SCIENCE SERVICE. They will compete in Washington Feb. 26 through March 2 for \$34,250 in Westinghouse Science Scholarships and Awards.

Kenneth is the first Nevada winner in the 23 years of the Search. He plans to major in physics and math at the University of Oklahoma.

Practical Math Applications

Three high school boys are in the running for scholarships after submitting project reports dealing with practical applications resulting from the complicated theory, equations and calculations that are confusing to so many of their elders.

Stephen Fisk, 17-year-old senior at Abraham Lincoln High School in San Francisco, dealt with the famous four-color theorem, which states that a map may be colored so that no two regions with a common boundary have the same color by using no more than four colors. He finds the theorem true if the configurations of points and lines all obey certain mathematical conditions. He simplified the theorem so it is possible for a computer to search for a general solution to it.

Stephen plans to major in mathematics at the University of California.

Joseph Kay, 16, of Wellesley Hills, Mass., believes the computer has even more possibilities. The Wellesley Senior High School

student has designed a machine for learning to identify letters of the alphabet and has simulated it on a digital computer. He is using both the simulated and real machines in research towards improvements in the field of intelligence in machines.

Joseph plans to study math or physics at the Massachusetts Institute of Technology after he completes high school.

Randall Zisler, 17-year-old senior at Wakefield High School, Arlington, Va., has used his math in architectural studies. During the past four years he has made an intensive study of wood platform construction, drawing blueprints and building models to develop a means of bracing a structure against horizontal stresses and vertical thrusts. His method, the trapezoidal wind brace, lends cross sectional stability and structural utility to the basic structure.

He made actual loading tests, and studied optical effects of strain under polarized light to derive mathematical relationships and detailed formulas concerning stress on the whole component and stress at a specified point on a component.

Randy, a frequent science fair winner, plans a career in aeronautical engineering after studying at Massachusetts Institute of Technology.

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Effect of X-ray on Bacteria

Three high school students won trips to Washington with their studies using bacteria, including even the rare Texan interested in something small.

The Texan, Robert Joel Barnhart, 17, of Pettus High School studied the effects of X-rays and halogen compounds such as chloroform on bacterial cells known as phage. He learned that X-rays break down halogen compounds into radicals that are effective in inactivating phage in large numbers, and that temperature is an important factor in obtaining inactivation of the cells.

Joel's interests include astronomy, collecting stamps and coins, a church youth group, photography and radio construction. He plans to attend the University of Texas majoring in biology or chemistry.

Judith Diane Goldman, 17, of Reseda (Calif.) High School, studied the masking of a trait of an abnormal gene by an infecting virus. Using a temperature sensitive strain of bacteria, she infected it with a temperature resistant virus and found the virus would protect the bacteria in the

first generation but did not multiply. Later generations were protected by a repressor which was formed, but this was diluted out as the cells divided.

Judi likes swimming, coin collecting, cryptography, and reading current scientific literature in the field of her experimentation. She plans a career in medical research after study at Stanford University.

Susan Weiss of Erasmus Hall High School in Brooklyn, N. Y., made a comparative study of two bacterial strains, because scientists had suggested that one was merely a variation of the other. She found the effects of different temperatures and drugs were the same on both organisms. Under ultraviolet light, mutations developed making one more like the other, and in some cases common characteristics mutated into new properties in common. It has been suggested that one might be reclassified as a variation of the other rather than as a separate strain.

Susan, 16, wants to study at the Massachusetts Institute of Technology and hopes to teach math or science.

In Washington Feb. 26 through March 2 they will compete with 37 other winners for \$34,250 in Westinghouse Science Scholarships and Awards in the 23rd Annual Science Talent Search, administered by SCIENCE SERVICE.

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PUBLIC HEALTH

Cigarette Smoking Effect Like Tranquilizing Drug

➤ CIGARETTES CALM the nerves and act somewhat like the widely used tranquilizing drugs.

British scientists have looked into this reason why people like to smoke and have a possible explanation.

Nicotine and some tranquilizing drugs such as meprobamate and mephanesin have been shown to have similar effects in suppressing spinal reflexes such as the knee jerk.

Although the method of action is different, this could explain the tranquilizing effect attributed to tobacco smoke, Drs. M. S. G. Clark and M. J. Rand, pharmacologists at the University of London, reported in *Nature*, 201:507, 1964.

Experimental cats had their knee jerks inhibited after one puff of an unfiltered cigarette—an effect comparable to injection of nicotine. The blood pressure also was raised. Smoke from filtered cigarettes was less effective.

Dummy cigarettes made from tissue paper produced irritating smoke but no rise in blood pressure and no effect on the knee jerk.

Smoke was introduced into the lungs of anesthetized cats through a T-shaped tube, or cannula, into which a lighted cigarette was placed.

A grant from the Tobacco Research Council of England supported the research.

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