SCIENCE NEWS

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THE EARTH'S CENTER

WHAT'S at the earth's center? Though it sounds like an unsolvable riddle, perfection of modern scientific methods and instruments have wrested from the world that its core is formed of metallic iron with a little nickel. This conclusion, generally accepted among scientists, dashes speculation which has persisted to recent years that the earth, because it is heaviest at the center, has a heart of gold.

While not troubling to contradict this Jules Verne conception of fabulous wealth unattainably hidden in the middle of the globe, Dr. L. H. Adams, of the Geophysical Laboratory of the Carnegie Institution of Washington, tacitly refutes any golden dreams of the earth's interior in a report to the Engineering Foundation.

This earth is made up almost entirely of four elements, iron, magnesium, silicon and oxygen, Dr. Adams says. And the remaining 88 elements (including gold, silver and platinum) are confined to the thin film called the crust.

Directly beneath the relatively thin layer of sedimentary rocks at the surface, there is a first layer of granite 10 miles thick; below that a 20-mile layer of basaltic rock. Two thousand miles of peridotite rock (consisting of iron magnesium silicate) come next, while the central core of 4,000 miles' diameter is formed of metallic iron with a little nickle.

Earthquake waves yielded the important key to the secret of the earth's composition. Earthquakes of any considerable magnitude produce elastic waves, some of which travel along the surface of the earth and others pass through it. By measuring the acceleration and retardation of these waves on passing through the earth at various depths, it is possible to judge what sort of rocks and minerals interevene. According to its elasticity, each different kind of rock has a different effect on the speed of the waves passing through it, and so it is possible to judge the kinds of strata traversed.

THE EFFECT OF SMOKE ON TEMPERATURE

SURPRISINGLY great differences in temperatures between a smoke-covered city and near-by country have been found by Fred L. Disterdick, of the U. S. Weather Bureau. He has just reported his researches to the bureau's headquarters in Washington. Comparing minimum temperatures in the city at his office, and in the country, only five miles away, he found that on one occasion when the temperature in the country was 35 degrees it was 52 degrees in the city. When conditions in the country were favorable for the radiation of heat from the ground and the city was covered with its usual blanket of smoke, the city was always at least 5 degrees and most of the time 10 or more degrees warmer.

Mr. Disterdick says that at his station they observed some time ago that the minimum temperatures tended to be lower on Sunday and Monday mornings than on any other days of the week, and that in predicting the lowest temperatures to be expected each night, this has been taken into consideration. It is attributed to the fact that most of the industries, which pour smoke into the air, are closed over the week-end, and the air is relatively smoke-free on Sunday and Monday mornings. He points out numerous effects of the warming influence of the smoke.

Directly west of Des Moines is a large open area more than half a mile wide. In this area the effects of frost are observed early and there is never any smoke to ward off an injury when the temperature is at a critical point. Rather early during September, 1929, a frost occurred that killed practically everything in the unprotected area. In advancing eastward, the extreme edge of the city showed only traces of frost and as the city was penetrated even the most tender vegetation was not injured in the least and continued to thrive for more than a month after areas immediately adjoining were entirely without vitality.

Calling attention to the fact that smoke pots are frequently used, especially in the western states, to prevent frost damage in orchards, Mr. Disterdick declares that the smoke factor should be considered and that the uncorrected data from smoke-infested cities should not be taken as indicative of the climatological conditions.

EXPERIMENTS ON MUSSELS

THE raising of fresh-water mussels in the artificial environment of a laboratory will be one of the projects given attention at the University of Missouri, at Columbia, Mo., in new laboratory space just provided by the university for the use of the U. S. Bureau of Fisheries.

Dr. Max M. Ellis, director of interior fisheries investigations of the Bureau of Fisheries and also professor of physiology at the university, has found a method of speeding up the development of mussels. In its natural environment, the mussel spends the first four to six weeks of his life as a parasite on a fish. Dr. Ellis has discovered a nutrient medium which will take the place for the mussel of the fish. After the mussels have spent an allotted time in this medium, they may be planted in the rivers, relieving a shortage which has been produced by river pollution. Fresh-water mussels are of considerable economic importance because of their value for pearl button making.

The effect of river pollution on fish and other fresh-water life is another important problem to be studied. The Bureau of Fisheries has been conducting field investigations in the upper Mississippi River for the purpose of determining the effect of the new 9-foot channel which is being constructed in the river. Dams are to be built at intervals all the way from St. Paul to St. Louis, and the Bureau of Fisheries officials want to know just how that will change conditions for life in the waters.

NEW WHEAT VARIETIES FROM RUSSIA

NEW varieties of grain from the oldest wheatlands of the world have been brought to the U. S. Department of Agriculture by Dr. J. D. Dickinson, who has just returned from a half-year's botanical exploration of the Caucasus region and other parts of Russia. On these great plateau grasslands, where wheat has been grown for many centuries, Dr. Dickinson found species of wild wheat growing side by side with cultivated varieties.

In his search for grain varieties which may be useful in America, Dr. Dickinson had the assistance of leading Russian economic botanists. One of the Russian scientists has identified seven distinct forms of wild wheat in the Caucasus region, which he regards as separate species. He has also found three species of wild barley.

One wheat variety grown on the Caucasian highlands appears to hold great promise. It is known in Russia as Persian wheat. It is a short-stemmed, heavy-headed variety, maturing in a remarkably short season and being able to grow successfully in cold soil. The peasants follow the receding snow fields in spring, sowing this wheat along their margins as they melt. The yield is reported to be as much as fifty bushels per acre.

Dr. Dickinson also collected a considerable quantity of the native fruits, especially apples, pears and cherries. These grow as wild forest trees in the Caucasus, sometimes reaching great size. He reports that he saw pure stands of wild apples several hundred acres in extent. The fruit of these wild trees varies considerably in quality. Some of it is very disagreeable to the taste, but much of it is really very good.

PRESERVATION OF THE TURKEY

THE price of turkeys may be high, but if it were not for scientific work the Thanksgiving bird could not now be had for any money. Department of Agriculture scientists have told *Science Service* the story of the rescue of the domestic turkey from threatened extinction.

Some years ago, the business of turkey-raising was being rapidly wiped out as the result of the ravages of a disease known as "black head." It attacked the digestive tract and liver, and the birds seemed to have no resistance to it whatever. It was doing more than decimating the flocks; it was wiping them out altogether.

In 1895 Dr. Theobald Smith, now of Princeton University, but then one of the rising young men of the Department of Agriculture, identified the germ of the disease. It was shown to be a parasitic protozoon, or one-celled animal. The pest attacked first in the digestive tract, and then worked its way into the liver, eventually causing the bird's death.

But though the cause was known there seemed to be no method of cure or prevention. Then, about ten years ago, Dr. E. E. Tyzzer, of Harvard University, showed that the same germ is harbored by common chickens. These, however, are quite resistant to it, never becoming very sick but serving as semi-immune "carriers." Turkeys kept in mixed flocks with chickens were therefore practically certain to become infected if there had ever been a case of black head in the history of the flock.

The salvation of the turkeys was accomplished by the simple expedient of segregating them from the chickens thus found to be such bad company for them. This has not by any means eliminated the disease, but it has at least made it possible to keep the turkey flocks alive. In the meantime the Department of Agriculture is attacking the problem anew, with the object of finding a positive and specific method of prevention or cure.

ITEMS

TEMPERATURES that ordinary animals and plants could not endure for more than short periods are built up and apparently enjoyed by the fungi that breed in piles of rotting straw. Experiments at the Rothamsted Experimental Station near London show that these organisms of decay thrive best at a temperature of about 130 degrees Fahrenheit, which is more than halfway from freezing to boiling point. These fungi, it has been found, do more than the bacteria often found associated with them toward the reduction of straw to a soil-enriching fertilizer resembling farmyard manure.

PORTABLE sound movie equipment, using the narrow 16-millimeter film now standard for amateur cameras and projectors, has been developed by the Westinghouse Electric and Manufacturing Co. The Society of Motion Picture Engineers heard at the recent meeting an account of this equipment, for which C. R. Hanna, P. L. Irwin and E. W. Reynolds are responsible. The only difference between the sound film and the ordinary kind of the same size is that in the former one row of sprocket holes is omitted to make room for the sound track, the record being made right on the film as in most of the theater methods. Like the large film equipment, the light from a small lamp shines through this sound track, then it is analyzed by a photoelectric cell, and converted into electric impulses. These in turn operate the loud speaker. The entire equipment can be carried in three cases, one for the projector, one for the amplifier and one for the loud speaker and screen. Together they weight 120 pounds.

QUARANTINE restrictions on Florida fruit and vegetable shipments, designed to protect the rest of the nation against the menace of the Mediterranean fruit fly, have been wholly removed, effective November 15. This restores Florida to complete parity with other states so far as shipment of these products is concerned. The decision of the U. S. Department of Agriculture to lift the fruit fly ban followed conferences with Florida officials, including Governor Carleton and members of the state plant board. It marks the end of a war of man against an insect that began in April, 1929, when the dreaded pest was discovered in orchards near Orlando, in the heart of the citrus belt. Since November 16, 1929, no infestation has been found in a commercial orchard, and only two isolated finds have been made elsewhere.