

leader of the syndicate of engineers who have been studying the question of wind power since 1907, calculates that the hundred-foot windmill in a 13 mile wind will give 50 horse-power, and the 130 foot windmill will give 90 horse-power. With a wind of 22 miles an hour the smaller wheel will give 240 and the larger 400 horse-power.

Constantin proposes to install a series of 130 foot windmills on Mont Ventoux, five thousand feet above the sea, and figures out that a single machine would deliver an average of over 700 horse-power throughout the year. The velocity at the extremity of the blades in the fastest wind would still not be more than half that of the blades of an airplane propeller, so there would be no danger of their flying off.

The wheel is to be connected directly with a dynamo to convert the rotary motion into electrical current and do away with gearing, cranks, or cables. The dynamo is encased in a light shell constructed on stream lines like a fish, so as to offer the least resistance to the wind. The wheel and dynamo turn on a common axis as the wind shifts.

A row of a dozen or more such windmills are to be connected with an "aeolian central" where the varying currents are brought together and transformed into a single current of constant intensity that goes out to the consumers. The surplus electricity at hours when the demand is slight is to be used in electric boilers in making steam, which may be stored in accumulators to be used as needed for heating or power.

It is anticipated that the power thus derived from the wasted energy of the air may serve to warm houses, run shops, drive shop machinery, heat metallurgical furnaces, and run trains. It is also planned to use windpower to propel vessels against the wind. Constantin and Joessel equipped a five ton boat, the Bois-Rose, with a thirty foot air screw, connected with a forty-two inch marine propeller, and navigated this vessel on the Seine at Paris in all directions without disturbing the ordinary traffic. The vessel made about four and a half miles an hour in the face of a fifteen mile wind,

ARMY WORM FLAGUE CHECKED

The outbreak of the army worm in Illinois has been brought under control, according to Prof. George A. Dean of the U. S. Department of Agriculture, who declared that the pest will not prove as damaging as was feared, not reaching the extent or severity of the attack ten years ago. A similar outbreak in Iowa is reported to have been checked before it got well under way.

This caterpillar of an insignificant moth or "miller" has been represented as moving very rapidly over several counties when in full action. An army worm has been known, according to Professor Dean, to cross an 80 acre field, a distance of one fourth of a mile, in 24 hours, which may be regarded as rapid for a caterpillar. But as the length of life of an army worm is from seven to ten days depending upon the temperature, the distance an "army" can travel is limited. The distance a worm travels depends largely upon the amount of food it finds. If, upon emerging from the eggs, the worms find only a thin covering of vegetation, the urge of hunger will compel migration and they will turn to grasses, young wheat, alfalfa, and other tender plants. If there is sufficient food to carry them through the worm or caterpillar stage, they travel no farther.

The rapidity with which a field may be devoured is surprising. Professor Dean recalled a farmer who woke to find his six acre potato field of the night before a barren waste. There are many records of fields of wheat, corn, and alfalfa disappearing between sunrise and sunset.

The worms undergo metamorphosis in the ground or under such shelter as they can find. The moths then emerge and fly considerable distances, and by laying their eggs, prepare the way for another army worm outbreak. An army worm attack seems sudden because the extremely small young eat comparatively little and remain near the ground. With increasing size their appetite grows rapidly and their migratory search for food suddenly reveals their presence.

Over the fields occupied by army worms there may be a bee-like buzzing of flies and insects seeking to prey upon the worms. Flocks of blackbirds may appear, and the concerted attack of these and other natural enemies such as insects, toads, and mice, explain the practical elimination of the pest. The farmer can assist by watching for the first appearance of the worm and spraying the fields in which they appear, and scattering poisoned bait. He can protect himself from invasion by plowing a furrow and through this furrow dragging a log to crush the worms as they fall in, or burning with kerosene. An infested field should be plowed to destroy the young worms and pupae that may be wintering there.

The last attack preceding the current army worm attack in Illinois and Iowa occurred in each case ten years ago. The cold backward spring caused entomologists to expect the present attack.

The true army worm is distributed over practically the whole United States east of the Rocky Mountains. It does its chief damage in the grain and forage areas of the central Mississippi valley.

The Fall Army Worm of the south has similar habits, but is more local in its attacks. Still another species occurs in the western Mississippi River Valley.

READING REFERENCE - Caldwell, Otis W. and Slosson, Edwin E. Science Remaking the World. New York, Doubleday, Page and Company, 1923.

MAY CROSS COTTON PLANT WITH BIG HAWAIIAN TREE

Cultivated cotton may be crossed with a tree just rescued from complete extinction in Hawaii to make bigger cotton plants and take the kinks from the backs of cotton pickers. Such is the possibility foreseen as a result of the announcement of the success obtained at the Department of Agriculture's Plant Introduction Garden at Miami, Fla., in growing *Kokia Drynarioides* from seed. There is only one other tree of this species in existence and that is the one from which the seed were obtained. It is a close relative to the cotton plant, and it has been suggested may be of value for crossing with the cultivated cotton.

But this cotton cousin bears about the same relation to the cultivated varieties as the famous beans Jack bought do to the ordinary garden kind; for *Kokia drynarioides* reaches 15 to 25 feet in height with a trunk of six inches or more in thickness.