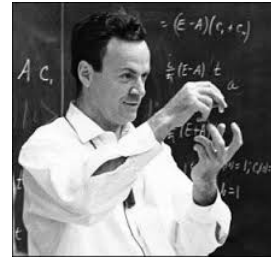


Richard Feynman and The Pleasure of Finding Things Out

Mark Dixon - September 2016

This morning I'll be talking to you about Richard Feynman. If you haven't heard of him, he is widely regarded as one of the geniuses of Physics in the last century. He also happens to be one of my heroes in Physics.



Hans Bethe who was himself a top Physicist and had won the Nobel Prize for Physics said this about Feynman: "There are two types of genius. Ordinary geniuses do great things, but they leave you room to believe that you could do the same if only you worked hard enough. Then there are magicians, and you can have no idea how they do it. Feynman was a magician"

Feynman won the Nobel prize for Physics in 1965 for his theory of how light behaves. He is most remembered for his original ways of viewing the world and for his enthusiasm for explaining Physics to the general public. His opinion was that someone is only an expert if he can explain his ideas to a non-expert. In 1986 he was responsible for discovering why the Space Shuttle Challenger exploded. He died in 1988.

Why am I telling you about Feynman? Well, not because of his achievements in Physics, but because of his philosophy of thinking and his approach to learning. That is what I want to share with you this morning

Richard Feynman's father was not a scientist and was instead a salesman. In later life there are stories, that Feynman often told, about his father's influence on him as a thinker when Richard was a child. I want to tell you about one of these.

The story was about when his father used to take young Richard for walks around the countryside not far from New York. On these walks his Dad would talk to him about the surrounding nature and explain what was going on and answer Richard's questions.

All the other kids in the neighbourhood were taken by their mothers. The mothers soon noticed this father and son and their conversations and convinced their husbands to take their sons out for walks and do the same thing.

After one weekend, when Feynman was at school playing during break, one of his friends said "Do you see that bird? What kind of bird is that?" Young Richard replied "I haven't the slightest idea what kind of bird that is".

His friend said "It's a brown-throated thrush. Your father doesn't teach you anything!"

But Richard knew the opposite was true. His Dad always said things to him like "see that bird, it's a Spencer's Warbler" (Richard guessed that his Dad didn't know the real name). His Dad then said "Well, in Italian it's *Chutto Lapittida* In Chinese it's *Chung-long-tah* and in Japanese it's *Katemo Tekeda*. You could learn the name for

the bird in all the languages of the world. But, when you're finished you'd know absolutely nothing about the bird. All you'd know is what different humans in different places call the bird."

His Dad then went on to say, "So let's look at the bird, forget what its called but try to see what it does. Do you see it walking around pecking it's feathers?"

Richard said "Maybe it messes up is feathers when it flies, so it's pecking them in order to straighten them out"

"All right" his Dad said, "If that's the case then it would peck a lot just after it's been flying, and it wouldn't peck as much after it's been on the ground for a while"

The father and son then quietly looked at the birds for a while and Richard noticed no real difference between those that had just landed and those that had been there for a while. Richard said to his Dad "Okay, I give up, why does it peck at its feathers".

His Dad said "Because there are lice bothering it, they eat the flakes of protein that come off it's feathers". He then went on to explain in more detail what the lice did. His story was probably incorrect in detail, but the *principle* behind what he was saying was correct.

There is a difference between knowing the name of something and knowing something. Feynman was more interested in *knowing* how something works rather than what it is called.

Feynman was interested in how the World worked and along the way come up with many ideas and theories which he is now famous for. An extremely modest man, towards the end of his life he said of himself "I was born not knowing and have had only a little time to change that here and there."

Of course it is important to know what things are called, but I want to appeal to you to be curious about the world and to ask questions of it. Ask questions also of your teachers and try to find out how and why things work as they are. Curiosity is a powerful asset to learning and I want you to embrace it, and we are here as teachers to help you try to satisfy it.