of adhering to the Union. If strong reasons exist for remaining out of the Union, unquestionably the division would welcome such information, as would also the 2,000 botanists who are now disposed to enter.

DONALD REDDICK

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HEVEA RUBBER TREES IN FLORIDA

THE Hevea or Para rubber tree of Brazil (*Hevea brasiliensis*), the species that is cultivated extensively in the East Indies, has been introduced experimentally into southern Florida, where the coconut palm, mango, avocado, sapodilla and other strictly tropical plants are being grown. Some of the rubber trees have grown rapidly, and have produced fertile seeds, so that the first generation of "native-born" Heveas is in its second year. A single stunted Hevea tree at Palm Beach is the only known survivor of an earlier introduction, at the end of the last century, by the U. S. Department of Agriculture, and has shown notable resistance to unfavorable conditions. It was broken off near the ground by the fall of another tree in the hurricane of 1928, but the stump has remained healthy and new branches have developed.

Although the native habitat of Hevea is in the Amazon valley, which lies along the Equator, the susceptibility to injury by cold weather appears to be rather less than that of the Castilla rubber trees from Central America and Mexico. Many tropical plants are damaged in cool periods, even in regions where frosts do not occur, but no such tendency has been noted with Hevea, even in the young plants, many of which have continued to grow through the winter. The seasonal leaf-fall of the older trees, which is a regular habit of Hevea in the tropics, may assist the adaptation of the species to the Florida conditions. In addition to Hevea and Castilla, the rubber experiments that are being conducted at the Plant Introduction Garden at Coconut Grove include the Ceara rubber tree of Brazil (*Manihot glaziovii*), the African rubber tree (*Funtumia elastica*) and the Assam rubber tree (*Ficus elastica*), which also are thriving and seeding under the Florida conditions.

The seedlings of the Hevea tree are notably specialized for forest undergrowth conditions and have very thin leaves. Protection of the young trees against the strong trade-wind breezes of the coast districts was found necessary, and the roots must reach permanent moisture, but the older trees are relatively hardy. The most normal and rapid growth has been in pockets of the limestone reef formation below Coconut Grove, though practical tests of production possibilities are not to be made under such conditions. The first requirement for adequate testing is that supplies of native-grown seed be available for planting in many localities, so that the general range of adaptation may be learned and permanent groups of trees established where soil conditions prove favorable, to give a basis of selection. The factor of selective adaptation may be emphasized on account of the very wide range of individual diversity in Hevea.

The extent to which it will be desirable to utilize Hevea or other tropical rubber trees in southern Florida no doubt will depend upon the efficiency of production that can be attained, and upon the need that may be felt for developing new industries or of protecting ourselves against military emergencies and commercial exactions. A limiting factor at present is the denuded state of much of the interior, but with the fire hazards removed and the natural forest covering restored, the tropical reclamation might extend over half the peninsula. Desert conditions are approached in the open fire-swept country during the dry season of the winter and early spring, with the exposed sand losing heat rapidly after sunset and the dry cold air inducing frost temperatures in moist places by surface evaporation. Water that is being drained from Lake Okeechobee and higher levels farther north could be diverted for controlling fires and irrigating the tropical districts in the dry season, if large-scale developments of rubber or other tropical resources were undertaken.

O. F. COOK

BUREAU OF PLANT INDUSTRY

FEB. 2, 1935

"SLEEP" AGGREGATION IN THE BEETLE, ALTICA BIMARGINATA

AS an addition to our comparatively limited knowledge of "sleep" aggregations in insects the following notes may be of value.

On July 29 and 30, 1934, while camping on a small stream near Missoula, Montana, I found large clusters of this species collected on trunks of alder trees, close to the stream. The weather was intensely hot, with maximum temperature at Missoula of 99° F., on the 29th, and a strong breeze from the southeast.

The beetles were gathered in dense clusters mostly on the leeward side of the alders in long vertical rows, occasionally one being on top of the others. For the most part they were quiet, but an occasional "sleep walker" would leave his comrades to crawl up the trunk and then down again.

I removed a lot and threw them on the ground. Here they ran aimlessly about until reaching some blades of grass up which several of them climbed to reach an alder trunk, which they ascended and wandered up and down for a time until coming into contact with other beetles, when they gradually came to rest close to their fellows.

When a wandering beetle made contact with one at rest, the latter frequently turned about as if to repel (?) the intruder, while the antennae of both were in active motion. They would then come to rest together

or the visitor might move on, as though to seek a more friendly "bed fellow."

During most of the day the beetles were in shadow, but toward evening streaks of sunlight fell upon them, causing them to shift their position, so that the configuration of the group was materially changed. Whether light or heat or both were the disturbing factors I can not say.

At 6:10 P. M. or about 5 minutes before the sun sank behind a nearby mountain, the beetles started to ascend the trees. But while the general movement was up a few of the beetles would reverse their direction and move down for a time. At 6:20, after the sun had disappeared, there was a great pilgrimage upward, but a few laggards were still "asleep." By 7:10 all but one had ascended the particular tree which I was observing, and by 7:30 all had gone up.

The following morning was partly cloudy and still. Most of the insects had moved to other trees in the vicinity, but a few were in the same location as on the two preceding days. At 9:15 A. M., or more than two hours after the sun had reached the top of the alders, a few of the beetles had come down the trunks or were wandering aimlessly up and down, while others were still in the tree tops. At 11 A. M. I noted several groups of from 10 to 20 beetles on the trunks of several trees, but many were still resting quietly on the leaves or flying from leaf to leaf, but apparently not feeding.

Further observations on the "sleep" behavior of insects and the rôle of various environmental and physiological factors in its control are desirable.

R. T. YOUNG

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NOTES ON THE COMMON SHRIMP

FOR about a year I have had in my aquarium a number of the common fresh-water shrimp—*Palaemonetes exilipes*. In general these specimens were fed on bread crumbs and bits of scrambled egg. One morning during the latter part of September, I introduced quite a number of mosquito larvae—(*Culex* sp.) into the aquarium. The shrimp at once began to chase the larvae. Even among the plants and grasses of the aquarium the larvae were easily captured. The shrimp held the larvae in their pinchers, introduced the still struggling larvae into the mouth and gradually consumed them.

This does not present proof that in its natural environment *Palaemonetes exilipes* eats the larvae of the mosquito. However, since it positively occurs in an aquarium, it seems probable that such is the case in the natural habitat of these shrimp. Such feeding habits make Palaemonetes very valuable economically.

G. ROBERT LUNZ, JR.

CHARLESTON MUSEUM

REPORTS

RESEARCH AT MELLON INSTITUTE DURING 1934-35

THE steady advancement of Mellon Institute during the past twenty-four years is frequently cited as an illustration of the esteem in which industrial research is held by American manufacturers. The institution was one of the first organizations in the United States founded expressly for investigating the problems of the industries, and its industrial fellowships, which have now passed the one-thousand mark, have served scientifically 3,600 companies, either as individuals or as members of industrial associations. In ten instances the inventions of fellowships have created new industries and as the results of research accomplishments of other fellowships many new branches have been added to existing manufactures. The triple function of the institute as an industrial experiment station, as a training school for industrial scientists and as a center for investigation in pure as well as applied chemistry is seen in the numerous discoveries, the successful processes and products, achieved under its auspices and in the regiment of keen research men who have here acquired specialized knowledge and experience that they are now applying productively in other fields.

In his twenty-second annual report to the institute's board of trustees, just issued, Dr. E. R. Weidlein, director, has summarized the progress during the fiscal year ended February 28, 1935. That there was a growth of the institute's activities in this period is shown by the funds contributed by the industries for the support of research, which amounted to $596,937.68, an increase of 11 per cent. over the preceding year. The money appropriated by companies and associations to the institute during the past twenty-four years amounts to $10,029,544.

At the close of the fiscal year, 56 industrial research programs, each relating to a major problem of technology, different in subject from the others, were being pursued, 16 by multiple industrial fellowships and 40 by individual industrial fellowships. Eighty-seven fellows and 29 assistants held positions thereon. Twenty-eight fellowships, or half the total number, have been in operation for five years or more, and of these fellowships 14 have concluded ten years of research, eight have been at work for 15 years or more,