

INSECTS THAT KEEP SLAVES, USE TOOLS

AND SEEM TO PLAN



Little Creatures that in Many Ways Act as Men and Women.

By Ellen Robertson-Miller.

There are some wonderful little people dwelling in our very midst, whose methods and maneuvers to get on in the world are usually unknown or ignored by us as we bustle through life intent on our own affairs.

When we do stop for a space and look about, however, we are certain to find these wee creatures quite as busy with their small undertakings as are we with our larger ones.

Have you ever seen a little insect mechanic using tools as it went earnestly about some construction work at hand? Do you know that there are other insects that keep trained servants to labor for them? They are never bothered by the servant-girl or hired-man problem, however, as their servitors are slaves and could not run away if they would.

Then there are other insect capitalists that own herds of "cows" and milk them regularly; certain species prepare the soil and grow crops of which they are fond, gathering them with seeming human intelligence at harvest time.

FOR example, there is the Pronuba moth but a half-inch in length, which possesses a faculty for doing remarkable things.

It is at night that she performs her strange mission, and we must watch the white yucca lily if we would see her at work.

She scrapes the pollen from this with her front feet and maxillary palpi, then holds it under her head with her tentacles while she visits the other stamens.

When she has secured a pellet the size of a pin's head she pierces the ovary of the flower with her long ovipositor, and lays her eggs in the midst of the embryo seeds.

But what does she want of the pollen dust? Ah, that is her secret, which we are about to discover.

Now that her eggs are laid, Madam Pronuba alights so that she can insert her uncoiled tongue and tentacles into the stigmatic opening of the pistil which leads to the ovary. As she does this she jams the pilfered pollen upon the style and so fertilizes the plant.

This insect is not the only winged visitor that helps to fertilize certain blossoms. There are other moths and butterflies, and bees as well, that do the same thing, but they are usually inveigled into the service by the promise of nectar, and probably are quite unconscious of the fact that their tipping obliges them to distribute the ripe pollen of their flower hosts.

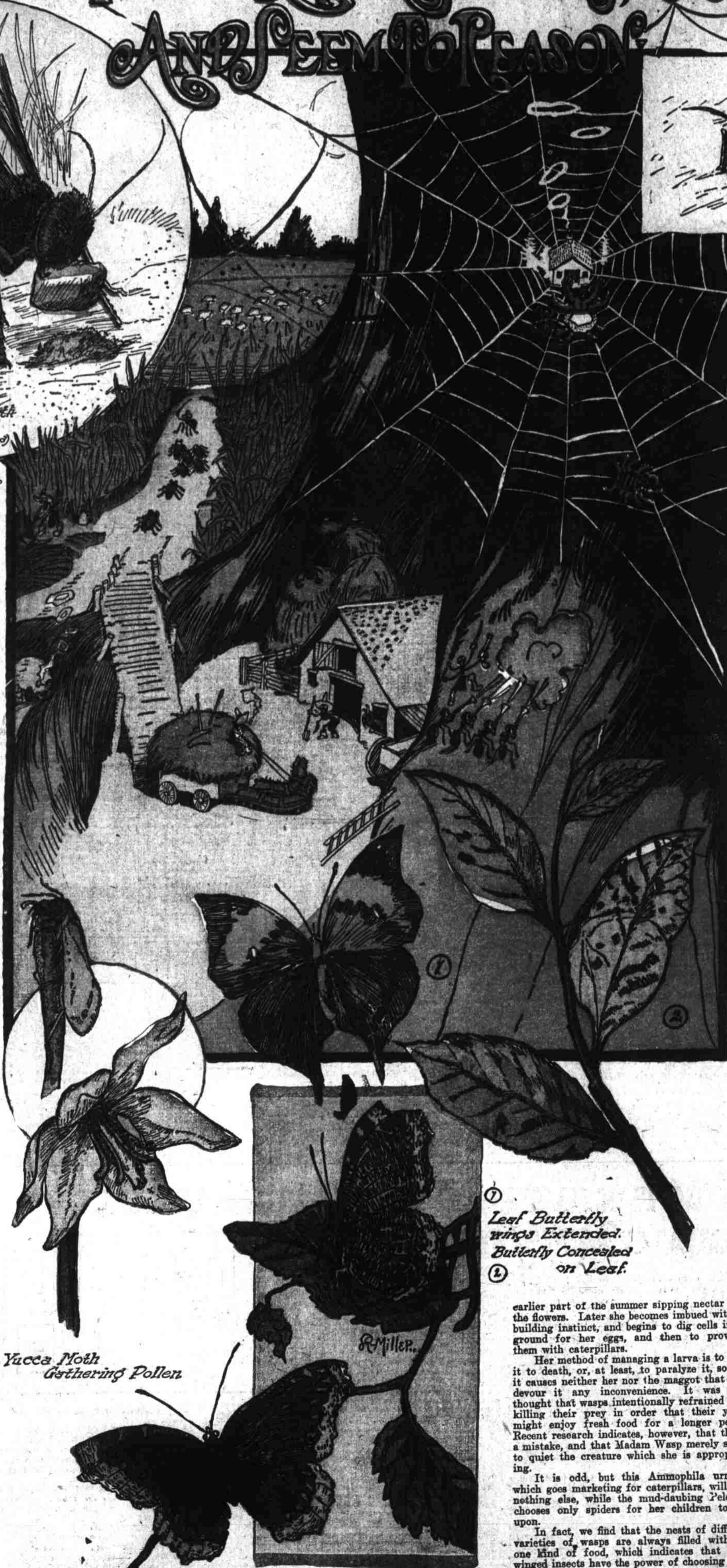
The yucca offers no treat to the Pronuba moth: still she comes unbidden, and intentionally, not accidentally, gathers the life-giving dust of the plant, places it upon the opening of the pistil, and so insures the ripening of the seeds.

Does she realize that without her aid these could not develop, and that her children in the ovary of the flower would then perish? For, strange as it may seem, a portion of the yucca seeds serve as food for the Pronuba larvae, while the remainder reproduce the plant.

How many of us ever consider the wasps as other than buzzing terrors to be avoided at all hazards? Still, when studied, we find that the work which they do is remarkable; much of it is performed instinctively, but these small insects at times show an intelligence almost beyond belief.

For instance, Professor and Mrs. Peckham once saw a solitary wasp, *Ammophila urnaria*, grasp a tiny stone in her mandibles and use it as a hammer to beat the earth into a smooth, hard surface above her completed nest. Here is an example of an insect using a tool.

We frequently find this wasp during the



urnaria, excavate tunnels in the earth leading to one or more cell chambers.

The *urnaria* workers build in our attics, under eaves, bridges, and such sheltered places. A single cell is laid up, ring upon ring, by the little mason. This is then stocked with spiders, and an egg is laid in their midst, after which the host is securely sealed, and, by degrees, others are added. When all are finished they are protected by a rough covering of mud before they are abandoned by the architect.

The *Eumene* fraters also works in clay, but in a very different manner. In fact, she might be called our prehistoric vase maker, for long before the first crude pottery was thought of she was busy modeling and hanging her we jars and jugs to the stems of convenient plants. But in that far-away time did she fill them with caterpillars as she does today?

If wasps are interesting, ants are still more so. Of course, we all know that an ant colony contains queens, males, workers, and soldiers. Then, in some nests, there are slaves also. For that slavery exists in the ant world is beyond question.

According to Sir John Lubbock, this custom was probably at first the result of having at different times an oversupply of hapless eggs, larvae and pupae in the nests, which hatched before they were needed for food, and that these stranger ants were suffered to remain and work for their captors.

We have a reddish ant which has become so dependent upon its slaves that it can no longer feed itself, make its own toilet, care for its young, or, in fact, perform any of the duties of the nest aside from fighting and laying eggs.

I once saw such a colony en route to its new home, and the black slaves carried not only the eggs, larvae and pupae of their mistresses, but the mistresses as well.

When we discover a colony in which there are two varieties of ants, it does not necessarily follow that one is servant to the other, as there is a very small ant with a very long name which persists in making its home in the walls of a larger ant, and greatly to its host's annoyance.

Our common garden ant is frequently found upon the stems and leaves of plants, hobnobbing with those was pests, the plant-lice or aphids. We soon learn there is a reason for this strange companionship.

These plant-lice have two honey tubes on their backs, from which a sweet liquid is exuded. The ants beg for this in quite a human way, and pay for the treat by guarding not only the aphids, but, in many cases, their eggs as well. The aphids are called the "cows" of the ants, and are often maintained in droves by the latter.

ANTS AS FARMERS

In the tropics there is a species of ant which cuts bits from green leaves, carries them to the nests, and piles them in a mass. When the mass decays the ants use it as a bed in which to grow a kind of mushroom, greatly prized by them as food.

A friend who once watched an army of these leaf-cutters told me that guards were stationed the length of the tree trunk, and that whenever an ant appeared with a dry or dead leaf, she was halted and turned back, apparently to do her work over, and that if she objected and refused to obey, she was ruthlessly killed and torn to pieces by the sentinels.

Another interesting species is the agricultural ant, found in Texas, Florida and other southern states. Dr. McCook, a noted authority on the subject, thinks it doubtful if these ants sow seed, but he is certain that they cultivate rice-grass, and harvest the grain, which they store in underground granaries.

The *Vanessa antiopa*, the cosmopolitan member of the butterfly family, is also a clever insect, which at times performs in quite a remarkable way as does the yucca moth, the *Ammophila urnaria* and the harvesting ants. But her efforts always seem to tend toward self-preservation rather than toward the preservation of her eggs or her friends.

The upper surfaces of this butterfly's wings are dark velvety brown, ornamented with violet spots, and an edge of dull yellow; but underneath they are very different, as we learn when we suddenly lose sight of a gay little rover which but a second before was flitting and frolicking about us in the spring sunshine.

This butterfly vanishes as if by magic, and then reappears as mysteriously, and we wonder how it was done, until we discover that it is a trick of the wings. Such a simple trick, too. The *antiopa* just closes them, and, presto! she vanishes into the background.

It is a case of protective coloration, for the under surfaces of the wings are mottled and blotched in grays and browns until they blend quite perfectly with the bark or earth where the insect usually alights.

The male *Vanessa antiopa* is said to have a trick all his own. During his courting days he manipulates his wings in such a manner that they produce "musical" tones. It is a pretty fancy, this of a butterfly's serenading his lady love. But I am still waiting to hear the melody.

To return to facts, however, there is in the East Indies a gorgeous butterfly, banded with orange and purple, which can, when occasion demands, slight among brown leaves and become so like them in appearance that the eye is rarely able to distinguish one from the other.

Yucca Moth Gathering Pollen

① *Leaf Butterfly wings Extended.*
② *Butterfly Concealed on Leaf.*

earlier part of the summer sipping nectar from the flowers. Later she becomes imbued with the building instinct, and begins to dig cells in the ground for her eggs, and then to provision them with caterpillars.

Her method of managing a larva is to sting it to death, or, at least, to paralyze it, so that it causes neither her nor the maggot that is to devour it any inconvenience. It was once thought that wasps intentionally refrained from killing their prey in order that their young might enjoy fresh food for a longer period. Recent research indicates, however, that this is a mistake, and that *Madam Wasp* merely stings to quiet the creature which she is appropriating.

It is odd, but this *Ammophila urnaria*, which goes marketing for caterpillars, will take nothing else, while the mud-daubing *Pelopaeus* chooses only spiders for her children to live upon.

In fact, we find that the nests of different varieties of wasps are always filled with but one kind of food, which indicates that these winged insects have the power of choosing what they consider best.

They also have inherited notions of how and when to build for the generation which is to follow them. One prefers decaying wood, one the stems of plants, others, like *Ammophila*

Conceals Itself by Closing Wings.