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It's all about thinking fresh

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This is an episode from the life of a famous 19th century scientist, an episode that illustrates the important role of creativity in science.

The Cambridge mathematics course had two brilliant students named Parkinson and Thomson. It was generally believed that one of these two would top the list when the results were announced. The question was, who would be first and who would be second. In the end, the results proclaimed that Parkinson had stood first and Thomson second. There was one striking fact about both of them. The examiner had set one very difficult question and only these two had solved it, and that too in an identical fashion.

The examiner was suspicious: had one boy copied the other? To probe further into the case, he first called Parkinson and asked him how he had been able to solve that question. Parkinson replied: "Sir, I make it a practice to read research journals as well as the prescribed texts. I happened to come across this problem in a research paper written by an anonymous author. I was stuck by the originality of approach in solving the problem and so remembered it. And, when I saw the same question in the examination paper, I had no difficulty in answering it." The examiner, who had picked up that question from the same research paper, was impressed by the reply and sent Parkinson off with a pat on the back for reading well beyond the normal texts.

Convinced now that it was Thomson who must have copied Parkinson, he called him and asked, somewhat aggressively, as to how he managed to solve that question. The examiner also mentioned what Parkinson had told him, and asked: "Are you also going to claim that you too had read that paper?" Thomson replied calmly: "No Sir! I wrote that paper."

This episode demonstrates the intellectual calibre of the student. It was so high that even the examiner borrowed his ideas. Thomson, in later life, became a distinguished physicist with fundamental contributions to electromagnetic theory and thermodynamics. He was honoured with a peerage and as Lord Kelvin, his work has become textbook material.

Science engages in a continuous battle to unravel the secrets of nature. While hard work and meticulous lines of attack are essential, the most essential thing required is original thinking. For, nature's secrets are often in unexpected directions and these cannot be found by routine thinking.

An episode from the life of Isaac Newton is worth recalling. Newton had joined government service as the Master of the Mint and had, in a sense, moved away from the life of a research professor. Bernoullie, one of the leading European mathematicians, posed a problem as a challenge to the mathematical community. The problem is simple to state.

Mark any two points on a vertical wall, say, A and B. B is below A, but not vertically so. A smooth wire joins these points and a bead slides down from A to B in a frictionless manner. What should be the shape of the wire so that the time taken by the bead from A to B is the least?

None of the leading mathematicians in Europe could solve this problem. Until, one day it reached Newton when he returned home from his office. Having moved away from the regular scientific channels, he had not heard of it before and decided to take up the challenge.

He worked till the early hours of morning and found the solution. He sent it to the secretary of the Royal Society, asking him to forward it to Bernoullie without revealing the author's identity. The curve Newton had found had the technical name "Brachistochrone". But rather than the answer, the highly original method used in obtaining it, made Bernoullie acknowledge the authorship of Newton. He reportedly remarked, "I know the lion from his paw."

There have been many lions in science whose paw-marks of originalty have guided the subject to where it is today. However, the essence of originality is that it takes you away from what is routinely believed. It takes courage to stray from the trodden path in search of new truths.

This is becoming increasingly difficult in today's environment when any new scientific idea is filtered through peer reviews. While peer reviews are an insurance against proliferation of cranky ideas, they can occasionally suppress or delay a genuine new finding. What is worse, a young Thomson today may be discouraged from thinking afresh for fear of derision by the peers. This is, perhaps, the greatest threat to science today.

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