Archaeological Forest is Studied

Botany

Scientist Finds What Happened To It During 100,000 Years

THE archaeology of a forest, to match the archaeology of the human settlements that nestled in and around it and depended on it for food, houses and fuel, has been traced for a hundred thousand years or more by Dr. T. W. Woodhead, well-known British scientist. Dr. Woodhead has prepared a series of model maps of the area he studied, and he displayed them at the Congress.

The forest in which Dr. Woodhead was interested lies on the southern Pennines, a range of low mountains running northward through north central England. They were not entirely submerged by the ice of the glacial period, but raised their summits through the sheet like the present "nunataks" of Greenland. The first model shows the bleak landscape of that period, with only meager mosses and ferns on the ground, and low scrub growths of birch and willow above them. The Arctic Circle had moved south to England, so far as the plants were concerned, and until a milder climate set in no men appeared in that part of the land. The earliest flint implements found there are of the Aurignacian type, used by comparatively advanced Stone Age men.

The coming of a milder climate brought heather and grass, such as are now found in the Scottish highlands. But though the climate was milder it was drier, so that a rich vegetation could not develop. Then improved moisture conditions set in, and at last a forest came into being: alders and willows in the swamps, oaks and hazels on higher land, with birches and heath in places. Here were found the first evidences of Stone Age man, tools resembling types found in Belgium.

With the coming of New Stone Age time the climate became, paradoxically, too moist for forest, and the upland degenerated into a peaty morass. The lower slopes still supported a mixed forest. Bronze Age time brought a somewhat drier climate again, but the wet-land conditions persisted nevertheless on the plateau.

From this time on, the changes in the vegetation on the hills were influenced more by the activities of man than by the climate alone. There are abundant evidences of human occupation, in roads and trackways, earthworks and Roman camps.

The first definitely dated reference in history is in the Domesday Book, the great census record of 1086 A.D. This tells of hills covered with peat-moss, birch-heath woods on the higher slopes, plowlands and pastured woodlands on the spurs, alder-willow thickets in the swamps and river bottoms.

Modern times show a further encroachment on the forest by the uncontrollable moorlands of the summit, and by farmlands and pasture on the slopes. Such remnants of the original forest as still exist are confined to stony escarpments or are enclosed as parklands.

More interesting reports from the International Botanical Congress held at Cambridge, England, are published with this article.

New Plant Diseases

How new and more troublesome plant disease strains may arise in nature has been indicated by laboratory experiments on the black stem rust of wheat by a Canadian scientist, Dr. J. H. Craigie of the Dominion Experimental Farms at Winnipeg. Dr. Craigie told of his researches at the Congress.

Some time ago Dr. Craigie discovered that the fungus of black stem rust, in common with higher plants, has sex, and that it regularly passes through a sex phase in its reproductive cycle. Now he and his associates have demonstrated that various characters of this parasitic plant are transmitted from parents to offspring and are capable of being mixed and sorted by hybridization just as surely as were the smooth and wrinkled seed-coats of Gregor Mendel's famous peas. This holds true both for characters externally visible, like color of spores, and for characters that show up only in the physiological behavior of the fungus.

Spectroscope Analyzes Plant Food

The spectroscope, the same instrument used in analyzing the chemical composition of stars trillions of miles away, is employed by Prof. H. G. Lundegardh, of Stockholm, to detect the smallest nibble that plants take of the mineral foods the earth provides them. Prof. Lundegardh burns the stems, leaves, roots and seeds of the plant to be investigated and passes the resulting light through the spectroscope. This separates the light into its spectrum and as each chemical element has it own particular lines, it is possible to measure the amount of the element present by observing the intensity of the lines. The spectrum is recorded on a photographic plate or, in the case of small amounts of minerals in the plant, a photoelectric cell is used as the light measuring device.

Elements such as sodium or potassium, which are extremely difficult to analyze chemically, can thus be quantitatively determined. Of some elements as little as one three hundred thousandth of an ounce can be detected.

Temperature Treatment

Just as human patients are often treated by keeping them at temperatures favorable for themselves but unfavorable to the germ of their particular disease, so sick plants can be helped and troublesome fungi hindered by the proper temperature treatment. Prof. L. R. Jones, of the University of Wisconsin, the American botanist upon whom was conferred one of the six honorary doctorates of Cambridge University awarded in connection with this Congress, reported his researches on temperature treatment of plant diseases. He and his associates found one cabbage disease that likes high temperatures. So the cabbage plants were grown under conditions as cool as possible and the disease was outwitted. A tobacco disease hated heat. So they raised tobacco under warm conditions and another disease was checked.

These experiments offer new hints to farmers who can govern the climatic conditions of their crops by late and early planting in open fields or by greenhouse cultivation.

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This latter kind of inheritability of characters is especially important from the daily-bread point of view, for one of the things thus transmitted is the pathogenicity of the fungus, or its ability to damage the wheat plant.

Dr. Craigie's latest experiments are of interest as an indication of the possible road by which the large number of known physiological strains of black stem rust have come into being. Two physiological strains of the organism may look exactly alike under the microscope, yet one will attack only Marquis wheat and the other only Turkey Red.

There are about 100 known physiological strains, which complicates the rust-fighting problem considerably. Dr. Craigie considers it probable that many of the existing strains occurring in nature are of hybrid origin. Supporting evidence for this theory is offered by the fact that there are many such strains in America, where natural conditions for hybridizing the fungus are favorable; whereas in Australia where hybridizing is not favored by nature, there are relatively few physiological strains.

The danger of new and more vicious forms of wheat rust arising by natural hybridization is held out. Most of the hybrids he produced were intermediate in virulence between their parent stocks, Dr. Craigie says; but some were less virulent than either. If such a shift can occur, there are sound theoretical grounds for supposing that an equal shift toward greater virulence can also take place.

Color at Freezing

The natural fruit colors of certain canned fruits are preserved much better when the cans are kept in cold storage than when they are kept at ordinary temperatures.

T. N. Morris and J. M. Bryan of the Low Temperature Station, Cambridge, have recently found that canned strawberries stored for three months at a temperature just above freezing have a fine red color, whereas those kept at 10 degrees below zero Fahrenheit are pale, and those stored at ordinary room temperature are also somewhat pale.

The strawberries from cans stored at just above freezing actually had a much better appearance than when they were first canned because the color had returned to the fruit from the syrup.

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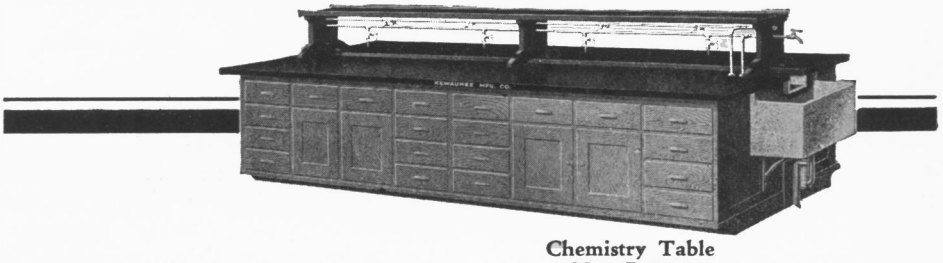

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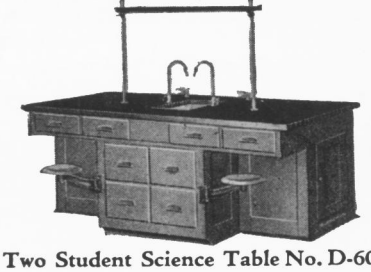

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