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Social Influence on Science

The concept of social influence on science is very interesting because it goes against the common notion of pure, unbiased scientific truth. In *The Mismeasure of Man*, Stephen Jay Gould proposes a method with which to examine scientific progress in the context of society.

> Science, since people must do it, is a socially embedded activity. It progresses by hunch, vision, and intuition. Much of its change through time does not record a closer approach to absolute truth, but the alteration of cultural contexts that influence it so strongly. Facts are not pure and unsullied bits of information; culture also influences what we see and how we see it (52-53).

This evaluation of the role of science in modern culture is largely true. However, the specialization of science and its separation from general culture create problems for Gould's assessment. His assessment is too simplistic to be a complete examination of the social influences on modern science. Although it is influenced by culture, as Gould states, modern science is also greatly influenced by the scientific communities investigating it.

The first statement of the analysis, that science functions from within society, is an almost undeniable fact. Because the process of science is conducted by people, it must be connected to the society in which the individual scientists live. In analyzing how science and culture relate, it is important to examine how the connection is manifested in society.

In *The Structure of Scientific Revolution*, Thomas Kuhn refers to scientific communities as the necessary connection between science and society. As Kuhn describes them, these communities are groups of scientists working in a particular field and sharing particular goals (177). Another important aspect of scientific communities is their necessity to the progression of science. Kuhn states, "Scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all" (210). Scientific communities form the connection between science and society, without which no science could proceed. In this role, their importance to any consideration of the social influences on science is immense.

The second sentence of Gould's statement says that science "progresses by hunch, vision, and intuition." This statement suggests the often subjective nature of science displayed so vividly in *The Golem*. Throughout *The Golem*, Harry Collins and Trevor Pinch discuss several scientific controversies. They examine how scientists can look at the same evidence and see completely different things. In a summation of everything in the book, the authors say, "scientists at the research front cannot settle their deep disagreements through better experimentation, more knowledge, more advanced theories, or clearer thinking" (142-43). This statement directly relates to Gould's in showing that science does not move forward by better facts alone, but instead advances by the "hunch, vision, and intuition" of those involved. The way science is conducted, and the way it moves forward, depends on the people that do it.

The next part of Gould's assessment connects directly with the previous two. "Much of its change through time does not record a closer approach to absolute truth, but the alteration of cultural contexts that influence it so strongly." This is really Gould's

fundamental idea. The rest of his statement just offers support and refinement. In this sentence, Gould connects the subjective nature of science with the idea that culture and society influence science. The use of the phrase "cultural contexts" seems to imply a connection to general culture much more so than to specific scientific communities. That is a major short sight of Gould's assessment. Historically, when science sought to describe concrete things that had everyday relevance to society, the separation between scientific communities and general society was not all that great. Science often had direct influence on government, religion, and other institutions. However, the increasing specialization of science has led to the study of abstract ideas and events. Modern science has become insignificant to a great majority of people. Robert Merton points out this increasing separation in *The Sociology of Science*.

> With the increasing complexity of scientific research, a long program of rigorous training is necessary to test or even to understand the new scientific findings. The modern scientist has necessarily subscribed to a cult of unintelligibility. There results an increasing gap between the scientist and the laity (263-64).

It has been necessary for scientific communities to emerge in order to carry out research in areas of science where the complexity is always increasing. These communities create the unique capability for scientific advancement and are largely separate from general culture in which they reside. Because of this, the culture of individual scientific communities has a much greater influence than the culture of society as a whole. Although, both still play undeniable parts.

The last part of Gould's statement, "facts are not pure and unsullied bits of information; culture also influences what we see and how we see it," applies the previous statement to a specific point of time, instead of analyzing the progression of science

through advancing culture and time. This allows a careful analysis of individual experiments and how society influenced them at the time they were conducted. These influences from society emerge in science in a variety of ways. Gould notes that *a priori* commitments subconsciously guide scientists, and Kuhn points out that irreconcilable views hold back progress. However, the social origins of these influences are more revealing to the flaws in Gould's assessment. The influences discussed here will be broken down, according to their social origins, into the two distinct types discussed above: those from general cultural and those from scientific communities.

Cultural influences are those that come from society as a whole, often from major institutions such as religion or social stereotypes such as racism. Examples of this are apparent in *The Golem*, *Bad Blood*, and *The Mismeasure of Man*. One particularly good example of religious influence is from *The Golem* in the section about the theory of spontaneous generation of life. This theory had far reaching religious importance. When it was finally defeated it "was taken to have dealt a final blow to the theory of evolution" (89). Although the defeat of the theory was the correct outcome according to today's science, in its own time the theory was only pushed aside when a biased commission decided against it, even though the evidence was not nearly so straightforward (87).

The Mismeasure of Man displays the creation of "scientific racism" in an attempt, greatly influenced by general society, to rationalize the social hierarchy. Gould shows how cultural views affected leaders of craniometry, despite their honest intentions. "They regarded themselves as servants of their numbers, apostles of objectivity. And they confirmed all the common prejudices of comfortable white males" (106). The influence of culture is also apparent in the Tuskegee Syphilis Experiment. In *Bad Blood*, James

Jones shows how the early formulation of the study was influenced by cultural beliefs. Jones points out, the physicians in the study were certain that there were differences in the affects of syphilis between blacks and whites despite the fact that "anyone who was not predisposed to find differences might have looked at these facts and concluded that the disease was affecting both races in the same way" (93). These examples show how culture can influence individual scientific theories. From this, it is also easy to see how culture can guide the questions that science seeks to answer, and thus guide the progression of science.

Scientific influences are those that come from within the scientific communities. These influences come from the traditions and culture of the scientific community itself. They are clearly displayed by both Thomas Kuhn and Robert Merton. In *The Structure of Scientific Revolutions*, Thomas Kuhn discusses how scientific revolutions occur. Particularly important here is the restriction to change that scientific communities impose on themselves. Kuhn describes the specialization and professionalization of science and how it leads "to an immense restriction of the scientist's vision and to a considerable resistance to paradigm change" (64). This restriction can easily be seen in an example presented later in the book. Discussing the conversion to Copernican astronomy, Kuhn describes "the very ease and rapidity with which astronomers saw new things when looking at old objects with old instruments" (117). This demonstrates just how much the paradigm bound traditions of scientific communities can restrict the range of scientific questions and the acceptable answers to those questions.

Traditions are held even tighter when influenced by the culture of scientific communities, particularly by what Robert Merton describes as "The Matthew Effect." Merton

says this effect "may serve to heighten the visibility of contributions to science by scientists of acknowledged standing and to reduce the visibility of contributions by authors who are less well known" (458). This effect, when combined with the fact, described by Kuhn, that "men who achieve these fundamental inventions of a new paradigm have been either very young or very new to the field whose paradigm they change" tends to reinforce the existing paradigm (90). Scientists privileged by the "Matthew Effect" are those that would most likely attempt to strengthen the existing paradigm. While those young scientists whose contributions are overlooked are the ones likely to challenge the existing paradigm with new ideas. The overall tendency of scientific communities is to confirm old ideas and push away new ideas for as long as possible. This can have a great affect on the type of progress science makes, but it is not included in the argument presented by Gould.

In conclusion, Gould's assessment of the progression of science is largely true, although too narrowly defined. In his use, the phrase "cultural contexts" limits the argument to a specific kind of influence from society, that from general culture. There is no doubt that general culture has the ability to affect science, but Gould's statement implies that without the influence of "cultural context" science would follow a much easier progression to absolute truth. This is not necessarily the case. Influences within scientific communities can be just as disruptive to the progress of science. Gould's statement could be improved by broadening its application. By changing "cultural contexts" to "social contexts" and providing a definition that includes both scientific communities and culture as a whole, Gould's assessment of scientific progression would cover a much larger range of social influences.