

Egg-laying for 1933 was finished in August, Dr. Larrimer stated, and preliminary cursory examinations give every indication that 1934 will again be an exceedingly bad grasshopper year, unless unpredictable climatic factors come to the rescue of the farmers. The Bureau's annual detailed grasshopper-egg survey is now in progress, and will be completed some time in November. It will then be possible to make a better estimate of damage to be expected next summer.

The one bright spot on the whole depressing grasshopper map, Dr. Larrimer said, is Minnesota. Here an active and informed state government has been cooperating with the farmers and local authorities in an intense eradication campaign for the past two or three seasons, with the result that in Minnesota the grasshopper damage last summer was negligible, while the insect hordes played havoc in states farther west and southwest.

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## AERONAUTICS

## Soviet Ascension Breaks World Altitude Record

See Front Cover

ENCLOSED within the metal shell pictured on the front cover of SCIENCE NEWS LETTER, three Soviet scientists rose higher above the surface of the earth than man has ever been before, in an ascension from Moscow on September 30. It is the gondola of the Soviet free balloon USSR. Only twice before has man using similar means reached comparable heights, and the leader of both flights was Prof. Auguste Piccard.

The Soviet balloon, larger than those of previous ascensions and carrying three men, Ernest Birnbaum, George Prokofiev and Konstantin Gudenoff, is reported to have reached an unofficial altitude of 62,340 feet, compared with the official record of 53,153 feet set by Prof. Piccard in August of 1932. On both of Prof. Piccard's ascensions only two men were taken up.

Instruments bringing data on cosmic rays, physical and chemical composition of air at high altitude and its electrical conductivity, pressure, temperature and humidity are said to have landed safely with the balloon. The craft was built by military engineers and has a gas bag 36 meters in diameter with a volume of 25,000 cubic meters.

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## CHEMISTRY-BIOLOGY

# New Heavy Water Kills Tadpoles and Guppy Fish

## Large Output, Thimbleful Every Two Days, Enables Princeton Scientists to Use the Water Freely

HEAVY WATER, containing the recently discovered double weight hydrogen, kills tadpoles, guppy fish and worms.

Prof. W. W. Swingle of Princeton, using some of the rare heavy water manufactured by Princeton chemists, found that the extraordinary H two O, with 92 per cent. of its hydrogen atoms consisting of the isotope mass two (deuterium), is lethal to certain fresh water animals.

Green frog tadpoles survived only an hour when placed in the heavy water. Tadpoles of the same sort immersed in distilled water that contained only 30 per cent. heavy water, lived happily and unaffected for 24 hours. Paramecia, one-celled organisms that are favorite biology experimental material, resisted the heavy water successfully for 24 hours.

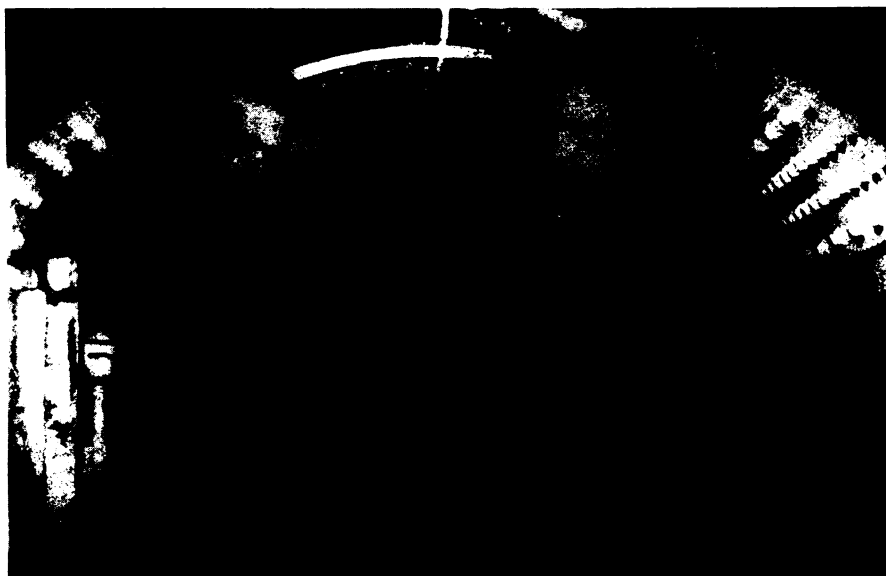
Relatively large quantities of heavy water are now being produced in Princeton's Frick Chemical Laboratory by Prof. Hugh S. Taylor, Prof. Henry Eyring and Arthur A. Frost, chemistry

fellow. A cubic centimeter, approximately a thimbleful, of the heavy water is produced every two days. This unusual supply of heavy water is allowing Princeton scientists to use it in various untried experiments.

Prof. Earle E. Caley has demonstrated that it has a smaller capacity for the dissolving of salts than ordinary water. Tests are now being made to ascertain its effect upon acids.

Physicists studying the structure of the atom will find the heavy water of great use, because most of its hydrogen atoms are twice the ordinary hydrogen mass. Experiments have shown that in attempts to break down the atom by collision with electrically propelled hydrogen projectiles, much smaller voltages are required when heavy water is used.

Prof. Taylor explained that there is one part of heavy water in every 5,000 parts of ordinary Princeton rain-water. Twelve hundred gallons of ordinary water are treated in order to produce three ounces of heavy water. The new substance has become one of the most



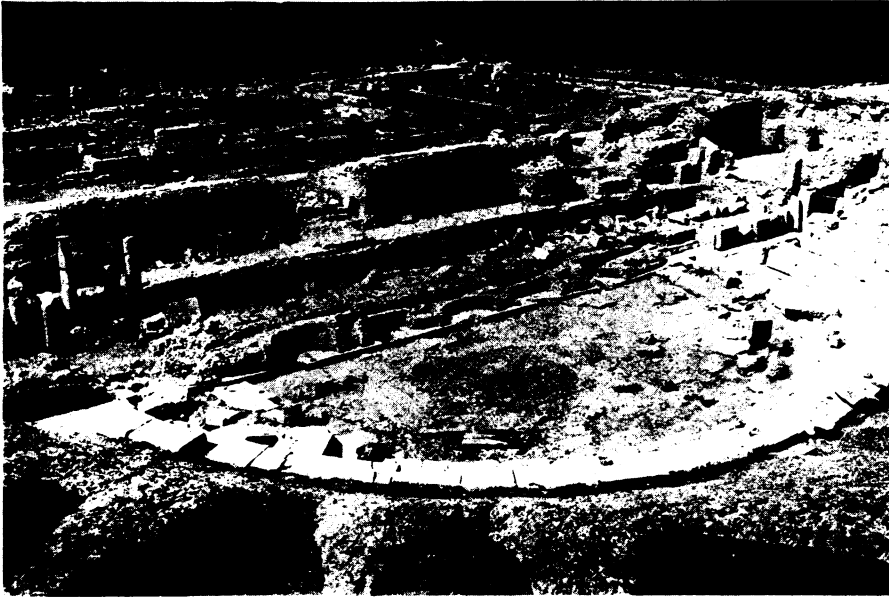
TEST CHAMBER

*These men are being examined in a special test chamber built at the Military Medical Academy, Leningrad, in preparation for the stratosphere ascension.*

valuable known in the commercial field. A price of \$150 is asked for a gram. At this rate a teaspoonful is worth nearly \$600; a quart, \$150,000. Princeton now has on hand about a glassful and is about to raise its production to a thimbleful a day.

What effect the drinking of heavy water will have on animals and human beings is not yet known, but it is believed that it may bring on a fever, and therefore might be useful in diseases that are treated by raising body temperatures.

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#### DOWN TOWN DISTRICT

*Looking over the ruins of Minturno, Italy, where an American expedition is finding much buried history. The theater in the foreground was a gift to the city from the Emperor Augustus, as a peace offering because the city was aroused over having to look out for a detachment of returned soldiers. The outer wall of the theater was divided into 24 shops, arranged in a semi-circular arcade. One of the shops was converted into a Christian chapel and a bronze tablet with small Christian crosses has been unearthed in it.*

#### RADIOLOGY

## Birthmarks Permanently and Safely Treated By Radium

**M**OLES, birthmarks and similar masses which are known to physicians under the name of nevi may for the most part be safely and permanently removed by radium treatment, it appears from the experience of Dr. William S. Newcomet, Philadelphia radiologist. Dr. Newcomet reported to the American Congress of Radiology the results he had obtained in treating such cases during the last fifteen years.

"There is a well grounded idea existing among the laity that to treat a nevus is to invite malignancy," said Dr. Newcomet. "Yet it is a well established fact that many cases of malignancy start from nevi. Unfortunately, even with the publicity that has been given to this

subject, there still remains, among a certain class, a constant fear that it is dangerous to remove nevi."

Dr. Newcomet prefers radium to X-rays for treating these cases on account of the susceptibility of the surrounding parts of the body and also because it is easier to confine the effects of radium to a more limited area. In fact, he stated that these marks should always be irradiated with radium, never with X-rays. Occasionally the radium treatment must be followed by surgery to remove scars in the case of very large marks. Sometimes when the patient has been treated in childhood, some slight deformity has resulted in adult life from lack of development of the affected

part or because some of the natural tissues were replaced by the tumor mass. These cases are comparatively rare, Dr. Newcomet finds.

"In the majority of cases results of treatment were very satisfactory," he declared. "The marks or tumor masses had disappeared; the site was practically normal and without scar. No other method could accomplish so much and, while the treatment is not so rapid as some other method, results are better.

"These lesions are not dangerous to life, therefore there is no justification for the employment of any dangerous procedure. In conclusion the fact is stressed that in all cases the mild application of radium may bring about a diminution of the tumor mass and it should always be used previous to operation. . ."

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#### ARCHAEOLOGY

## Ruins Shed Light On Rome's "Bonus Army"

**A**RCHAEOLOGISTS excavating the ruins of Minturno, Italy, have dug up relics of evidence showing how the Roman Empire solved one "bonus army" problem. The evidence is found in the city's water pipe system which has been investigated by the University of Pennsylvania Museum expedition to Minturno, led by Dr. Jotham Johnson.

Dr. Johnson, who has just returned to Philadelphia, said that a length of lead water pipe was found bearing the name of the slave who made it. It dates back to a period in the career of Augustus between 40 B.C. and 14 A.D. The Emperor Augustus had sent some returned soldiers, "bonus army" men as it were, to the vicinity of Minturno, about 100 miles south of Rome. This aroused the people of Minturno to great discord and dissatisfaction. To appease the city, the Emperor presented it with an aqueduct and theater. The city thus acquired "modern" plumbing, with water under pressure in the pipes. Dr. Johnson remarks that it is significant that the wells previously used, were filled in.

The lead pipes were made from sheets folded over and clamped. The lengths as originally found varied from six to twenty feet according to diameter. About 18 tons of this ancient pipe were excavated by peasants during the World War and sold as scrap metal.