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Class-X

English

Footprints without Feet

Chapter-6



Robert W. Peterson

The Making of a Scientist

Part - 1

Neha Rajvanshi

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BEFORE YOU READ

- Richard Ebright has received the Searle Scholar Award and the Schering Plough Award for Biochemistry and Molecular Biology. It was his fascination for butterflies that opened the world of science to him.

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Cell : कोशिका



AT the age of twenty-two, a former 'scout of the year' excited the scientific world with a new theory on how cells work. Richard H. Ebright and his college room-mate explained the theory in an article in the Proceedings of the National Academy of Science.

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It was the first time this important scientific journal had ever published the work of college students. In sports, that would be like making the big leagues at the age of fifteen and hitting a home run your first time at bat.

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String : शृंखला

For Richard Ebright, it was the first in a long string of achievements in science and other fields. And it all started with butterflies.

An only child, Ebright grew up north of Reading, Pennsylvania. "There wasn't much I could do there," he said.

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Determination : दृढ़ निश्चय

"I certainly couldn't play football or baseball with a team of one. But there was one thing I could do — collect things."

So he did, and did he ever! Beginning in kindergarten, Ebright collected butterflies with the same determination that has marked all his activities.

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Fossils : जीवाश्म







He also collected rocks, fossils, and coins. He became an eager astronomer, too, sometimes star-gazing all night. From the first he had a driving curiosity along with a bright mind. He also had a mother who encouraged his interest in learning.

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Equipment : उपकरण







She took him on trips, bought him telescopes, microscopes, cameras, mounting materials, and other equipment and helped him in many other ways. "I was his only companion until he started school," his mother said. "After that I would bring home friends for him.

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But at night we just did things together. Richie was my whole life after his father died when Richie was in third grade."

She and her son spent almost every evening at the dining room table. "If he didn't have things to do, I found work for him — not physical work,

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but learning things," his mother said. "He liked it. He wanted to learn."

And learn he did. He earned top grades in school. "On everyday things he was just like every other kid," his mother said.

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Species : प्रजातियाँ

By the time he was in the second grade, Ebright had collected all twentyfive species of butterflies found around his hometown.

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Species and Sub-species of Butterflies Collected in Six Weeks in Reading, Pennsylvania

Gossamer-Winged Butterflies

- white M hairstreak
- acadian hairstreak
- bronze copper
- bog copper
- purplish copper
- eastern-tailed blue
- melissa blue
- silvery blue

Wood Nymphs and Satyrs

- eyed brown
- wood nymph (grayling)

Monarchs

- monarch or milkweed

Brush-footed Butterflies

- variegated fritillary
- Harris's checkerspot
- pearl crescent
- mourning cloak
- painted lady
- buckeye
- viceroy
- white admiral
- red-spotted purple
- hackberry

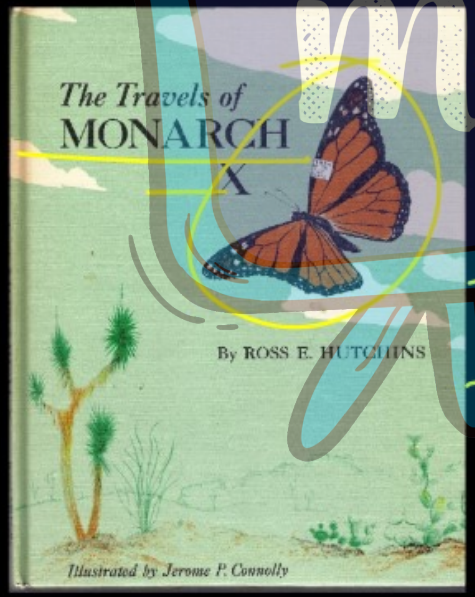
Snout Butterfly

Whites and Sulphurs

- olympia
- cloudless sulphur
- European cabbage

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"That probably would have been the end of my butterfly collecting," he said. "But then my mother got me a children's book called The Travels of Monarch X."

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Migrate : पलायन करना

That book, which told how monarch butterflies migrate to Central America, opened the world of science to the eager young collector.

At the end of the book, readers were invited to help study butterfly migrations.

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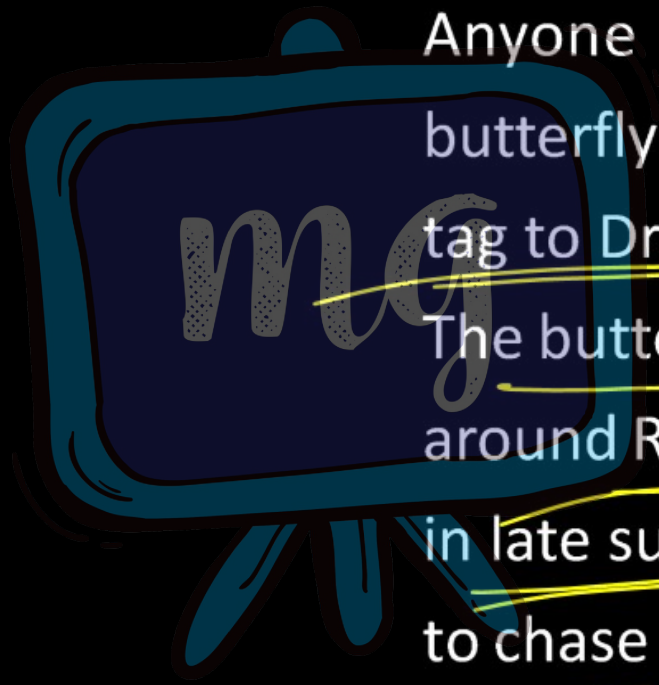
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They were asked to tag butterflies for research by Dr Frederick A. Urquhart of the University of Toronto, Canada. Ebright's mother wrote to Dr Urquhart, and soon Ebright was attaching light adhesive tags to the wings of monarchs.

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Anyone who found a tagged butterfly was asked to send the tag to Dr Urquhart.

The butterfly collecting season around Reading lasts six weeks in late summer. If you're going to chase them one by one, you won't catch very many.

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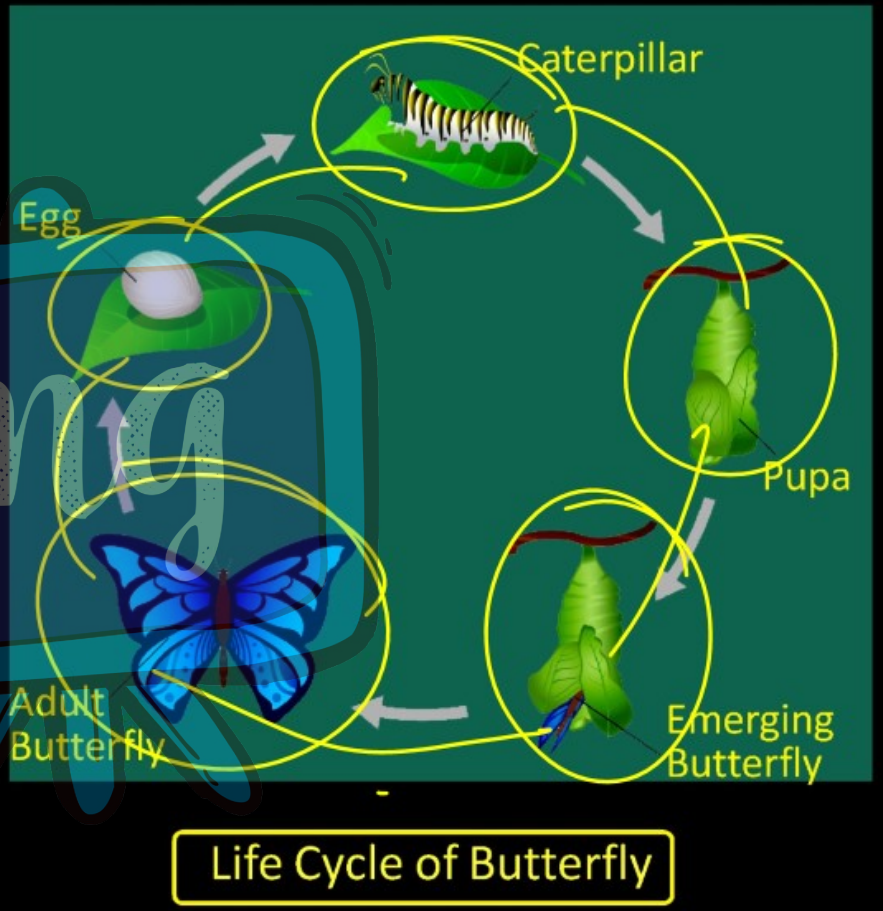
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Flock : समूह

So the next step for Ebright was to raise a flock of butterflies. He would catch a female monarch, take her eggs, and raise them in his basement through their life cycle, from egg to caterpillar to pupa to adult butterfly.

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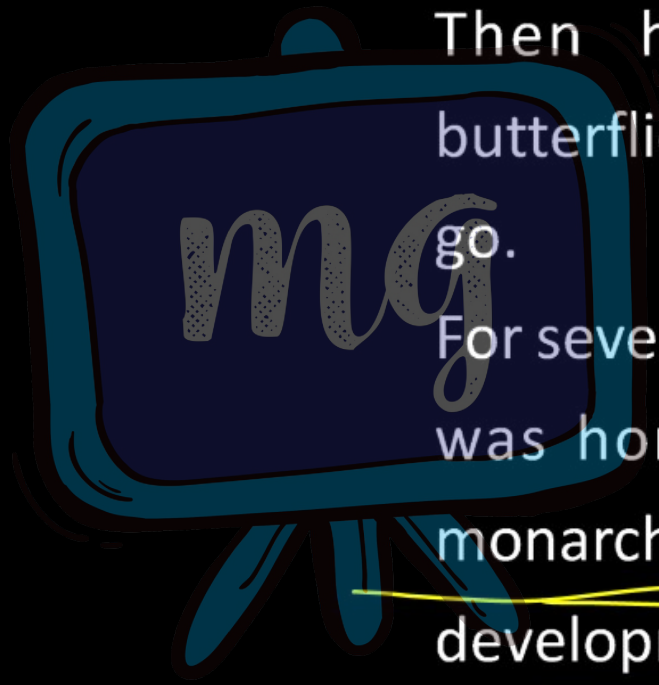
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Life Cycle of Butterfly

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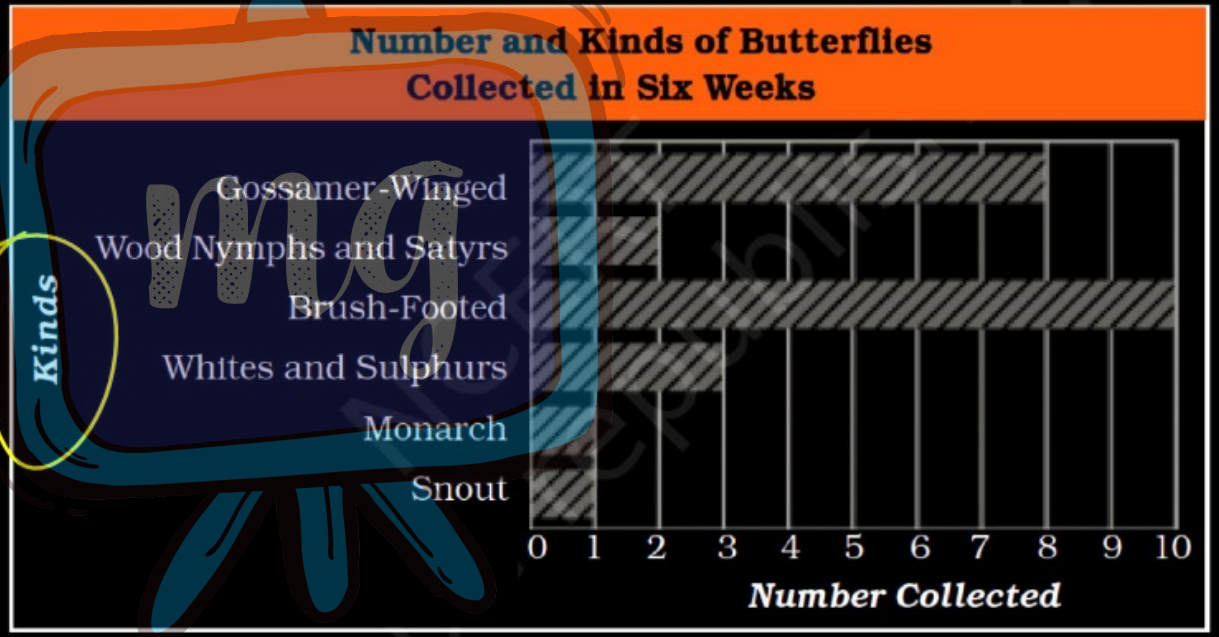


Then he would tag the butterflies' wings and let them go.

For several years his basement was home to thousands of monarchs in different stages of development.

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Eventually : अन्त में
Tedious : थकान भरा

"Eventually I began to lose interest in tagging butterflies. It's tedious and there's not much feedback," Ebright said. "In all the time I did it," he laughed, "only two butterflies I had tagged were recaptured — and they were not more than seventy-five miles from where I lived."

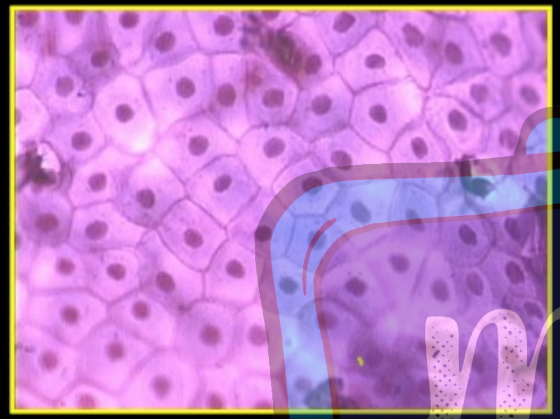
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Then in the seventh grade he got a hint of what real science is when he entered a county science fair — and lost. “It was really a sad feeling to sit there and not get anything while everybody else had won something,” Ebright said.

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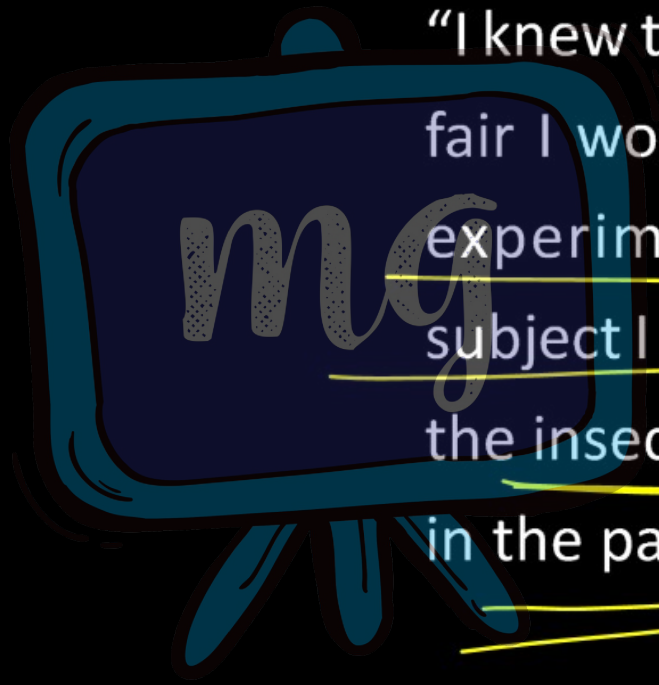


His entry was slides of frog tissues, which he showed under a microscope. He realised the winners had tried to do real experiments, not simply make a neat display.

Already the competitive spirit that drives Richard Ebright was appearing.

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"I knew that for the next year's fair I would have to do a real experiment," he said. "The subject I knew most about was the insect work I'd been doing in the past several years."

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Stack : ढेर

So he wrote to Dr Urquhart for ideas, and back came a stack of suggestions for experiments. Those kept Ebright busy all through high school and led to prize projects in county and international science fairs.

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Cause : कारण



For his eighth grade project, Ebright tried to find the cause of a viral disease that kills nearly all monarch caterpillars every few years. Ebright thought the disease might be carried by a beetle. He tried raising caterpillars in the presence of beetles.

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"I didn't get any real results," he said. "But I went ahead and showed that I had tried the experiment. This time I won." The next year his science fair project was testing the theory that viceroy butterflies copy monarchs.