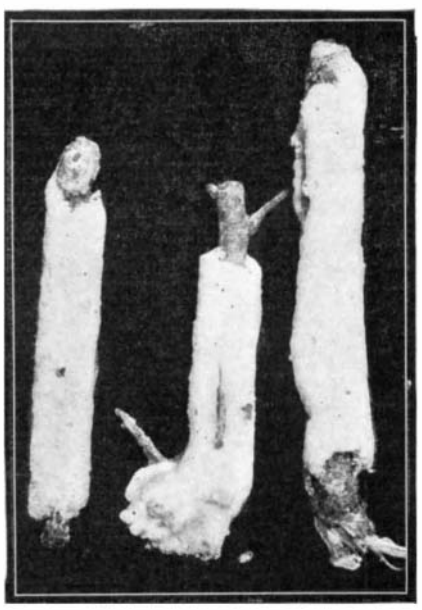
WAX FARMING IN CHINA—A STRANGE INDUSTRY.

BY WALTER L. BEASLEY.

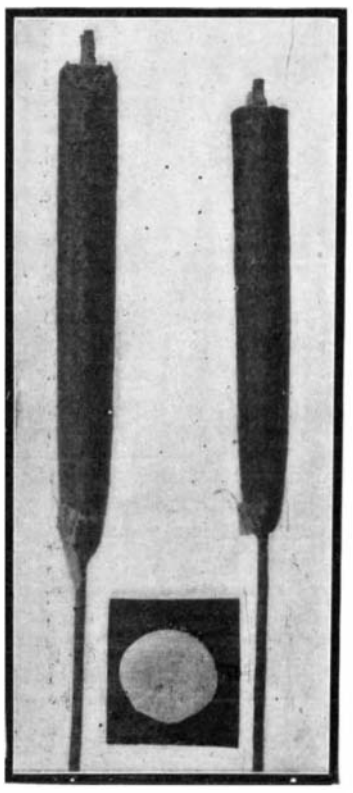
Among the novel occupations in China but little known, if at all, to the outside world, is that of the wax farmer. The most remarkable feature in connection with this industry is that the owner's entire crop is produced by the free labor of myriads of little insects, whose eggs or cocoons deposited on the limbs and branches yield a rich harvest, which is transformed into pure white wax and marketed at a fair price. Equally odd and fantastic are the midnight journeys of the agile and sure-footed porters, who are forced to hurry along as fast as possible with their loads of insects on their backs hundreds of miles across steep and rocky mountain passes, ascending and descending precipitous places which no animal or conveyance could traverse with safety, in order to land their cargoes in proper time for the hatching-out season. The American Museum of Natural History has just received some specimens of the wax-covered branches taken from the field, and the only ones to reach this country so far. Photographs of the strange creature itself and other characteristic views are shown and described here for the first time.

Comparatively little is known of this peculiar and valuable insect. Prof. C. Saski, of the Agricultural College of the Imperial University of Japan, has just reported in a bulletin on the life habits of the wax-producing coccid (*Ericerus pela*, Westwood). He gives much detailed information as to the size, appearance, and breeding habits of the creature, the salient points of which are here incorporated to supplement the general narrative. Through the kindness of Prof. William Beutenmüller, of the Entomological Department, this has been placed at the disposal of the writer. The insect is more common in China, though it is also found in Japan. In both countries it selects different trees to feed upon. The food plant in China is *Fraxinus Chinensis*, while in Japan it is *Fraxinus pubentrois* and *Ligustrum ibata*.



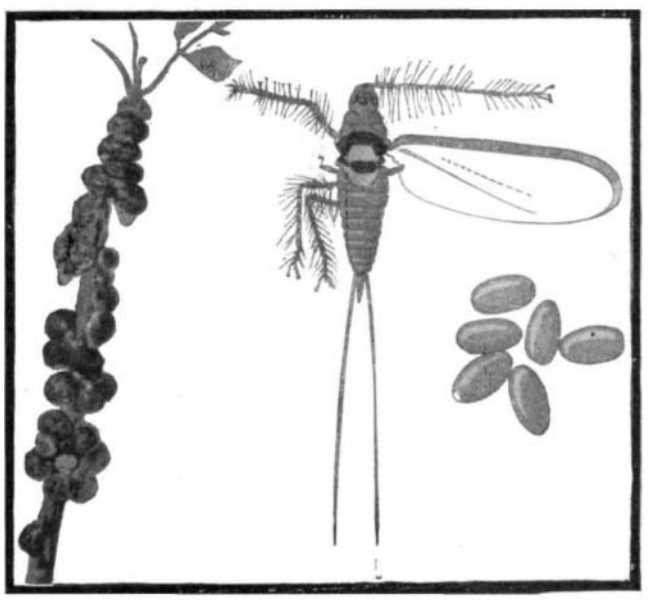
Layers of Wax as Deposited by the Insect on the Branch.

The male has a head nearly triangular and of a light orange color; the dorsal surface is marked with a broad grayish-brown band. The antennæ are long and composed of ten segments, covered with hairs. The segments are long, except the two basal ones, which are shorter and stouter than the rest. The last segment has on its tip three digitules. The thorax is large, elongated, and broader than the head. The legs are comparatively long, light brown, and covered with grayish hairs. The first pair lie far apart from the others. The four wings are long oval, and quite transparent. The abdomen is of nearly equal length to the thorax, and its anterior segment is closely attached to the thorax by its entire breadth. From the side of the last abdominal segments there protrude two slender white filaments, which are much longer than the body. The length of these is 3 millimeters. The female is globular in form and 11 millimeters in diameter, and when found in aggregations is slightly deformed from mutual pressure. The dorsal part, which forms the larger portion of the body, is dark reddish brown in color. The ventral flattened surface is almost oval in shape, but its large central portion becomes gradually concave, as the eggs are deposited, and finally gets deeper and deeper, so as to form a large hollow space, wide enough to protect many thousand eggs. If the insect is removed from the stem, the eggs fall freely off. These are elongated oval, light yellow, with diameters of 0.432 millimeter and 0.216 millimeter. The female begins to lay eggs about May 1, and the young larvæ commence to hatch out at the beginning of June. They are long oval, of an orange yellow color. The larvæ distribute by crawling about over every branch, and after molting pass to the second stage of growth. In the last part of August the male larvæ of the second stage are completely imprisoned within an oval cocoon, formed by snowy-white filaments, secreted by the dermal glands. Usually large numbers of the oval flattened cocoons completely surround the stems and branches. Within these the larvæ pass from the second to the third stage. At this period the antennæ, wings, and legs are all free, and the length of the body is 2.2 millimeters. A few days after remaining in this state, the winged insect appears through a slit-like opening at the free edge of the cocoon. The females go through the same stages of molting, and vary but slightly in structure and size from the male. The males appear about the last of September or beginning of October, and flit around the young females, who are already attached to the stems and branches.



Temple Candles made from White Wax.

The tree (*Ligustrum lucidum*) which produces the white wax insect grows in the Chien Chang valley in the western part of China, which is some 5,000 feet above the level of the sea. In March round brown forms are seen attached to the limbs and branches. If one of these should be opened, it would be found to contain innumerable white insects. By a strange law the insect will not flourish or produce wax in its birthplace, and if allowed to remain will drop off in a dead mass. The Chinese, with clever instinct, have discovered the exact locality where they will flourish to the best advantage, and have started breeding the insect and cultivating the particular food plant upon which it thrives and deposits the wax-making cocoons. Transporting the females to the various farming places some two to four hundred miles distant in the Province of Sze-Chuan gives employment during the season to thousands of porters. One of these wax-making centers is Kiating. About the first of May the female is nearly grown, and the body is almost conical, with a round base. Later on it becomes mature, and begins to deposit eggs. At this time the operation of removing the females from the limbs and branches to which they are attached and getting them ready to turn over to the porter for transit is commenced. They are thereafter carried hundreds of miles distant, to where the wax farmers have rows of the special food plant—a species of flowering ash five or six feet high (*Fraxinus chinensis*) upon which the insects feed and deposit their layers of wax. The insects are first tied up in a leaf of the wood-oil tree. A number are then placed in a gourd-like receptacle. These are then packed into two large bamboo baskets, and carried suspended on the shoulders. Many thousands of insects are taken in this way by each man on a trip. The porters have to travel entirely at night with their delicate and precious loads, for the mid-day heat would be dangerous to the lives of the inmates, as it would have a tendency to develop them too fast. It is customary, as the season approaches when the wax messengers are due, for the various cities and villages along the route to leave the gates open, so as to afford free and unobstructed passageway to the carriers. Seen at night running with all their might, dressed in most cases in rainproof straw, their flickering lanterns swaying to and fro with the motion of their bodies, they form a weird and picturesque sight. On they go, traversing rocky paths and lofty ascents of the Sze-Chuan Mountains, never stopping until the break of day, when they huddle up under cover of a shady retreat, where their baskets can be protected from the heat. They then prepare their meals, and await the coming of the night to continue their lonely and tiresome journey. On reaching their destination they immediately go to their masters or other agents, who have been awaiting their arrival. The baskets of insects are forthwith distributed to the respective farmers, who proceed at once to place them upon the food plant. They are tied on the branches in small bags made of leaves, where the heat of the sun hatches them. Holes are made in the leaves of the bags in which they are enveloped with a blunt needle, so that the insects may find their way out. When first hatched they creep rapidly up to the leaves of the food plant, where they nestle for nearly two weeks. After this they begin to scatter, and crawl along the branches.



Female Wax-making Insect and Eggs.

Night Porter Carrying Wax-making Insects to Breeding Place.

The females, after a short period, begin to lay their eggs, and the males deposit white cocoons, which in time completely coat every branch and stem. It is the cocoon of the male which yields the wax. By the first of September the whole tree is literally covered with layers of pure white wax a quarter of an inch thick. This is a beautiful sight, and were it not for the temperature of the air, one might readily imagine there had been a recent snowstorm in the vicinity. The farmers cut off the branches, and scrape them. The material is heated, strained, and turned into molds of different sizes, becoming pure, white, and hard. The cultivation and preparation for market furnishes employment for a large number of industrial workers, who convert the wax into candles for house and street lanterns, also for the making of temple images and other articles connected with ceremonial worship. It is also used as a polish for furniture and for imparting gloss to silk. A tax tribute of this white wax from the Province of Sze-Chuan is sent every year to Peking. The whole output of the various wax farmers is estimated to amount to about $200,000 annually. It is said that the process is very old, over six hundred years or more, being handed down from one of the ancient dynasties.