

## GENERAL SCIENCE

# Projects of STS Winners

Future research scientists, winners in the Ninth Annual Science Talent Search, reveal results of their scientific experiments.

► SOME of the scientists of tomorrow will gather in Washington, D. C., March 2 through 6, for the Ninth Annual Science Talent Institute. They will bring with them the results of their favorite hobbies and pet projects for an evening of checking on each other's progress before an audience of several thousand invited guests.

Some of the projects they will display were also subjects for the 1000-word essays which the contestants wrote. The essay was one of the requirements of the competition (See SNL Feb. 11, 1950). Summaries of some of the essays of the 40 winners follow:

## Two of Triplets Study Nature

The first two of triplets to win in the nine years of the Science Talent Search, are girls who live in Forest Hills, N.Y. Both study living things, but one turns to ants and the other to birds. The third sister is not scientifically inclined and did not compete in the Ninth Annual Science Talent Search.

An ant named E-1 has finally learned that the shortest path is the quickest way to dinner, thanks to the patience of 17-year-old Cynthia Jackson.

Working with complicated mazes in which there were three zig-zag pathways of increasing complexity, Cynthia put E-1 through 45 trial runs before he finally caught on. During the last four trips he ignored the two roundabout routes and made an unerring beeline for the shortest path. All three routes led to the feed box where he got his reward.

This was part of a maze-learning experiment which Cynthia conducted on her own in the animal behavior department of the American Museum of Natural History in New York City. Cynthia, a senior at the High School of Music and Art in Manhattan, found that ants show varying skill in mastering the problem. E-1 was one of her brighter pupils.

Patricia Jackson, Cynthia's sister, turned her scientific interest to a different segment of the natural world. In studying the relationship between birds and their environment, Patricia staked out 25 acres of undisturbed upland woodland near Roslyn, N.Y.

Within this area she observed 18 different species which had chosen the locality to build their nests. These included oven birds, scarlet tanagers, blue jays, chickadees, and red-shouldered hawks. In all she counted 99 nesting pairs.

She came to a preliminary conclusion

that the large proportion of insect-eating birds coincided with the presence of abundant insects, while the absence of seed-eating birds apparently coincided with a lack of suitable food. Patricia hopes, however, to make further studies to see what other factors, like water supply and available nesting sites, affect the bird population.

Patricia, first in the senior class at Hunter College High School in New York hopes to become a biologist too.

## Helium Energy Measured

By very careful measurement of the tracks made by helium atoms across a photographic plate, Saul Sternberg, 16-year-old New York high school senior, has calculated the energy released by cyclotron bombardment of one of the non-fissionable elements.

The helium was produced when the element boron was bombarded with neutrons. To get this effect he used photographic plates impregnated with boron. These he persuaded Washington University, in St. Louis, to bombard with neutrons in their

cyclotron.

He measured 500 helium tracks and averaged them. Then he computed mathematically the energy the helium atoms are expected to have, using the famous Einstein equation:  $E=mc^2$ .

Mr. Sternberg is a senior at the High School of Music and Art, New York. He has other interests besides physics. He has designed and built several electronic devices, including an audio-frequency amplifier, an electronic metronome, and an electric page-turner for musical scores. His career choice is theoretical physics.

## Control for Potato Beetle

A mixture of Paris green, lead arsenate, and lime gives the best control over adult Colorado potato beetles, is the conclusion of John Rippon, 17-year-old Sylvania (Ohio) high school senior, after studying the effect of nine different insect preparations.

The Colorado potato beetle is a serious agricultural pest, and Mr. Rippon set about discovering the best way to control it. He took a strip of land 50 by 15 feet and divided it into 10 equal patches. On one patch he studied the life history of the beetle and on the other nine he tested the effect of various insecticides.

He found that chemical control is most effective during the larval and adult stages. A mixture of pyrethrum and sesame oil paralyzed larvae but had little effect on adult beetles, while cryolite proved ineffective on both larvae and adults.

Paris green, when used alone, proved



**TWO OUT OF THREE**—Phyllis Jackson, one of the triplets, center, pins flowers on her sister, Patricia, left, and Cynthia, after they were chosen among the forty top winners in the Science Talent Search. Although both of the winners are students of nature, Phyllis' chosen field is sociology.

detrimental to the potato plants themselves. When mixed with lead arsenate and lime, however, the preparation had no damaging effects on the plant, and it gave very good results against the beetles.

Mr. Rippon is president of the physics and chemistry clubs at Burnham High School. He hopes to go to the University of Michigan to prepare for a career as a parasitologist.

### Tick-Tack-Toe Machine

Noel Elliott, 18, has designed and built an electronic machine that plays tick-tack-toe.

The human player gets the first move and the machine counters with a scientifically calculated move. These were set after the young designer had studied thousands of possible moves.

The machine, using a simplified version of the principles on which the large electronic computers are based, is not designed to win. Chances for man vs. robot are even but whenever its obstructive move goes into a winning square the machine is the victor.

Although tick-tack-toe is a very simple game, it was no simple matter to design a machine which would make all the correct moves. There are 362,882 possible games, and the circuits had to be so designed that the machine gives the correct reply in any situation.

The machine's moves are signaled by a light after the man has made his move by throwing a switch.

This device is not the first original machine Mr. Elliott has to his credit. The Kellogg, Idaho senior, who plans a career in electronics, has been building various kinds of machines since age 13.

*(To be continued next week)*

Science News Letter, February 25, 1950

### CHEMISTRY

## New Fire Extinguishing Chemical Gives Promise

➤ A NEW fire-extinguishing chemical under test at Fort Belvoir, Va., by Army engineers gives promise of being more effective than those generally used. It is a chemical of the bromo-fluorocarbon group.

Tests already made indicate that several compounds of the bromo-fluorocarbon group easily put out gasoline and electrical fires against which identical quantities of carbon dioxide or carbon tetrachloride were not effective.

The initial laboratory work on these compounds in fire-extinguishing was carried on at Purdue University, Lafayette, Ind. Tests are to verify laboratory data and to screen the candidate compounds. The final selection will have to be one that is not poisonous because the new agent will be used to fight fires in vehicles and other confined locations. Preliminary work indicates that several of them are not toxic.

The fluorocarbons constitute a relatively

new family of organic chemical compounds. They are similar to the hydrocarbons of petroleum but differ in that the hydrogen is replaced by fluorine. Bromo-fluorocarbons contain both bromine and fluorine.

Science News Letter, February 25, 1950

### ASTRONOMY

## Northern and Republican Irish Share Telescope

➤ NORTHERN Ireland and the Irish republic do not always see eye-to-eye but they are both part owners now of a new eye-glass that will soon be peering at the "hub of the universe" from the Harvard Observatory station in South Africa.

The new Baker-Schmidt type of telescope with the world's largest (33 inch) prism was accepted from Perkin-Elmer Corporation, Glenbrook, Conn., by Dr. Harlow Shapley, director, and Dr. Bart J. Bok, expedition leader, who will use it to explore the Milky Way more thoroughly than ever before.

Stars a hundred thousandth of the brightness of the faintest star visible to the naked eye will be captured photographically in 20 minutes with the new ADH telescope (A for Armagh Observatory, Northern Ireland, D for Dunsink in Eire, and H for Harvard.)

The program of Harvard astronomers using the new telescope is the first step in a five-year program to map and discover the center of the universe.

Science News Letter, February 25, 1950

### ENGINEERING

## Narrow Strips of Soils Test New Mine Detectors

➤ NARROW parallel strips of different types of soil are used in testing new mine detectors at the Army Engineer Research and Development Laboratories, Ft. Belvoir, Va., it is now revealed. The objective is detectors that will be usable on all types of soil.

Mine detectors may react differently with different soils. Most of the detectors are electric devices that are swept over the path of an advancing army to locate buried mines that explode when trodden upon. The detector sets up an electric field and this field is affected by any magnetic material over which it passes.

The most common mines are in an iron or steel container. When passed over by the detector, the electric field is altered enough to send a warning signal to the earphones of the operator. The detector, however, has little value if the soil contains iron ores, particularly magnetite, found in volcanic regions.

The narrow, side by side testing lanes of soil used contain many kinds of soil. They represent all the soils of the world, at least in type. They contain sand, clay, gravel, sandy loam, and many other soils. Mines, test disks and test blocks are buried in them at given depths.

Science News Letter, February 25, 1950



**VERSATILE DETECTORS**—New mine detectors are tested on narrow parallel strips of different types of soil. The aim is the perfection of a detector usable on different types of soil.