

ENTOMOLOGY

Real Insect "Miracle"

► THE REAL "miracle" of insect life is the unseen change of a butterfly to a caterpillar, not the visible transformation of the rather ugly caterpillar to a beautiful winged insect.

This is the conclusion of Dr. R. E. Snodgrass, collaborator of the Smithsonian Institution and the U. S. Department of Agriculture.

Because the change of caterpillar into the butterfly can be seen and is an event re-enacted every generation, it is often pointed to as a startling example of metamorphosis, or the transformation of one creature into another.

The real metamorphosis, Dr. Snodgrass has reported in "Insect Metamorphosis" (see SNL, April 17, p. 252), is that unseen one "which has changed a young butterfly into a caterpillar." The visible metamorphosis of the caterpillar into the butterfly is merely the return of the changed young to the form of its parents, he concludes.

In some way not yet fully understood, the insect egg of the butterfly becomes two individuals, each independent of the other, and each of which is born, leads its own life and dies. The cells that are eventually to become a butterfly remain dormant and undeveloped during the caterpillar's life cycle.

Two sets of hormones, those of the caterpillar and those of the butterfly, appear to control the development. First and most important of these biological chemicals to come into play is the "youth hormone," known to be secreted from glands located near the brain. The youth hormone, and probably others yet unknown, govern the caterpillar's development.

As the caterpillar nears the end of its normal life span, the previously dormant butterfly hormones take over. They influence the butterfly cells in the caterpillar body to become the wings, pigments, eyes, etc., of a flying insect. The youth hormone, however, remains to regulate the butterfly's egg-laying functions.

Passage through the worm-like stage is not a telescoping of evolution, Dr. Snodgrass points out. In its evolutionary history, the butterfly never went through a larval stage, and the first insects on earth, at least 300,000,000 years ago, laid eggs from which hatched organisms very similar to their parents.

Although these insects were immature at birth, anyone who saw them would know that they were young insects, not young caterpillars.

"In attaining their present distinctive forms, the butterfly has followed out the evolutionary path adopted by its adult ancestors, and therefore represents the adult line of descent," Dr. Snodgrass states. "The caterpillar, on the other hand, in its evolution has departed from the ancestral path and has become a new and distinct juvenile form of its species.

"Since the caterpillar leads an independent life in a very efficient manner as an individual, it would seem that it might be capable of developing its reproductive organs to maturity and thus dispensing with the butterfly stage entirely."

This has not happened, Dr. Snodgrass concludes, because the butterfly can distribute eggs for the next generation of caterpillars over a wide area, thus preventing overpopulation in any one place.

Science News Letter, June 19, 1954

HEMATOLOGY

New Clotting Factor Extracted From Blood

► A POTENT new clotting factor in blood has now been extracted in purified form. It should aid treatment of bleeders who suffer from a lack of this substance.

The factor is called PTF-B, short for plasma thromboplastin factor B. It is different from PTF-A, or plasma thromboplastin factor A, which is the antihemophilic factor in blood.

From 10% to 20% of all patients thought to be suffering from hemophilia, the hereditary bleeders' disease, probably suffer from a deficiency of this newly discovered PTF-B, Dr. Paul M. Aggeler of the University of California School of Medicine estimates.

PTF-B was discovered by Dr. Aggeler and associates in 1952 in a 16-year-old boy, Kent Kincaid of Walnut Creek, Calif. Almost from birth young Kincaid suffered from internal bleeding that could only be controlled by blood transfusions.

At first, doctors thought he had hemophilia. Later, this diagnosis was doubted, especially as the anti-hemophilic globulin of blood was useless to stop his bleeding. At that time he needed two pints of plasma every two weeks.

PTF-B, Dr. Aggeler reports in *Science* (June 4), is found in the beta 2 globulins of blood plasma.

The latest findings were made with Drs. Theodore H. Spaet and Byron E. Emery, in studies at the University of California and Stanford University and the Veterans Administration Hospital in San Francisco.

Science News Letter, June 19, 1954

PSYCHOLOGY

Gulls Prefer Super-Egg

► BY EXPERIMENTS conducted with a flock of wild herring gulls, scientists were able to make an artificial super-egg that the female would sit on in preference to one that she herself had laid.

The super-egg is larger than the natural egg, and has more small spots. The spots are closer together and the contrast in color between spot and background color is increased.

The experiments were reported to the International Congress of Psychology meeting in Montreal by Prof. G. P. Baerends, zoologist of the University of Groningen, the Netherlands.

The preferences of the gulls were studied, Prof. Baerends said, by watching the wild gulls from a blind. The scientists would put an artificial wooden egg on the edge of a bird's nest and then observe the bird's behavior on its return to the nest. A meas-

ure of the value placed by the bird on a particular egg was found in what the bird did to try to save an egg that had fallen out of the nest.

A female bird may react to an egg in either of two ways, Prof. Baerends pointed out. She may eat it, or she may try to sit on it.

There are some birds who do not seem to care about the size or spottedness of the egg. They make their selection by chance. These are the individuals who are not afraid, but who are very broody.

Contrasted with these are the birds who show signs of alarm and whose impulse to incubate is weak. These birds pick the eggs that are less desired by other birds.

Some birds are influenced by the position of the egg rather than by its size or spottedness.

Science News Letter, June 19, 1954

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