

Science and Creativity

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When I was a teenager I was taken to visit a house with friends of my parents with a view to buying it. Set on the Cotswold hillside in Oxfordshire looking down a picture book valley I thought what an ideal place this would be to sit and think deep thoughts. We entered the house and on visiting the son's bedroom a rather large hole in the wall had been apparently chiselled away by hand connecting to the parents' bedroom. The owner pronounced, waving a hand at the rough hewn hole: "Oh that was done by Rupert, he is so creative!" I have never been able to reconcile the obvious vandalism of Rupert with the creative process and all my life have wondered if I have missed something.

The linking of creativity with anything in particular is problematic. Indeed the word itself is highly subjective. For instance a cook can be described as creative if they have baked a perfect cake that everyone likes. The basics of cake making are well known and in this instance it is the skill rather than a completely new approach to cake making that is being lauded. A creative artist will produce something that will force us to stop and think, and to continue to think again and again. The impact will be on the observer rather than, necessarily, a new method of applying paint or using a chisel. For example in Rembrandt's "Return of the Prodigal Son" it was highlighted to me in the meditation on this picture by Henri Nouwen that the two hands of the Father who has them holding the shoulders of the son are different. One is male and the other is female reflecting the necessity of justice and mercy coming together in this instance. Each time I look at the picture it forces me to look at my own life again. I could ask whether there is anything specifically creative in the individual hands. They are well painted but are they of themselves creative? No, it is the juxtaposition on one person that stops us in our tracks to re-examine ourselves that is the genius.

So it is when we come to the realm of looking at science and creativity. Individual elements may not seem creative and it is the master visionary who can look at relatively mundane facts and step back to "create a new scientific vision." This volume contains many examples of where creativity in science has occurred. The poverty of the institutes in Hungary combined with cultural mixing and political tensions leading to the tremendous impact that Eotvos

had on the mathematical output of that nation. The cultural heritage of Jewish thinkers, the intense debates focused around Niels Bohr in Copenhagen or the bringing together of international scientists around the big questions of science and the facilities needed to start to answer them. If nothing else, all these demonstrate that there is no one set way of inspiring creativity although there are many ways of suppressing it. At one extreme one thinks of lone pioneers and at the other the firmament of debate when new ideas are being formed around a specific theme. In trying to distil out some of the key factors one stands out by far: that is a passion and drive to reach into the unknown, to pursue a vision without considering the cost or the impact. While Galileo had to bow to the church authorities there is the impression that this was just on the surface. Deep down did he not seethe with indignation knowing he was right? Coupled with a passion and self belief is the need to reflect. The prophet Amos is constantly asked “what do you see?” While replying to the obvious pictures he is presented with, such as a basket of fruit or a plumb line in front of him, God wants him to see before the blindingly obvious to what lies behind. This is where a mix of cultures starts to have an impact. Just listen to the way people from different backgrounds look at a situation. Not just the looking but note how they speak, the inflections of their voice, the movement of hands etc. All these will show that their observations of the same thing or fact may be very different from your own. In many countries there is now a move to have a commonly agreed teaching syllabus and in Europe we are trying to find common standards for higher education. While the aims are largely desirable the attempt to “do science” in the same way everywhere could be counterproductive to future creativity. In the recent report of the European Research Area Board which looks at how the grand challenges before the world may be tackled by researchers, it states that we should celebrate and nurture the cultural differences between scientists for the very reason that different ways of thinking have led to creative solutions in the past.

Then we have to turn to something that is not necessarily palatable. This is summed up in the phrase “necessity is the mother of invention.” Here we see the plight of the refugee, the lack of resources, the oppression of authority or the threat of physical harm that drives people to seek new solutions.

While investment in large facilities for the good of all disciplines is required, they do not of themselves produce new ideas. The investment in the Large Hadron Collider at CERN has a major objective to try and track down the elusive Higgs boson. Scientists working on this project are often asked what happens if it is not found. Normally with a glint in their eye they imply that things will be even more exciting since new physics will be uncovered. While this is undoubtedly true, it is hardly a compelling reason for politicians to keep investing in such facilities. Yet take a bunch of politicians to CERN or Fermilab for example and they are blown away by the passion and interactivity of the scientists they meet.

So while the various contributions give glimpses of creativity and science, it became clear during the discussion of these contributions by the participants that it was the confluence of vision, passion, cultural mixing in addition to talent, often driven by the feeling of either competition or oppression that were some of the common factors that are at least one approach to fostering creativity in science. As one observer wryly observed that many of these attributes are found in the coffee rooms of research institutes or the common rooms of leading universities where different disciplines and temperaments come together and either interfere constructively or destructively.

*"For my thoughts are not your thoughts, neither are your ways my ways" declares the Lord. "As the heavens are higher than the earth, so are my ways higher than your ways and my thoughts than your thoughts."
(Isaiah, ch 55 v 8-9)*

