

SCIENCE NEWS

FIRE-SWEPT CITY OF ANCIENT MAN IN
TENNESSEE*Science Service*

CHARRED and blackened remains of a beautiful prehistoric Indian city, destroyed by fire long before the advent of the white man, but formerly covering an area of 500 acres and defended by a palisaded wall and breastworks more than a mile in length, have been discovered in two bends of the Harpeth River near Kingston Springs, Tennessee, by W. E. Myer, special archeologist of the Smithsonian Institution.

Mr. Myer, who has just returned to Washington after two and a half months' excavation at this ancient site, declared that no other old Indian town in the United States was laid out with such artistic skill as is evidenced in the structural plan of the great mounds of this large fortified place.

On one bend of the river is a great hill which was artificially shaped by the ancient builders from bottom to top. Three wide terraces were built at various levels along this hill, and its original summit was cut away until a level plaza, about 1,000 feet in length and 500 in breadth, had been formed. On this level plaza they had erected a large mound. Around the edge of the plaza and the terraces other mounds had been formed. The sun-baked clay used in the construction of ancient earth lodges was found surrounding the open plaza and along the terraces.

In addition to this great central mound on the bold terraced hill, which formed the most striking feature of the city, there were within the walls five other eminences which had also been leveled into plazas. These yielded many traces of the ancient earth lodges and other evidences of the former inhabitants. The remains of about thirty mounds of various sizes have been found. On the edge of the terraces were the earth lodges of the common people. The sacred temples and council houses and the earth lodges of the chiefs and sub-chiefs had probably been placed on the summits of ten of the largest mounds.

The upstream portion of the ancient city was defended on the water side by perpendicular cliffs of the Harpeth River. On the land side many traces still remain of the ancient breastworks, which extended for about a mile and a half and originally had wooden palisades about 10 feet in length firmly embedded in their tops. These palisades formed a wooden wall which had been plastered on the outside in order to make scaling difficult by an enemy. Along this wall at intervals of about 150 yards were found earth bastions which had formerly supported semi-circular wooden towers. The enemy advancing to attack was therefore subjected to fire from the defenders along the main wall and also an enfilading fire from the warriors in the towers on these bastions. Faint traces of the wooden towers and of the wooden palisades were found. The great length of the wall to be defended

indicates that the city must have contained several thousand inhabitants.

All the buildings whose traces were uncovered appeared to have been burned. Under an overturned wall the charred remains of the woven-reed tapestry which had formerly hung on the walls of the building were discovered, and Mr. Myer and his assistants secured plaster casts of this ancient work of art for the Smithsonian Institution. No object of white man's manufacture was found on the site. Everything denoted great age.

Beyond all question this town had been lived in and destroyed long before the coming of the whites into the region, while the Indians who claimed this section of Tennessee stated to the first whites that their Indian forefathers had found these remains lying silent and deserted when they arrived.

The mention of these mysterious mounds in a rare book long since out of print gave Mr. Myer the clue which led to the exploration of the place. An airplane was used to survey and photograph the ancient Indian town site.

ALCOHOL FROM SUGAR

Science Service

GASOLINE shortage holds no terrors for the Hawaiian Islands. Their chief crop, sugar cane, is not only able to supply all the motor fuel needed locally, but also enough surplus to make a worth-while export, should the price of gasoline rise much above its present level.

The manufacture of industrial alcohol from molasses is merely awaiting the demand, according to an extensive report issued by H. P. Agee, director of the experiment station of the Hawaiian Sugar Planters' Association, and W. L. McCleery, assistant sugar technologist of the same institution.

Technical problems, they say, have been solved in a satisfactory way with respect to manufacturing both motor alcohol and stove alcohol for domestic fuel purposes. But at the average prices of gasoline and kerosene for the last five years, extensive production is not an inviting proposition.

One sugar plantation, the Maui Agricultural Company, now has in operation an industrial alcohol distillery which is supplying the needs of 32 trucks, 20 passenger cars and two tractors owned by the plantation and its employees. Five hundred stoves used in the kitchens of the field laborers are also being supplied with fuel from this distillery.

Difficulties incident to the substitution of motor alcohol for gasoline in automobiles are said to have been overcome. Much experimentation was necessary in arriving at the present satisfactory formula, but now there is essentially no difference between motor alcohol and gasoline in facility of starting or general ease of operation. The life of the motor and extent of repairs is not influenced by the new fuel. Automobiles at the Maui plantation, which have been operated with alcohol for

several years, have less carbon trouble than when they used gasoline. Proper carburetor adjustment must be made in changing the fuels, however, as not all carburetors are suitable for alcohol.

Alcohol possesses certain advantages over kerosene as a kitchen fuel. It burns with a clean flame, without smoke or soot. In point of fire risk, it is more inflammable, but more readily extinguished by water. A greater volume of alcohol is required, except in so far as sooty utensils reduce the efficiency of kerosene.

Agee and McCleery estimate that it would cost, independent of the value of molasses as a raw material, about 8 to 11 cents to produce a gallon of industrial alcohol. Molasses at present is a waste by-product of the sugar cane industry. It is used somewhat as fertilizer and somewhat as stock feed, but is practically valueless. Stove alcohol costs about 25 per cent. less to make than motor alcohol. Ether as well as alcohol can be made from the molasses.

A NEW DISEASE

Science Service

A NEW disease of man, called tularemia, has been found to be present over the whole of the United States, and infections in human beings have been found from the Atlantic to the Pacific coast, according to a report by the U. S. Public Health Service.

Investigators from the U. S. Hygienic Laboratory discovered that rabbits being offered for sale in the Washington market this winter were in some cases infected with this disease, not known in the East before outside the laboratory. It has been epidemic in some western states, particularly Utah, for about five years. Tests showed that one market man was immune to the disease because of a severe attack last year. Cases were also reported from Cincinnati, Ohio, and Charlotte, N. C. Additional cases of infection are to be expected.

Since the government laboratory started to study the disease, which was first discovered as a fatal epidemic among ground-squirrels in California, six scientific workers have contracted the malady, one of them twice. Among the victims was Dr. Edward Francis, in charge of the investigations. The attacks begin with a high fever lasting about three weeks and are followed by about two months of convalescence. Although the disease has few fatalities, it causes a long period of illness that works a particular hardship on Utah farmers since it usually occurs there in midsummer.

A germ, known as *Bacterium tularense*, causes the disease and it is transmitted by the blood-sucking fly, the stable fly, the bedbug, the squirrel flea, the rabbit louse and the mouse louse, only the first four of which bite man. The germ can also gain access to the human bloodstream through broken skin while an infected rabbit or squirrel is being handled.

ARTIFICIAL LIGHTNING

Science Service

Two million volt artificial lightning is being created in the research laboratories of the General Electric Com-

pany at Pittsfield, Mass., in order that buildings and high-power electrical transmission lines may be protected against the powerful "electrical dynamite" that nature discharges during storms.

F. W. Peek, Jr., engineer in charge of the spectacular experiments now in progress, states that in addition to the trouble that engineers have in keeping power current from escaping from the conductors, there is the very important problem of lightning protection. A few million horsepower are released in a fraction of a millionth of a second when the lightning crashes. Electrical engineers must know how to prevent this destructive force from reaching the conductors of power lines, or they must arrange so that it will discharge harmlessly to the ground when it does get to the line.

In 1916 when the General Electric engineers built their first lightning generator it produced only 200,000 volts but now 2,000,000 volt flashes with all the characteristics of real lightning are generated at will. Wooden posts of large size are readily shattered and blown apart.

A model village for the study of lightning protection has been built in the laboratories and with controlled lightning the best methods of protecting power plants, churches and other buildings are being worked out.

The highest voltage actually used at the present time for the commercial transmission of power is 220,000 volts on a line in California, but the General Electric Company has an experimental million volt line. It is too early to say whether such high voltages will ever be required in practice. But Mr. Peek states that "a single 220,000-volt transmission line in a year can transport for 300 miles energy equivalent to 1,000,000 tons of coal, while a 1,000,000-volt line could transport for 1,000 miles energy equivalent to 25,000,000 tons of coal."

ITEMS

Science Service

THE U. S. Department of Agriculture is bringing up the heavy artillery in its fight against the cotton boll weevil. Three DeHaviland 4B planes are to be used in a few days to poison the weevils from the air by dusting the plants with calcium arsenate. Several plantations have been mapped and all arrangements made for the test which will be awaited with interest by every one connected with the cotton industry. Four applications of the poison will be made during the season, five pounds of the poison being used to the acre at each application. The chemical is sifted out of a specially designed hopper while the plane is flying at low altitudes, mostly from fifty to two hundred feet. Although extremely fatal to the weevils, there is no danger to human beings or to farm animals, in the opinion of the experimenters, from the use of the poison.

THE last representatives of a race of large-horned sheep which were once widely spread throughout Europe during the Bronze Age are found to-day on the island of Soay, one of the Hebrides west of north Scotland.

REINDEER herds started in Alaska thirty-three years ago with sixteen animals have grown until to-day there are 250,000 head of reindeer in that territory.