Should Be Changed or Should Not Be Changed—That Is The Question

Tsang Ling Yi
Psychology, S.H. Ho College

I. Introduction

The impact of Darwin's *On the Origin of Species* was far-reaching. After Darwin's death, funds were established under his name and statue of him was erected ("The Darwin Memorial"). In a speech addressing the Royal Highness, Thomas Huxley made a powerful statement: "Nor, most assuredly, do we ask you to preserve the statue . . . as evidence that Mr. Darwin's views have received your official sanction; for science does not recognise such sanctions, and commits suicide when it adopts a creed". ("The Darwin Memorial") He reminded the audience that although Darwin's work made a profound impact on science and our understanding of nature, his theories should not be an unchallenged dogma, for that would undermine science.

Huxley's views worth a thoughtful discussion as how scientists view science (in this case, whether it allows adoption of creeds) will significantly affect how they approach science and conduct scientific investigations. In this paper, Huxley's view will be discussed. "Creed" originates from

the Latin word ("credo") which means "I believe". ("Credo") Other than religious faith, it can also refer to a belief system that "substantially influence a person's identity, worldview and way of life". ("Policy on Preventing") As it is generally agreed that science performs the functions of "explaining and predicting nature", (Purtill 301) "commits suicide" in this paper will be synonymous with "loses the function of explanation and prediction and fails to seek truth". I contend that Huxley's assertion is true when "science" refers to scientific knowledge. However, science, as a way to seek truth, needs some criteria to judge what should be considered truth and it inevitably has some limitations. Huxley's view might not hold if "creed" is a criterion judging how close to truth a certain finding is or the limitations of science.

II. What Can and Should Be Changed

First, adopting a creed can be obstructive to truth seeking when scientists adopt a creed regarding scientific knowledge that tries to explain nature. Scientific knowledge and creeds by nature are different. Creeds are beliefs that do not change easily. They are what man hold onto despite changes externally. Scientific knowledge is the exact antithesis of it. It by nature is tentative and changes as technology advances. For example, the model for cell-membrane changed from Gorter and Grendel's lipid bilayer, to Davidson-Danielli's Tri-Layer, to the fluid-mosaic model as research advances. (Nicolson, "The Fluid") If scientists hold a creed that something must or must not be true, and do not question or test it, they will not be able to get closer to truth. For example, Scholasticism dictated scientific investigation before Merton scholars emerged. As Scholastic scientists held the view that the Aristotelian worldview is true, their research focused on explaining Aristotle's loopholes using Aristotle's theories. For instance,

Avicenna and Averroes explained "the mover" and "the moved" by Aristotle's "form-matter distinction" while Thomas Aquinas "reviv[ed] one of Aristotle's proposals" and claimed that "the body requires no mover but simply . . . moving towards its natural place". (Lindberg 45) These scholars could never get closer to truth because of their dogmatic approach towards scientific knowledge. They did not question whether Aristotle's claim was correct and expanded on it. With an inaccurate view of the universe as the basis for research, they failed to seek truth or make use of science to accurately explain or predict nature, leading science to "commit suicide".

On the contrary, being open to possibilities instead of being dogmatic when developing theories helps scientists get closer to truth. Darwin, although inspired by Lamarck, was not "trapped in the box" of Lamarckism that he was able to refute Lamarck's belief that behaviour of organisms change as the environment changes. ("Jean-Baptiste Lamarck") Instead, he developed his view that variation exists in organisms in the first place, and natural selection occurs. (Darwin 74) It is possible that further research will falsify Darwin's theory of natural selection. But at least Darwin was closer to truth compared to Lamarck, and his theory can explain and predict nature better than that of Lamarck's. Science progresses by challenging old claims and beliefs.

It is true that scientists build their work on previous scientists, just as how scientists discover auxin as the hormone that promotes "elongation of stem cell", from Darwin, to Salkowski, to Boysen-Jenson, to many more scientists. ("Auxins") However, it is vital for scientists to hold a critical attitude, attempt to replicate the experiment, be open to falsify previous claims if it is scientifically proven that they no longer stand, make sure it is a scientifically true ground to base their research on, and get a step closer to truth.

III. What Should Not Be Changed Frequently

However, science as a way to seek truth, needs objective criteria to classify what are "closer to truth". And these criteria cannot be changed often or easily. Scientists need to have these criteria in mind in order to head towards the direction that is closer to truth. Therefore, if a creed is the objective criterion of what is closer to truth, then it is a creed that will not lead to "suicide" of science, and might even be necessary for scientific investigations.

One of the criteria is harmony, or as Poincaré put it, "the harmonious order of its parts". (163) It is with the belief that what fits into the full picture of how nature works harmoniously should be what is true, that scientists refute what does not look harmonious and keep investigating what seems harmonious, and get closer to truth. Poincaré asserted that this search of what is harmonious, what is intellectually beautiful, what "best suited to contribute to this harmony", though "instinctive and unacknowledged", will not "divert the scientist from the search for truth". (164) A quintessential example is Crick and Watson's building of the DNA model. It was by intuition that Watson "felt" that DNA model should be two-chain instead of three-chain, partly because chromosomes duplicate instead of triplicate. It is only by having the DNA model to be a double helix that it fits harmoniously into the bigger picture that genetic materials exist in pairs instead of trios. (Watson 130) It is this belief or intuition that what is harmonious is likely to be true that leads Watson and Crick and many more scientists their way to truth.

The second criterion is simplicity. The more general a theory is, the more circumstances in which it can be used, the better it can be used to explain and predict nature. This is why "the more general a law is, the

greater is its value". (Poincaré 160) In order to find a general law, scientists have to reduce natural phenomenon by extracting an order or pattern behind individual phenomena. These orders are the "simple facts" that repeatedly occur. Therefore, the simpler the fact is, the more frequent it repeats, the higher the value. For example, scientists consider Newton's laws of motion an advance from Aristotle, not only because it explains motion more accurately, but also because it is simpler, more general. Aristotle had to divide his discussion into terrestrial bodies and celestial bodies (Lindberg 28, 33) while Newton could use his theory to explain occurrences on Earth and outside Earth. (Newton 67) It is with the belief that the simpler the better, scientists endeavour to look for facts that are as simple as possible, leading them to improve their laws' ability to explain and predict.

Science, as a way to truth-seeking, also needs clear boundaries of what kinds of problem it can or cannot solve in order to have a clear direction. These boundaries cannot be easily changed either. For example, as mentioned before, one of the criteria for what is closer to truth in science is simplicity. However, it might not be applicable to all subject matter. In *In Search of Memory*, Kandel raised the example of consciousness: the study of natural sciences employs reductionism while consciousness is "irreducibly subjective" so it is still a realm that is "beyond [natural science's] reach". (184) There are many more questions that science cannot provide an answer to, such as what it means to live an ethical and meaningful life, how to live in the face of suffering, how we should live together as a community, just to name a few. It is because these all involved human nature and mentality which can hardly be reduced, experimented or mathematised. These questions might be more properly dealt with in disciplines like philosophy, religion, or social sciences. Natural sciences certainly have its limitation in terms of things they investigate and their methodologies, and might not be

the best tool for understanding the different facets of "true" human being. It is just one of the ways to seek truth. It is of utmost importance to recognise science's limitations in order to make the fullest and best use of it. If these limitations are changed frequently, it implies that the directions or even methodology of scientific investigation will also change frequently, which render science an inconsistent way to truth-seeking.

Therefore, from the above examples, it can be concluded that holding creeds which are the objective criteria of truth (harmony and simplicity) and limitations of science will not lead science to "commit suicide". Instead, it will lead scientists to truth, and lead them to improve their theories' ability to explain and predict.

IV. Conclusion

In conclusion, scientific development can be severely harmed if scientists hold a dogmatic view on scientific knowledge. That would impede the advancement of science. However, science needs a consistent view on its criteria of what is closer to truth and its limitations in order to advance. Huxley's statement is justified when "science" refers to scientific knowledge, but not so if "science" refers to the criteria of what is closer to truth and science's limitations.

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Teacher's comment:

Does *science* commit suicide if scientists hold a dogmatic view? In her paper, Ling Yi argues that it all depends on how science was defined in different contexts. If scientists adopt a dogmatic approach towards *science* (scientific knowledge), the action would certainly hinder the searching of truth behind the nature. To preserve the consistency of truth-seeking, scientists should treat *science* (the objective criteria of truth and the

limitations of scientific method) as dogmas. Ling Yi has made use of a wide variety of evidence to support her arguments. This paper provides readers with a systematic review on different dimensions of science. (Yip Lo Ming Amber)