# The Necklace

## Summary of the Chapter

Richard H. Ebright published theory of how cells work in an article in the proceedings of the National Academy of Science at the age of twenty two.

Richard H. Ebright grew up in reading in Pennsylvania. There he was not able to do anything. He was not able to play football or baseball too. But he said that there he could do one thing – collect things. So he collected things.

In Kindergarten, Ebright collected butterflies. He also collected rocks, fossils, and coins. He would observe sky at night too. He would live with his mother, who encouraged his interest in learning. She would take him on trips, bought him telescope, microscope, cameras, mounting materials, and other materials required for learning. He lost his father when he was in third grade. Her mother would call him Richie. Her mother would discuss with him every night and give him mental exercise instead of physical exercise which he wanted to learn.
By the time he was in the second grade, Ebright had collected all twenty five species of butterflies found around his hometown.

Richard said that this would have been end of his butterfly collection. But her mother gave him a children's book called "The Travels of Monarch X". That book, which told how monarch butterflies migrate to Central America, opened the world of science to Richard.

At the end of book readers were invited to help study butterfly migration. They were asked to tag butterflies for research by Dr. Frederick A. Urquhart of the University of Toronto, Canada. Anyone who found a tagged butterfly was asked to send the tag to Dr. Urquhart.

If you tried to catch them one by one, you won't catch very much. So Richard rose 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. 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.

In got a hint of what a real science is when he entered a county science fair, and lost. He said that, it was a sad feeling to sit there and not get anything while everybody else had won something," Ebright said. His entry was slides of frog tissues, which he showed under a microscope. He realized that winners had tried to do real experiments. And he decided that for the next year, he has to do something extraordinary than others. So he asked to Dr. Urquhart for suggestions and back came a stack of suggestions.

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. So he rose caterpillars in the presence of beetles. But he didn't get any real result. But he went ahead and showed that he had tried the experiment.

The next year his science fair project was testing the theory that viceroy butterflies copy monarchs. The theory was that viceroys look like monarchs because monarchs don't taste good to birds. Viceroys, on the other hand, do taste good to birds. So the more they look like monarchs, the less likely they are to become a bird's dinner. Ebright's project was to see whether, in fact, birds would eat monarchs. He found that a starling would not eat ordinary bird food. It would eat all the monarchs it could get. (Ebright said later research by other people showed that viceroys probably do Copy the monarch.) This project was placed first in the zoology division and third overall in the county science fair.

In his second year in high school, Richard Ebright began the research that led to his discovery of an unknown insect hormone. lndirectly, it also led to his new theory on the life of cells. The question he tried to answer was simple: What is the purpose of the twelve tiny gold spots on a monarch pupa? "Everyone assumed the spots were just ornamental," Ebright said. "But Dr. Urquhart didn't believe it." To find the answer, Ebright and another excellent science student first had to build a device that showed that the spots were producing a hormone necessary for the butterfly's full development.

This project won Ebright first place in the county fair and entry into the International Science and Engineering Fair. There he won third place for zoology. He also got a chance to work during the summer at the entomology laboratory of The Walter Reed Army Institute of Research. As a high school junior, Richard Ebright continued his advanced experiments on the monarch pupa. That year his project won first place at the International Science Fair and gave him another chance to work in the army laboratory during the summer.

## Quick Revision Notes

• Richard's article on how cells work published in a science journal at the age of twenty-two.

• Richard was a single child and didn't have friends to play with. So, he became interested in collecting butterflies and various other items

• His mother bought him all the equipment he needed. She guided him and helped him to learn.

• He read a book "The Travels to Monarch X' which created a love for science in him.

• He raised thousands of monarch butterflies at home over a few years. He tagged them as they grew and freed them to study their migration.

• Richard put up a slide of frogs at the County science fair but did not win any award.

• His defeat inspired him to experiment. He took help from Dr. Urquhart to work on various projects.

• He won many awards at the County and International science fairs in subsequent years.

• His work on viceroy butterflies got him the first position award in a fair.

• Richard discovered a hormone necessary for the growth of, monarch butterfly

• He worked at the Army laboratory and the US Department of Agriculture laboratory.

• Richard spent a year at Harvard as a freshman before going back to the laboratory to discover the chemical structure of the hormone responsible for the gold spots on the monarch pupa.

• His findings motivated him to study cells and how they read their DNA.

• His theory may help to prevent many kinds of cancers and other diseases.

• He graduated from Harvard with second position among 1510 students.

• His other interests include debating, public speaking and photography.'

• Richard's social studies teacher praises him for his excellent mind, curiosity and a will to win – the essential qualities of a scientist.