MISUNDERSTOOD BUSY SPIDER CHECKS MANY INSECT PESTS

He Spins His Web or Trap Instinctively, Without Learning How—Yet He Has the Dawning of a Mind and Captures the Moth as It Flies

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Few of us are devoted to snakes, few of us dote on centipedes, and one cannot say that there is a strong prejudice in favor of spiders. Yet spiders are fascinating in their works and ways. We like them almost in spite of themselves.

One of the few unwise things that Emerson did was to describe an improved earth in which there should be no spiders. A little natural history would soon have convinced him that the world without spiders would be unendurable, for it is by means of spiders that the insect scourge is kept in check. There is an old adage with much truth in it:

If you wish to live and thrive,
Let the spider run alive.

Spiders are not insects. They are no nearer to insects than reptiles are to birds. Spiders have no wings, while almost all insects have; yet spiders can make aerial journeys on the wings of the wind, borne by their silken parachutes. Spiders have no feelers or antennae, while all insects have, yet spiders speak to one another by vibrations. They have a sense of touch unexcelled in the whole animal kingdom. They have structures that take the place of feelers and are exquisite organs of tactility.

A spider has four pairs of legs, while an insect has three pairs. At the end of the spider's legs are curved toothed claws by which the spider can hold on to anything that has any roughness of surface. A spider often runs along the ceiling holding on to the plaster with these claws—a remarkable acrobatic feat, defying gravity.

A Spider's Equipment

While insects have three pairs of jaws, spiders have two pairs, and in their mouths is a part like a half-open penknife, at the base of which is a poison gland. All spiders are poisonous, and they poison their victims by nipping them with this knife-like weapon. A spider has a waist, suggesting the waist of a wasp, a narrow isthmus between head and breast, which are joined in one, and the posterior, body. Through that narrow waist, as narrow often as a wasp's, the food canal, the nerves and the blood vessel have to pass. All spiders have spinning glands also, from which comes a multiple jet of liquid silk.

Another peculiarity of spiders is that they hatch out as fully-formed young spiders, whereas most of the insects emerge from the egg as grubs, caterpillars or some other form of larvae. But out of the spider's egg there comes a creature that has simply to grow and moult to become a full-sized spider.

Just as we cannot understand hive bees without knowing something about wax, or wasps unless we understand the paper of their beautiful hanging houses, so we cannot understand the spider unless we know something about silk, for all spiders are silk producers. This silk is a liquid. It is exuded from a large number of small glands in the posterior part of the spider's body. It comes out as a liquid jet, which hardens instantaneously on exposure to air. Out of that liquid silk the spider makes all sorts of contrivances. It is always paying out a drag line of silk as it moves on difficult journeys. If a spider is creeping along the ceiling and its footing gives way, instantly it presses its spinning arms against the whitewash and so can sink with dignity to the ground, paying out a rope of silk. Sometimes it changes its mind when half-way down and turns again and climbs up the rope, winding in the silk as it ascends. Every spider has this power of paying out a drag line.

The drag line is of the same material as the nest lining, the snare, the web and the cobweb, which is a low-grade web without any geometrical pattern. We admire the web of a garden spider and wonder how such a beautiful and effective thing could be evolved. When we notice the drag line, the threads about the nest, the tangle of the snare, the untidy cobweb and the simple webs, we see by how long a process of evolution the orb web has become possible. The drag line is the foundation of all.

One use spiders have for their silk is to make a cradle for the young. They wrap up the eggs in a silken bag, a cocoon. The cocoon of an insect is the enclosure that the larval insect makes for the time of the great metamorphosis when the caterpillar changes into a butterfly. But the cocoon of a spider is quite different. It is a silken bag for holding the eggs and by and by the young spiders. Sometimes the threads of silk are used as a parachute by means of which the small spiders are wafted for miles through the air. Darwin records in his "Voyage of the Beagle" that the ship's rigging was covered with little spiders sixty miles off the coasts of South America. These aeronauts had been borne on the wind many leagues over the sea before they came to rest on the ship.

The spider makes its web by instinct; that is to say, without any experience, without any apprenticeship, without any learning. That is the mystery of instinct. The web is made true to pattern the very first time the spider tries, true to the particular patterr of that particular species. It can be made in the course of an afternoon or in less time. It can be made in the dark.

In making an ordinary web the spider first lays the foundation lines, often four in number; and these are made particularly strong, for they are used over and over again. Next the spider starts from the middle of the top foundation line and drops to the middle of the lower foundation line, paying out a line of silk, and pulls that taut. Then it climbs up that line, pauses for a moment in the middle, begins to pay out another line, walks along the upper foundation line to the right-hand corner and pulls the third ray taut. Then back again to the centre, down the lower half of the central ray, away to the lefthand corner, paying out the lower drag lien and tightening it. So it goes on from side to side until the rays of the web are like the spokes of a wheel.

Now the spiner goes to the centre of the web and with pecular strides swings from ray to ray, paying out what is called the primary spiral, which is not viscid, but is just the scaiolding. When it has completed the primary spiral, which binds all the rays together, it starts at the circumference and with a different kind of swinging movement it makes the second spiral, the sticky spiral, the spiral that forms the snare for the insects. Being very economical, as it makes and completes the secondary spiral it eats up the primary spiral, the scaffolding that made the second spiral possible. In the making of an ordinary garden spider's web there are these four chapters: Laying the foundation lines, making the rays, making the primary spiral and making the viscid secondary spiral.

An Architect by Instinct

There are three things to notice about the web. First, it is made very quickly; often it is made every day, just as a part of the day's routine, though the foundation lines are used over and over again. Second, each kind of spider, if it makes a web at all, makes it of a particular pattern. Every species has its own architecture. Third, the web is not the product of intelligence—there is no hope in that theory—but is made instinctively, without learning, without training, though it may be adjusted to difficulties or to situations by a spice of judgment.

In spiders the sexes usually differ greatly in size. Ordinarily the male is a pigmy compared with his mate. The disproportion is almost incredible. It is as if a man six feet high were to marry a woman the height of a church steeple or as if a man weighing 160 pounds were to mate with a woman weighing 200,000 pounds.

In the breeding season these pigmy mates, which have no end of pluck, often meet together in little companies and fight. They fight like those birds that used to breed in Britain, the ruffs, whose mates are called reeves, that are still visitors to the Norfolk Broads. The combats of the ruffs have often been described, and similar combats occur among spiders. They fight and fight, hour after hour, but at the end there is no wounded warrior. Their duels are like those of politicians—most vigorous and spirited, but no blood is drawn.

Courting Under Difficulties

The male spider's courting has to be done with care. He may show off his good points of color and agility; he may dance around his desired mate, sometimes a hundred times, at a great rate, or he may in other ways—for instance, by twirling one of the threads leading to the web on which he is sitting—indicate his intentions. But the female has a capricious temper, and what begins playfully and pleasantly often ends in a death when she makes a rush at him.

But, while the female spiders are cross-grained as sweethearts, they are devoted as mothers, unsurpassed in care for the young. The eggs, wrapped up in beautiful silken bags, are hidden under stones or among the twigs of a bush, or under loose bark. Sometimes the mother spider is still more careful and carries her cocoon about with her, holding it firmly and binding it to her body with silken threads. If you take away the silken cocoon, about the size of a pill, from the mother, and put it at a slight distance, you may see her search about. She is very short-sighted; she gropes and feels for the lost cocoon. If you give it to her again, she trundles it under her body and off she goes.

One mother spider makes a trap-door nest, a wonderful contrivance common in the south of France, a deep shaft sunk in the ground, lying smooth, plastered smooth and fitted with a lid with a silken hinge. All that trouble is not for a house for her but for a cradle for the young ones. Another clever mother is the inimitable water spider. She makes a web underneath the water and fills it with dry air, and in that diving bell, as in a dome, she lays her eggs and brings up her young.

Can one understand anything about the mind of the spider? It is peculiarly difficult for man, who is a creature of intelligence, to get psychologically near a creature whose whole life is dominated by instinct. Spiders make their web, their trap-door, their diving bell instinctively. We know that because they do it perfectly the very first time, and also because of another impressive fact: if we interrupt them when they are in the middle of their building operations they are strangely nonplused, quite unlike a dog or a cat that appreciate intelligently the relations of things. The spider is puzzled and often has to begin again at the beginning, like a child repeating a piece that it has learned by rote and does not very well understand.

Yet the spider has the dawning of mind. If you give it a tempting fly that has been dipped in turpentine it eagerly snatches at the food, but soon rejects it. Give it half an hour to forget and try again with the turpentined fly. The instinct is too strong; the spider rushes forward, seizes the prey and rejects it again. Give it an hour and it will repeat the process. But after three or four times no more turpentined flies for that spider. It has mind to the extent that it can profit by experience. Next day it will have nothing to do with flies that look like the turpentined fly.

It is hard to believe that some of the things that spiders do are not actuated by reason. In Queensland, Australia, lives a fine spider called the Magnificent—the female is like a bit of rainbow. This spider makes no web but still has a way of getting its food. It lowers itself from a twig on the end of a thread about three inches long, then puts out a short thread about an inch long, with a viscid drop at the end. When a moth comes flying past in the disk the spider casts for it with the viscid globule and draws it in as a fisherman lands a bass. The trick is so wonderful one feels it must have a little intelligence behind it.

Jinks: "If you drop knives and forks it means company's coming." **Binks:** "If you miss them, it means they're gone."

Familiar Leo Will Soon Be Heard Say "Hello Folks"

HOLD YOUR EARS, LEO IS GOING TO GO INTO THE [illegible]

Leo, famous trademark of Metro-Goldwyn-Mayer pictures, has become a familiar movie figure wherever pictures are screened. His well-known roars, hitherto silent, are now being recorded for talking devices, so it will be "See and Hear Leo"

New Sources of Rubber Located by Exploration in Madagascar

Washington — Twenty-three plants believed to be potential sources of rubber are among botanical specimens which Dr. Charles F. Swingle of the U.S. Department of Agriculture recently brought from Madagascar.

Dr. Swingle is the first American to visit the island on a plant-hunting exploration. His trip was made possible through the co-operation of the bureau of plant industry with the Arnold Arboretum of Boston, the University of Algiers, and by the friendly interest of the French and Madagascar governments.

Ten of the plants are being commercially exploited for rubber at the present time in Madagascar, Dr. Swingle says. Some of them have already been introduced into the United States and are being tested in the department's experiment garden in southern Florida.

Another plant which promises to be of economic importance is the alombora, a large leguminous tree which produces "leety," a gum used in varnish manufacture. Numerous ornamental plants, shrubs, vines and trees are included in the collection, among them a number of specimens of elephant's foot, several aloes and a rare hibiscus-like shrub.

A duplicate set of the collection was left at Tananarive as a "nest egg" to serve for replacing in case of loss or injury to the collection during its long journey to the United States. Another duplicate set was sent to the University of Los Angles.

Although Dr. Swingle was finding new rubber plants that may enable the rest of the world to continue to "ride on rubber," he was not so fortunate at all times in his own mode of travel. In the southern part of the island where most of his time was spent, transportation was extremely difficult. Although some of the trip was made by automobile, at times it was necessary to use the "filanzana," a sort of sedan chair swung on two poles carried by four natives. With the baggage carriers and guides the party on the march consisted of 40 or 50 men and 30 miles was a good avrs'l tyad .e bis-Nngelesingshrdnn day's travel.

The Baby Teeth

A Series of Articles of Interest to all Mothers, Young and Old Particularly Young

How many should there be? "Ten little fingers and ten little toes"—making twenty in all—and there you have their number. Easy to remember, isn't it?

And when should you begin to look for them? About the sixth or seventh month.

And which comes first? As a rule, the lower front tooth, the central incisor.

So after all baby's fretfulness he has a brand new tooth or two—so white and so sound they look that you never give a thought to future tooth troubles.

Then the other eighteen or nineteen white coated little "millers" will follow at somewhat regular intervals until Sonny is two years old, when he should have his full temporary set.

These are the temporary or deciduous teeth—being known also as the "milk teeth", from which you will be aware, of course, that they won't be retained right through adult age. They should all remain in place, however, until about the seventh year, when, through the natural process of shedding, they commence to be lost.

Then, as the time approaches for the eruption of the second set, unless the first teeth are sufficiently separated in front to allow one or two thicknesses of blotting paper between them, the arches have not properly expanded and the second set is certain to be crowded and irregular. In such case, the family dentist should always be consulted.

Since Sonny is going to lose these small teeth in good time and get a nice new set, why bother to care for them?

Well, little Sonny does not want a tooth-ache any more than do you—and for several other good reasons, of which more to follow.

A Foolish Stunt That Should Be Stopped

STUNT RIDER FORCES MOUNT THROUGH FLAMES

At a Mexican rodeo held in Ascot Park, Los Angeles, Captain Claus Pitt staged this daring and spectacular ride through flame and smoke on his horse "Red Head"

Killing On High Seas Involves 4 Nations

The United States Deports to Brazil Sailor Who Caused Death of Norwegian on Swedish Vessel

A story of manslaughter on the high seas, which started with the quarrel of two sailors over a shaving brush and has caused international complications, has now been brought to an end, through the extradition recently to Brazil of Francesco, alias Manuel De Lima, a nineteen-year-old oiler on the Swedish steamer Liguria of the Swedish Lloyd line.

The events date to Aug. 23, last year, when the steamer was thirty-six miles off Ambrose Light, Port of New York, according to statements made by witnesses at the time. Lima was shaving on deck when Olaus Monson, to have a drink of water and saw that his shaving brush was being used. He took the brush from Lima, but there was no quarrel. Later the two men had breakfast together. Afterward, however, they were found fighting, witnesses said, and Lima struck Monson so severely with an iron bar that he died from internal injuries the following day. Before his death Monson gave his version of the row. De Lima, on his part, maintained he had been persecuted by his fellow-sailor. He admitted the blow. A preliminary hearing was held on board the steamer by the Assistant United States Attorney. The Brazilian sailor was arrested and placed in jail in Brooklyn.

Olof H. Lamm, Swedish Consul General in New York, sought immediately to have De Lima sent to Sweden to be tried there, as the crime was committed on board a Swedish steamer on the high seas. At the same time the Swedish Legation in Washington communicated with the Secretary of State and asked for De Lima's extradition.

The case was referred to Extradition Commissioner William J. Wilson of the Federal Court, Eastern District of New York, who decided that the extradition treaty between the United States and Sweden was not applicable. Shortly afterward the Department of Labor deported De Lima to Rio de Janeiro.

It seems likely now that the Swedish and Norwegian authorities will seek to have De Lima tried before a Brazilian court. Manuel de Barros, Consul General for Brazil in New York, has taken charge of the case.

Britain's "Safety Glass"

It is Bullet-Proof and Non-Discolorable, Laboratory Tests Show

In describing the new "safety glass," which is asserted to be "non-splinterable, non-discolorable and non-inflammable," and which was recently patented by an English firm, The London Daily Telegraph notes some of the tests to which it has been subjected and its appearance as follows:

"Tests at Faraday House Testing Laboratories have been made of the new glass. Subjected to a powerful mercury vapor lamp for twenty-four hours it showed no discoloration, although the temperature of the glass when under test was about 77.7. When service revolver bullets were fired at the glass at distances of ten and twenty-five yards the glass was pulverized to a depth of 1.32 of an inch only.

"In appearance it is almost identical with ordinary glass. It can be made in any shape or size (within the limits imposed by the protective raw materials) and in any thickness, from that of the finest optical glass to that of bullet-proof glass.

"The facts that 'xetal' is not made with the ordinary celluloid (nitro-cellulose) which upon exposeure to the sun's rays becomes discolored even in temperate zones, and that it is not inflammable, are advantages claimed for it by its manufacturers."

Britain Plans Curb on Forced Labor

Gradual Elimination of Service in Kind in Tropics is Aim of Dominions Secretary

London—The Dominions Secretary, L. C. M. S. Amery, at a League of Nations Union conference on forced labor here, referring to the survival of this institution in Africa, said the question was how gradually to limit and in time eliminate, those forms of customary service in kind. He referred particularly to public roads and drainage works, on which service in kind is still held indispensable in some backward areas.

The Colonial Undersecretary, William A. Ormsby Gore, said forced labor had been eliminated practically everywhere in British territory outside of tropical Africa and its main use to-day, whether for native or protectorate governments, was in connection with roads.

He claimed that conditions under which compulsory labor was resorted to by British administration were comparatively free from abuses.