

GENERAL SCIENCE

Research of STS Winners

Independent scientific work of high excellence done by final competitors for Westinghouse Scholarships who will come to Washington Feb. 28 for Science Talent Institute.

► **HIGH SCHOOL** scientists who may be leaders in tomorrow's world of science will meet in Washington on Feb. 28 for five days for the Eleventh Annual Science Talent Institute. They will bring with them exhibits they have made illustrating a project in their particular field of endeavor.

Forecast of Birth Date

► **MEASUREMENT OF** blood changes during pregnancy might form the basis for an exact prediction of the date of childbirth, if the results of an experiment carried out by 16-year-old Robert W. Colman with a pregnant rabbit can be applied to humans.

Mr. Colman, a Far Rockaway (N. Y.) High School senior, discovered that the red blood cell count in his rabbit rose immediately before birth, but dropped sharply on the date of birth. He carried out his experiment as his scientific project in connection with the Eleventh Annual Science Talent Search, and is one of the top 40 winners.

The potential biologist spent ten weeks at the Jackson Memorial Laboratory, Bar Harbor, Me., last summer and did his experiment there. He made five daily measurements on the blood of his rabbit. These were: hemoglobin determination, red blood count, white blood count, differential count and color index.

What appeared to him to be his most important findings were that the red cell count generally correlated with the white cell count, the white cell count constantly declined and a significant drop occurred two days prior to birth, and the red cell count rose immediately prior to birth but dropped sharply on the day of birth.

Future research on this subject, he said, might make possible the prediction of the exact date of birth in the rabbit and this knowledge might be extended to humans.

Soil Moisture Instrument

► **A NEW** method for measuring the amount of moisture in soil has been developed by Paul L. Richards, 17, who attends Riverside Polytechnic High School, Riverside, Calif.

The amount of moisture in soil is an important fact for farmers to know. Previous methods of measuring this factor, according to Mr. Richards, were inefficient because they involved direct contact between the electrothermal unit used for measurement and the soil.

Water absorbs heat to a much greater extent than does soil. Thus the amount of

water in soil can be measured by putting a specific amount of heat into a sample of soil. The amount of increase in the temperature can tell how much moisture is in the soil.

In a previous instrument, a single coil of copper wire served both as the resistance thermometer and the heat source.

Mr. Richards used separate elements for his resistance thermometer and his heat source. He put them both in a porous ceramic cup containing a standard porous moisture-absorbing medium.

Preliminary tests indicated to Mr. Richards that this method largely overcame the difficulties with the direct contact type of soil moisture indicator. Further experimental work, he said, showed the need for use of porous membranes and air pressure chambers with the instrument. He is now working on this.

Twin Chicks Hard to Hatch

► **TWIN CHICKENS** are hard to hatch. This was the discovery of 17-year-old Leslie M. Klevay, Jr., Niles Township (Ill.) High

School senior, who has studied the embryonic development of double-yolked eggs.

Only three of the 455 double-yolked eggs which he placed in an incubator hatched out twins, and half of one pair of twins died soon after hatching. This compares with 22 hatchings out of 24 single-yolked "control" eggs. Single chicks hatched out of 15 of the double-yolked eggs, Mr. Klevay reports.

Mr. Klevay kept careful records of all the 455 double-yolked eggs in his incubator. He candled them regularly to note their development and when the embryos had died. For this purpose, he developed a new egg candler, suitable for revealing the internal structure of the eggs. Those which had died he broke open to try to discover the cause of death.

He found two critical periods in the development of his embryo twins, the sixth to tenth and the 19th to 22nd days. The young scientist found it impossible to explain the cause of death in the early period, but he believed that the struggle to break the shell had something to do with the high death rate in the second period.

Size of the egg, he found from measuring those which hatched out, did not seem to be a factor in the cause of death. One embryo which died caused the death of the other embryo, he discovered, but what caused the first death is still a mystery to him.

Position of the embryo in the egg during the second critical period might lead to death, Mr. Klevay also concluded.

Designs Plane Wings

► **PAUL H. MESSINGER**, 18, Dorsey High School (Los Angeles) senior, built his own wind tunnel and then designed a wing for a model airplane.

Mr. Messinger, who would like to become an aeronautical engineer, wanted to test wing sections of his own design for their performance as related to stability, stalling angle, lift and drag.

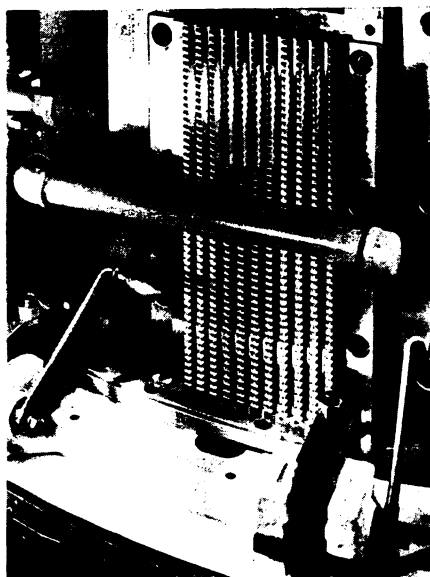
For his wind tunnel he combined a one-tenth horsepower electric motor with fans, the blades of which he redesigned, to achieve speeds from 15 to 75 miles per hour in the tunnel. A blower was used to introduce smoke so he could see how the wing sections and the air flow interacted.

Now he has neared completion of tests on a U-shaped wing with the propeller near the trailing edge. He has tested out this wing, which he designed himself, on an experimental model airplane.

Early America Visitors

► **IRREGULAR CONTACT** by boat between southeast Asia and Central America may have existed before 1492, according to 17-year-old Alice E. Beck, a senior at A. B. Davis High School, Mt. Vernon, N. Y.

Miss Beck summed up the evidence both for and against travel from southeast Asia



BROACHING MACHINE—Saving four hours in the production of turret ring gears, this broaching machine is now in operation at the Detroit Arsenal of U. S. Army Ordnance.

to Central America. Wheeled toys, a parchesi game, pan-pipes, coca-lime chewing, several art motifs, looms and resist-dyeing were things which may have been brought on ships to the western shores of Central America, she said.

On the other hand, she pointed out, many important old world inventions were never known to the new world before Columbus started the westward migration. In addition there was an almost complete divergence of agricultural methods. There are sometimes fundamental differences between supposedly shared inventions, like pyramids. And no social customs seem to have been transplanted.

But the weight of the evidence, she thinks, lies with the existence of irregular contact across the Pacific between southeast Asia and Central America.

Studies Talented People

► **HIGH-SCHOOL** salutatorians seem to make more money in their professions and jobs than do the valedictorians.

This was one of the conclusions arrived at by 18-year-old Ruth F. Harrell, senior at Maury High School in Norfolk, Va. She is ranked number one in her class. She studied, as her scientific project, the subsequent careers of 64 of the valedictorians and salutatorians who had graduated from her school since 1916.

The second honor graduates, Miss Harrell found in studying the questionnaires she devised and which were returned to her, averaged \$6,429 in annual income, for those who were working, while first honor students averaged \$4,690.

Bright students tend to have a higher proportion of fathers who are in the professional class than is found in the general population. And their fathers are less likely to be laborers.

Only one divorce was found among those of the 64 who had married. This is much less than the average rate. More than two-thirds of the women are married.

Men are superior to the women in the group in average scholastic standing and also in average test scores for college entrance examinations. In the group studied there are almost twice as many women as men.

Aureomycin Helps Fish Grow

► **TROPICAL FISH** grown in an aquarium with the new wonder drug, aureomycin, added to the water seem to have much more vitality than fish grown without the antibiotic. Also, there is some evidence that they grow larger, concludes 17-year-old David A. Goldstein.

The young scientist, who is a senior at Monroe High School, Rochester, N. Y., divided 31 tropical fish into three tanks. To two of the five-gallon aquaria he added 100 milligrams of aureomycin daily. The third he used as a control tank.



KILOWATT CHINA—Undergoing trial by lightning to reveal any flaws are these ceramic insulators. The white streamers cascading over the porcelain are arcs of man-made lightning, 90,000 volts strong. Electricity jumps from the three solid brass conductor rods to the vertical electrodes placed in the center of each insulator, then flashes over the insulators themselves.

At first, the fish without the antibiotic surpassed in growth those swimming around in the aureomycin solution. But after about a month and a half, the treated fish surpassed the control fish. One surpassed the control fish by 35% in growth rate.

Some of the aureomycin fish died, but of no evident disease. None of them developed the diseases which maturing fish so frequently contract, said the young scientist.

On the other hand the fish without the wonder drug developed a disease known to tropical fish fanciers as the "shimmy." This finally made necessary the stopping of the experiment.

Observes Jupiter

► **BUILDING THREE** telescopes and two machines for grinding and polishing telescope mirrors was the scientific project of 17-year-old Eugene E. Epstein.

With this equipment, the Hollywood (Los Angeles) High School senior was able to approximate the equipment of a professional observatory and to carry out a series of observations on the planet Jupiter.

He constructed a long focus, ten-inch telescope, a six-inch telescope with two mirrors, and a portable four-inch telescope.

With this ten-inch telescope, the young scientist determined the drifts and rotation periods of three atmospheric disturbances on the planet Jupiter. The first was the

famed Red Spot, the second a white cloud south of the planet's south temperate belt, and the third a split in the south temperate belt.

Builds Stereophonic Recorder

► **CONSTRUCTION** of a machine which will record music so that an orchestra will sound as though it is actually in the room with the listener was the scientific project of Dana D. Mitchell, 18, a New Rochelle (N. Y.) High School senior.

Mr. Mitchell attempted to achieve the effect of binaural or stereophonic hearing of his recordings, somewhat as the old-fashioned stereoscope gave a three-dimensional effect to photographs. He did this by placing two microphones in front of and at each side of the orchestra and recording the sounds picked up by each microphone on separate channels of the same magnetic tape.

Two loudspeakers, placed in positions similar to the microphone then, he figured, would give the listener if he shut his eyes the illusion of being in the concert hall. The instruments would sound as though they came from different parts of the "stage."

Mr. Mitchell largely built his own tape-recorder. He has plans to test the most effective placement of the microphones and also of the performers.