Biography Paper -- Richard Feynman

> *"If we will only allow that, as we progress, we remain unsure, we will leave opportunities for alternatives. We will not become enthusiastic for the fact, the knowledge, the absolute truth of the day, but remain always uncertain...In order to make progress, one must leave the door to the unknown ajar."*[1]

Richard Feynman is a fascinating person to study on almost any yardstick of creativity. His family background, particularly the influence of his father, played a significant role in shaping his interest in science. As Feynman himself puts it:

> "His way was never to tell me to be a scientist, or anything like that, but simply to tell me interesting things about the world all the time…. The most important thing I found out from him is that if you asked any question and pursued it deeply enough, then at the end there was a glorious discovery of a general and beautiful kind about the way life behaves." (Sykes, 1994).

(Significantly, this low-key but powerful manner in which the elder Feynman inspired his son, worked with his daughter as well. Joan Feynman also obtained a PhD. in physics, although on a different topic.) Csikszentmihalyi (1999) presents an interesting table that hypothesizes how personal background affects the incidence of creativity. Feynman states that he did not know where his father's interest in science came from, but it clearly formed part of the cultural capital that both brother and sister inherited. Specifically, the tradition of respect for learning and culture in the environment must have contributed to the young Feynman's enjoyment of "finding things out."

On the broader, societal front, the 'external threat' facing the United States during and after World War II, prompted an interest in physics (Csikszentmihalyi), especially in view of the work on the bomb done at the Los Alamos facility. It is likely that this combination of family background and the social context brought about the right conditions for Richard Feynman's early work.

As Feynman's work in physics continued throughout his career, his "domain-specific knowledge" grew (Weisberg 1999). I think that a case can be made (especially in science) that the work of one scientist builds upon the work of others who preceded him or her; but there is also that "something extra" of which Amabile (1983) writes that allows creative individuals to make breakthroughs where other scientists do not.

The personal traits and motivations that Feynman possessed contributed to his creativity. First, he exhibited what Csikszentmihalyi has described as the most salient characteristic of a creative individual; that is, constant curiosity and even a kind of "childishness." Anecdotes abound about Feynman's playful approach to science. In his own words:

> That afternoon while I was eating lunch some kid threw up a plate in the cafeteria. There was a blue medallion on the plate, the Cornell sign, and as he threw up the plate and it came down, the blue thing went around, and it seemed to me that the blue thing sent around faster than the wobble, and I wondered what the relation was between the two (Sykes).

Marvin Minsky, the MIT professor who founded the Artificial Intelligence Laboratory in 1958, said, "When Feynman faced a problem, he was unusually good at going back to being a child, ignoring what everyone else thinks, and saying, 'Now, what have we got here?'" (Sykes). Second, he was not afraid of failure or of taking risks. The way he poignantly writes in one of his memoirs about that period of time when he felt burdened by everyone's expectations, shows how he was able to release his fears by telling himself: "You have no responsibility to live up to what other people think you ought to accomplish. I have no responsibility to be like they expect me to be. It's their mistake, not my failing" (Feynman, 1989).

Motivation and persistence play a significant role in creativity. Feynman regarded his achievement of the Nobel prize with characteristic ambivalence: although he worked hard for it, his work on quantum electrodynamics was not done with the thought of an external award in mind. In fact, he was almost annoyed when he won the prize! He truly rejected the "singling out" of one person's work over another. And although he was never chosen as a MacArthur Fellow, Feynman had that quality Shekerjian (1990) writes about when she said that, "Creative work doesn't evolve simply from wishing or accident, or wholly from a mystical flash of inspiration. It also requires a sustained purpose and the discipline of trying over an extended period of time."

Finally, a trait that personifies Feynman has been compellingly defined by Amabile as, "cognitive style characterized by a facility in understanding complexities and an ability to 'break set' during problem solving." Feynman liked a challenge, and he was not discouraged by the fact that others had tried to solve problems before him. Minsky said that Feynman was the "least stuck" person he had ever known.

Addendum Questions

My choice of Richard Feynman as a creative person brought me much enjoyment and value. I admire him for many reasons: for being down-to-earth and quirky, for making all the discoveries that he did (even though I cannot understand anything about them!), for the breadth and range of his interests (including bongo playing), for his energy and commitment to teaching and his students (my eyes always sting at that last slide that shows the banner that the students at Caltech raised the morning after he died!). One of the messages that his life conveyed to me was the importance of finding something that you are enthusiastic and passionate about. It's not that Feynman was curious about everything he came across; for instance, he thought philosophers were wasting their time, and that people who wanted a "mystical" explanation to life were screwy, but he was truly engaged by the natural and scientific world and in finding out why things are the way they are. I think that his life underscores for me the importance of finding what it is that is or could be my passion.

I am also struck with his enjoyment in confounding people's expectations. He was not bound by what other people thought of him and in fact, liked to poke fun at what he regarded as

I hope that when I return to my job after this sabbatical year, I will be able to model to students who come to the library some of the enthusiasm I have for critical thinking and the fun and joy of researching, a 'la Richard Feynman!

References

1. Sykes, Christopher. (Ed.). (1994). *No ordinary genius: the illustrated Richard Feynman*. New York: W. H. Norton.

2. Csikszentmihalyi, Mihaly. (1999). Implications of a systems perspective for the study of creativity. In NinaGreenwald and Steven Schwartz (Eds.), Readings in creative thinking. (2002), pp. 329; 323.

3. Weisberg, Robert W. (1999). Creativity and knowledge: a challenge to theories. In Nina Greenwald and Steven Schwartz (Eds.), Readings in creative thinking. (2002), p. 227.

4. Amabile, Teresa M. (1983). The social psychology of creativity: a componential conceptualization. *Journal of personality and social psychology*, 45 (2). p.364. In Nina Greenwald and Steven Schwartz (Eds.), *Readings in creative thinking*. (2002).

5. Feynman, Richard P. *Surely you're joking, Mr. Feynman*. New York: Bantam Books, p. 156.

6. Shekerjian, Denise. (1990). *Uncommon genius: how great ideas are born*. New York, Penguin Books, p. 142.

Notes:

The quote is from "Dr. Richard P. Feynman." http://amasci.com/feynman.html
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