

Chapter 6

The Making of a Scientist

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Q.1 How did a book become a turning point in Richard Ebright's life?

Ans.: Ebright was an inquisitive boy who was supported by his mother throughout his childhood. His mother brought him a book entitled The Travels of Monarch X which proved to be a turning point in his life. The book talked about the migration of monarch butterflies to central America. At the end of the book, its readers were invited for studying the butterfly's migration. This chance exposed the young curious Ebright to the world of science. He caught female monarch butterflies, took their eggs and raised them in his basement. He observed their life cycle curiously and researched on everything that ticked the clock of his mind.

Q.2 How did his mother help him?

Ans.: Ebright's father died when he was very young. He was everything for his mother and she made it a point to become his best friend. They used to spend all the time together. She used to get him instruments like telescopes, microscopes, cameras etc and encouraged him in his desire to study things. His mother would also take him on trips and encourage his spark of learning.

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Q.1 What lesson does Ebright learn when he does not win anything at a science fair?

Ans.: At the science fair, Ebright showed slides of frog tissues while other students had done real experiments. He had always been a bright student and explorer so it was sad for him to lose when everyone won something or the other. He then realized that to win a prize he had to do some real experiment and not just show slides.

Q.2 What experiments and projects does he then undertake?

Ans.: Ebright had spent most of his time exploring the world of butterflies specially the monarch butterflies. It was the only subject that struck him for the next year's fair. He got many ideas from Dr Urquhart and worked on them one by one. Initially, he tried to find out the cause of a viral disease that killed nearly all monarch caterpillars every few years. For this, he tried raising caterpillars in the presence of the beetles, the suspected disease carrier. It didn't give him any sound result but he won for having done that experiment.

He later tested the theory that viceroy butterflies copy monarch butterflies to save their lives from the birds. His next research led to the discovery of an unknown hormone which ultimately led to the theory on the life of cells.

Q.3 What are the qualities that go into the making of a scientist?

Ans.: The qualities that go into the making of a scientist are an inquisitive mind, a positive competitive spirit which is targeted at winning not for the mere sake of winning a prize but for the purpose of being the best, insatiable curiosity, the zeal to do new things, a never-say-die attitude and a strong will.



Think About it

Q.1 How can one become a scientist, an economist, a historian...? Does it simply involve reading many books on the subject? Does it involve observing, thinking and doing experiments?

Ans.: To achieve anything in life one needs to put in a lot of efforts. Merely reading books on a subject can never make a person a pro in that field. One can't deny the fact that the more you read, the more you know but if knowledge isn't put to practice, it never reaps results. It is important to read to enhance one's perspectives, gain knowledge, the technical know-hows and understand the wide opportunities of research or exploration a topic opens.

It is equally important to have a never-say-die attitude, the zeal to learn beyond limits, an inquisitive mind and a strong will to perform to be the best and not be the winner of a prize. Success comes to those who work hard for it.

Q.2 You must have read about cells and DNA in your science books. Discuss Richard Ebright's work in the light of what you have studied. If you get an opportunity to work like Richard Ebright on projects and experiments, which field would you like to work on and why?

Ans.: Yes, in our science books we have read about cells and DNA. It is the immense contribution of Richard Ebright which has made the study of human cells possible. It helps us understand the concept of heredity and transfer of genes. It serves as a research tool in experiments to trace the origin of diseases and then formulate their cures.



It was his inquisitiveness that he worked on the same subject for years and tried to explore various aspects of the subject for as long as he could. He always came up with some or the other fact or inference which led him to his further researches.

If I ever get a chance to work on any project, I would want to work in the field of cloning or artificial intelligence. Both the fields if researched well can prove to be a boon for humans and can help us achieve a lot more in life.

Talk about it

Q.1 Children everywhere wonder about the world around them. The questions they ask are the beginning of scientific inquiry. Given below are some questions that children in India have asked Professor Yash Pal and Dr Rahul Pal as reported in their book, *Discovered Questions*.

- (i) What is DNA fingerprinting? What are its uses?
- (ii) How do honeybees identify their own honeycombs?
- (iii) Why does rain fall in drops?

Can you answer these questions? You will find Professor Yash Pal's and Dr. Rahul Pal's answers (as given in *Discovered Questions*).

Ans.: (i) DNA profiling or fingerprinting is the process of determining an individual's DNA characteristics, called a DNA profile, that is very likely to be different in unrelated individuals, thereby being as unique to individuals as are fingerprints.

It is used for the following purposes:



1. As a forensic technique in criminal investigation
2. To clarify paternity
3. To study plant and animal populations

(ii) Honeybees use the sun as a guide and are worldly-wise at navigation. They are said to have a sharp memory and a unique pattern of direction guidance i.e. dance. Their dance stipulates the distance and direction of the food source with respect to the direction of the sun.

(iii) Water rises in the form of vapours to form a dense cloud when the air is below the dew point. All the vapor in a cloud doesn't condense in one go. These vapours condense slowly on dust particles present in the air. These dust particles combine to form a heavier particle. When these heavy particles start falling, they absorb more moisture and reach the ground as droplets.

Q.2 You also must have wondered about certain things around you. Share these questions with your class, and try and answer them.

Ans.: Yes, I do wonder about many things around me. Some of them are listed below:

- (i) How does the colour of a leaf change from green to yellow or orange?
- (ii) How do our organs differentiate between oxygen and carbon

dioxide?

- (iii) How do the plants develop a suction pull to absorb water and nutrients from the soil?
- (iv) Why is there no such place on our planet from where we can see its real elliptical shape?
- (v) Why does honey not degrade with time?

