**The Shock of the New: Innovation, Inventors, and the Development and Acceptance of Technology.**

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Within the readings this week we have the central theme of innovation and the development of technology within industrial societies. In our post-industrial world it became important to attempt to incentivize the production of ‘new’ technologies in a way which , although recognizing the rights of a *specific* inventor, also allows technologies to be adopted and integrated into the total socio-technical fabric of society. Within this response paper I have chosen to address three specific areas of thought, namely; innovation, inventors, and the adoption of technologies.

The nature of innovation and change both in terms of the starting point, but also in the way that the network of human and non-human actors adapt and change technologies is complex. Yet, Hong (1999) makes a compelling case that study the history of technology can make important contributions to how we understand our rapidly changing world. More specifically that it is “a quite natural assumption that, in spite of many discontinuities and even ruptures between past and present, understanding the past will result in a better understanding of the present, and that the better understanding of the present thereby obtained will give us some lesions for the future.” (1999:260) I think within the socio-technical system of society there truly is a symmetry between nonhuman and human actors. However, I am uncomfortable with the assertion that machines and technical systems can exhibit agency in active sense. Rather, I suggest that if technology is seen to have agency, it is not any intrinsic part of the technology, but rather a reflected agency which confers itself upon technology by its interaction with human actors, much like the same way that we can see objects, not because the thing itself emits light, but rather because of the light reflected off it which has its origin at the sun. Hong also discusses the difference between radical and incremental innovations in technology. She relates that objects have been made that while radical innovations cannot be predicted, whereas the routine progression of development can, that “Radical innovations are characterized by the unexpectedness of or exceptionality of the technical, social, and economic consequences of a technology.” (1999:264) Yet, I would suggest way of understanding these complex dynamics of innovation. I suggest that while the process of refinement and development of a given technology can be slow and progressive, non-radical, the consequences of that change can be just as radical as a moment that we’d define as a step change in innovation. I believe that a good example could be the development of the atomic bomb in the years preceding, and during, the Second World War. The consequences of the nuclear age were profound, yet much of the work to advance this technology could be suggested to be predictable and slow, after all the roots of the Manhattan Project start in the discovery of radioactivity in 1896. I am not arguing that there is no such thing as radical innovation, indeed, it could be claimed that the discovery of radioactivity is itself a moment of revolutionary change in the human socio-technical environment. Rather, I am making the point that slow and predictable change in technology can have radical effects, I would suppose that it is a ‘tipping-point’ argument.

 Therefore, having addressed some issues of innovation, we come logically to the inventors themselves. It seems of no surprise to me that historians of technology have, much like their colleagues in other historical fields, have fallen into a revisionist mode of thought which has moved away from the ‘great (white) man’ mode of constructing historical narrative. Both Hong (1999) and Cooper (2003, 1991) give many examples of how this trope of the ‘Yankee Whittling Boy’ is no longer a suitable way of addressing the history of technology. One area of Coopers (2003) article that I would like to examine further concerns the way we as humans learn in childhood “Eugene Ferguson and Brooke Hindle have written about the importance of visual or nonverbal thinking in design, innovation, and technological problem solving.” (2003:95) I feel that this is an important part of the picture when looking at technology in the industrial age. For example John Harrison who has in recent years be lionized as one of these ‘heroes of technology’, designed the nautical chronometer, a key innovation in maritime navigation. It was a very sophisticated design which utilized modes of design that are still very much in use today. Yet, he had no training as a watch maker of engineer, it seems that he developed his skills in an avocational manner. Yet, he did not act alone, if it had not been for his brother (technical collaborator) and son (advocate) he would have failed. The problem he faced was one of, as Hong (1999:279) out its, of technological “lock-in” whereby a prevailing and established technology blocs or delays the adoption of a new technology. The interesting thing in Harrisons case is that this blocking technology was not even in use, it was a parallel developing approach to the problem of establishing Longitude at sea. Due to the make-up of the committee which awarded the ‘Longitude Prize’, more specifically the chair (none other than Isaac Newton), the approach they favored was based upon celestial observations, rather that Harrisons ‘mechanical (time based) solution’. Therefore, you have the situation were Harrisons innovation was blocked not by an actual technology that was in use and “locked-in” but rather by an *idea* of a technology which did not even exist. Harrison also points us to the fact that really there is no such thing as the lone inventor working in isolation. They are part of a societal whole, whereby human and non-human systems act to support the individual.

Harrison’s case leads us logically on to my concluding area of thought, namely the mechanism by which technologies are regularized, standardized, and adopted within society. Within western society the way be which we have sought to both adopt and reward the process of innovation has been through the patenting system. Coopers (1991) article shows us how in the 19th century technology became a (in my words) a ‘contested space’ whereby the systems for judging ‘newness’, and by extension ‘progress’ were mediated through the system of Patent Defense “In the deeper, definitional sense of “invention,” however, the patent management system had an additional special relationship to American societies store of technological knowledge, for it was the arena in which the implicit rules were determined for deciding what was new.” (1991:997) Yet, within our modern world the conflict space of the patent process has led some to wonder if we have reached a point of paralysis whereby so many patent infringement cases are being brought that it is undermining the development of new technologies. A good example of this process can been seen in the ‘smart phone’ and ‘tablet’ markets where manufacturers such as Apple, Sony, Microsoft, Samsung, and Google are suing and counter-suing each other for hundreds of patent infringements. It would seem the cause of this problem is that as the sociotechnical complex makes choices and constringes the types of technologies that will be used in these products the battle over who invented, and therefore has the rights to use them, will only increase. As always, and even in the history of technology, it’s the lawyers who win.