

Assisted by students from the laboratory, Dr. Roberts excavated the village ruins, finding new evidence of the evolution of architecture in prehistoric Indian settlements.

When Southwestern Indians first made homes, they dug pit houses for themselves and roofed them with poles and brush. Around the houses were storage bins for winter food supplies. Dr. Roberts finds that the storage bins in time were enlarged into dwellings and there were even row houses in the old settlements. The underground pit house became the village kiva, or church. Down to today, Pueblo kivas where ceremonies are held are still built underground.

The evidence shows that these architectural changes took place in about 200 years for the different type structures are there and charred pieces of timber from the ruins tell the dates, in terms of tree rings, when the buildings were in use. The dates cover a period from 700 A.D. to 950 A.D.

Science News Letter, October 14, 1933

PUBLIC HEALTH

Scientists Took First Chance With Encephalitis

BEFORE trying to give encephalitis or "sleeping sickness" to convicts by the bite of presumably infected mosquitoes, officers of the U. S. Public Health Service tried to experiment on themselves, as is the custom among medical scientists.

Dr. J. P. Leake, in charge of the federal health service's encephalitis investigations at St. Louis, Dr. L. L. Williams, Jr., and Dr. Bruce Mayne all took their chance of getting this serious disease by letting mosquitoes feed on patients and then on themselves. None of them has contracted the disease as a result. This may be because, in the course of their work with the patients, they have already acquired immunity.

The next step was to repeat the experiment with ten convicts, volunteers from the Mississippi Penitentiary, who will win their freedom if they survive the experiment.

In calling on Mississippi authorities for convict volunteers, the federal health authorities followed a precedent set in 1916 when a similar experiment with Mississippi convicts Dr. Joseph Goldberger of the U. S. Public Service was able to prove that pellagra is due to deficient diet and that it can be corrected.

Science News Letter, October 14, 1933

METEOROLOGY

Microclimatology, Science That Studies "Working" Weather

Temperature, Evaporation Rates and Other Environmental Factors Measured Close to People, Animals and Plants

WEATHER Bureau records are notoriously inadequate pictures of conditions which human beings, cats and dogs, cabbages and cornstalks are up against. Official thermometers are always perched well above ground, in structures that provide a maximum of shade and ventilation, and a considerable degree of shelter from direct wind, snow and rain. Hence, no matter how ideal their readings are from the viewpoint of pure atmospheric physics, they are of much less human interest than are those of the humbler unofficial instruments that share our common lot down in the sweltering street, or out on the blizzard-stung prairie.

Great Difference in Short Distance

Some scientists, especially ecologists, who study the intimate details of the social life of plants and animals in nature, have taken cognizance of this, and are using a kind of meteorology of their own. They read the weather factors where these are actually operative on living things; at the level of the grasses in the field, among the leaves of trees and bushes in the forest, and where man and his suffering fellow-creatures must breathe and sweat in the streets and crowded inside spaces of great cities.

This new and closely applied climate study has been given the name "microclimatology" by one of its pioneers, a German scholar. It is the climatology of little spaces.

Significant differences in this extremely localized weather can be found in amazingly short distances. One European student of the subject found greater differences in temperature between ground level and six feet above it, among the trees of a forest, than was shown on official records of "general" temperatures between cities on the coast and hundreds of miles inland.

Microclimatology takes account, also, of factors other than temperature, such as relative humidity, air movement, and

their close companion, evaporation rate. Differences in these will be as marked as they are in temperature, over distances as little. Instrumental determinations of the evaporation rate from free water surfaces show three or four times as great evaporation in midsummer sun as in the shade a few feet distant. Determinations of wind velocity in a sheltered pocket behind trees or a wall show contrasts as striking, when compared with the record as obtained above the trees or roof-tops.

Of course, everyone who has ever kept a tree between himself and the sun in summer, or a wall between the wind and himself in winter, has been a kind of rule-of-thumb microclimatologist. But the active students of the new science want exact and quantitative data rather than loose and qualitative guesses. They want such information not only because it is more scientific but because it is more practical. For on the study of microclimatology, both indoors and out, will depend a great deal of the success in human comfort as well as the cost in cash, of the great new branch of engineering which is just arising—the practice of air-conditioning.

Science News Letter, October 14, 1933

ENTOMOLOGY

1933 Bad Grasshopper Year, Entomologists Report

GRASSHOPPER depredations in the United States during the past summer were the worst for many years, Dr. W. H. Larrimer of the Bureau of Entomology, U. S. Department of Agriculture, reports. Although the early hatching from their eggs in the soil was slowed down by wet, cold spring weather, subsequent heat and drought operated to the advantage of the 'hoppers, the damage they caused in late summer more than made up for their delayed start. Even into early October they were reported as still going strong in the northern Plains States. (*Turn Page*)

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.

Science News Letter, October 14, 1933

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.

Science News Letter, October 14, 1933

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.

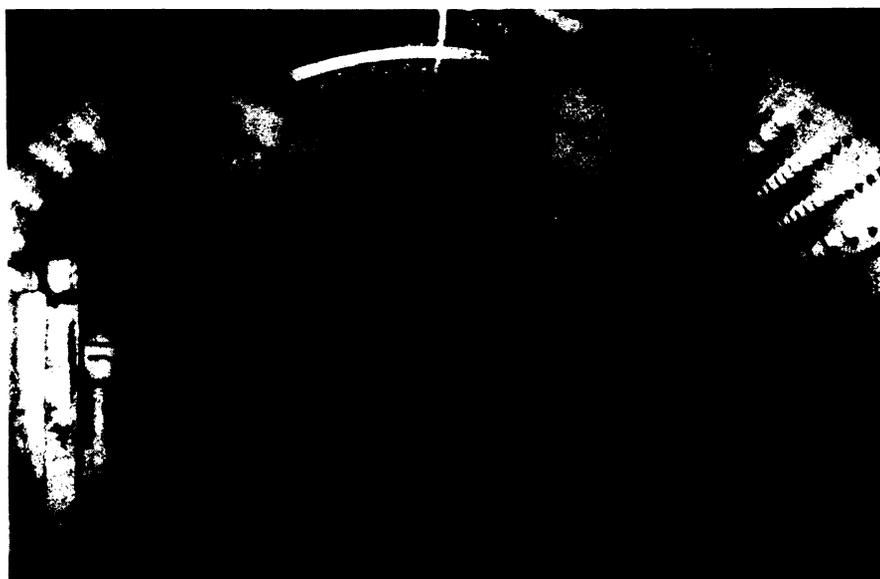
Relatively large quantities of heavy water are now being produced in Princeton's Frick Chemical Laboratory by Prof. Hugh S. Taylor, Prof. Henry Eyring and Arthur A. Frost, chemistry

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.