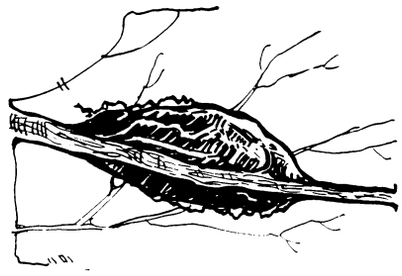
BIOLOGY

NATURE RAMBLINGS



Cocoons

➤ THE SEASON has arrived when children become interested in cocoons. They bring these familiar fall and winter fruits into the schoolroom on the twigs where they have found them, or even better, they capture late-feeding caterpillars (the bigger and fatter the better) and keep them captive until they decide to spin themselves in for the winter.

The spinning of the cocoon by a caterpillar, and the strange process that goes on inside it, whereby through a death-like sleep the unlovely and wingless worm acquires wide pinions and shimmering colors, was a great mystery to the ancients, and indeed is pretty much of a mystery still. This strange long sleep of the caterpillar-becoming-a-moth is one of the most outstanding facts of natural history, and yet, in spite of all the attention that has been bestowed upon it, one of the least understood.

In one way, the spun-in larva is as though dead, for it can not be aroused from its sleep even if the silken cover is cut away and all sorts of rough stimuli applied. But this dormancy is not torpor. The creature is most intensely alive, and except when the temperature is at freezing, all sorts of changes in bodily structure are vigorously taking place.

If we cut open a cocoon we shall find inside neither caterpillar nor moth, but a brown, varnished-looking chrysalis, that looks more like the mummy of an insect than like the half-way station from grub-hood to glory. The caterpillar, or larva, has become a chrysalis, or pupa. The gross, soft bulk of the larval body has condensed, hardened and shrunk into the brown, tough, apparently dead creature that looks like a half-finished insect, partly baked and then tossed aside as not good. It is a half-finished insect, but by no means tossed aside. Folded up in this brown lump are all things necessary for full existence as an adult insect, and within that unprepossessing brown case further changes are taking place.

The head is well marked, with the projections for the eyes on either side and a bulge in front where the coiled tongue will be. The legs are very distinct indeed, folded closely across the chest. It is a little difficult to figure out how the large, flat, stiff wings can get out of the two small back-packs; but whoever has ever seen a butterfly emerge from its cradle will remember that the wings are all soft and rumpled at first, like wet paper. The extension and stiffening come later.

Not all caterpillars spin complete cocoons. Many of them can be found as chrysalises in mere scanty webs that hardly conceal them, and some kinds hang totally naked by a single thread.

All the gorgeous costume of the mature moth is being fabricated out of the stored-up material which the gluttonous caterpillar stuffed into itself during its long summer feast.

Science News Letter, September 1, 1951

BIOLOGY

Radioactive Atoms Show Food Moving in Sugar Cane

➤ THROUGH THE use of radioactive carbon dioxide, scientists at the Hawaiian Sugar Planters' Association Experiment Station in Honolulu have been able to trace the movement of food through sugar-cane plants.

The radioactive material was fed to a single leaf and its progress through the plant was checked with Geiger counters.

Within 20 hours after feeding, food manufactured by this leaf was found to have moved to blades in other stalks of the plant. In 44 hours, 94% of the material had left the blade from which it had originated. All but three per cent had moved out within eight days.

Although the greatest amount of material had moved to the stalk immediately below the joint to which the test blade was attached, some had found its way to old joints. This disproves the theory that active storage takes place only in joints to which leaves are attached.

It was also found that different stalks within the plant received varying amounts of the food manufactured in the test leaf. The variation was not related to the size of the stalk, indicating, according to the experimenters, "that there must be some internal physiological factors determining distribution."

On the basis of these experiments, it is estimated that the minimum rate of movement of food within the plant is about 1½ feet per hour.

Experimentation with the radioactive carbon, obtained from Oak Ridge, was begun several years ago. Earlier tests proved that green leaves can form cane sugar by adding together the two simple sugars, glucose and fructose.

Science News Letter, September 1, 1951

NUTRITION

Probe Odd-Shaped Eggs

➤ WHAT CAUSES all those crazy-shaped, odd-sized eggs the farmers can't sell? Is it heredity, handling, temperature, humidity—or some factor not yet known?

That's what poultry experts at the University of California are trying to find out.

Investigations to date indicate that abnormal eggs often follow certain diseases but sometimes the cause of egg damage can't be determined. Some of the eggs show severe reduction in size, odd shapes, thin, rough or wrinkled shells, abnormal air cells or free-floating air bubbles, completely watery egg white and egg white containing floating whitish particles.

Some birds lay eggs with only one or two of these defects, while the eggs from others may show most of these characteristics. The duration of damage varies also.

The damaged eggs may be so poor in quality and grade that they have little market value, though actually they are satisfactory for human consumption.

Egg damage is known to occur in flocks after recovery from pneumoencephalitis (Newcastle disease). This is true also following the use of certain vaccines. However, this is true only if the infection or vaccination occurred when the flock was in production.

Damage also has been observed to occur following infectious bronchitis in a laying flock. Severe damage to egg quality also has followed an attack of coryza, another respiratory disease, and also seems to occur when there is no history of respiratory disease of any sort.

Science News Letter, September 1, 1951