

THE SIGNIFICANCE OF MODERN MEDICAL EVOLUTION – TO SCIENTIFIC REVOLUTION

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ABSTRACT. *If the significance of modern medical revolution to the Scientific Revolution wanted to be illustrated, then of course, some important concepts, like “medical science”, “revolution”, “science” and “religion”, related to topic of these fields will be involved in my study and research range. Frankly, before better introduction of “Modern Medical Science Revolution”, it was difficult to explain the relationship and significance of “Modern Medical Science Revolution” and “Modern Scientific Revolution”, therefore, to start with, I would like to state “Modern Scientific Revolution” and then try to make it clear, after all, the association between the two is obvious.*

As for the course and development of the history of Scientific Revolution, I am inclined to agree with Professor Zhang Butian’s view in the book “Scientific Revolution of Historiography”, translated by H. Floris Cohen,” especially the viewpoint about “how ‘Science’ comes into the new world from the old world”² in another book of his “Re-creation of the world: how the modern science is produced”. Therefore, after careful consideration, I decided to briefly demonstrate my understanding of the “meaning of medical revolution to the modern Scientific Revolution” focusing on the following three aspects:

- 1. What is the Scientific Revolution?*
- 2. The eve when Scientific Revolution breaks out;*
- 3. The significance of medical science revolution in modern times.*

KEYWORDS: *modern medical science revolution, Scientific Revolution, Vesalius, Copernicus*

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² Floris, Cohen H. (2012). *The Scientific Revolution: A Historiographical Inquiry*. Trans. by Butian Zhang. Hunan Science & Technology Press. Pp. 313–339.

Introduction

Jinghua Liu, Gongyao Zhang and Minghan Liu, looking at “The history of European Renaissance”, point out in their book [2008] that:

The year 1543 is undeniably the most shocking year in the history of scientific development. The publication of Copernicus’s ‘De Revolutionibus Orbium Coelestium’ revealed the mystery of the universe, the stars, the sun and the moon, the earth, which struck the theory of the Christians – ‘God created the universe’, from the most macro level. Meanwhile, Andreas Vesalius published the book ‘De humani corporis fabrica’, where the human body structure was elaborately described from the perspective of anatomy, and declared that ‘God made man theory’ was ridiculous, from the most microscopic field. Of course, this new recognition of the human body was not only an inevitable result of mankind rediscovery process of humanity, human strength, human potential since the Renaissance Time, but also the pursuit of self-perfection, health, requirement of enjoying the real happiness to the fullest. Its subversion to the conservative religious ideas had an important impact on Medical and Physiological Revolution”³.

Hence, when we talk about how Science is apart from Religion, the contribution of Medical and Physiological Revolution is as equally important as Physical Revolution. According to historical references on what happened during 16th century, we can clearly know that Medical and Physiological Revolution much earlier broken out than Physical Revolution. As we know, Medicine is more easily understood and accepted by people, and because it is widely used and needed by common life, the knowledge of Medicine is spread fast and quickly, so if the spirit of Science was from Medical Revolution, not only the Physical Revolution should give its credit to Medical and Physiological Revolution for the later prepare the people who can understand and accept easily the spirit and concept of Science, but also we should thanks it bring us with new Paradigm of thought, i.e. Science.

1. What is the Scientific Revolution?

“When it comes to «Scientific Revolution», «Renaissance», whose essence is actually the return of human nature, must be mentioned, where usually the philosophy, theology and science and other various fields are also included”⁴. So when we discuss the concept of “Scientific Revolution”, we should distinguish it from the concept of “Scientific Revolutions”. The later usually be understood as a philosophical concept which means that the development of Science always show itself as a leapfrog way, we can see details of this understanding in “Structure of Scientific Revolutions” written by Kuhn. However, the former is more used in the history of Science, it is a concept of history, the meaning of “Scientific Revolution”

³ “History of the European Renaissance: Science and Technology Volume”, by Jinghua Liu, Gongyao Zhang and Minghan Liu; Beijing, Renming Press, 2008.3: p. 119.

⁴ Ibid., p. 1.

in today is mainly from Koyré. For these reasons, when I talk about the concept of “Scientific Revolution” in this article, I intend the meaning of “Scientific Revolutions” from Kuhn who stress that so many different paradigms change fiercely during a same period.

As a consequence, I regard the Renaissance Time (from the 14th century to 17th century) as a revolutionary era in the history of science and technology, so I also believe that the technological revolution itself, the same as medical revolution, is a by-product of the Renaissance. *Hence, the meaning of revolution of Science can be explained as “Paradigm Shift”⁵, from Paradigm of Aristotle’s cosmology to Paradigm of Copernicus’s cosmology. As we know the classical words which can better show Aristotle’s views on cosmology from “Physica”, “De Caelo”, “De Generatione et Corruptione”, “Meteorologica” and “De Mundo”, and also we can see Copernicus’s sights on cosmology from his book “De Revolutionibus Orbium Coelestium”. Like the differences between “Scientific Revolutions” and “Scientific Revolution”, similar situation happens to the “Medical Revolutions” and “Medical Revolution”, the essence can also be understood by the concept of “Paradigm Shift”, from Hippocrates’s theory of four body fluids to Paracelsus’s theory of five elements, from Galenic thoughts on anatomy to Vesalius’s “De Humani Corporis Fabrica Librorum Septem” and Harvey’s “Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus”.*

2. The eve when Scientific Revolution breaks out

Although European was still reigned over by Christianity before Revolution of Science, the tradition of mundane philosophy was already becoming a potential condition for future thought of revolution.

On the one hand, between 6th century and 8th century, wars among different empires in Mediterranean region boost them to understand each other and communicate their economy and culture. After 8th century, the famous event that the historical documents of Ancient Greek were transported back to European and transplanted and spread by people lived far away from the domination center of pope.

On the other hand, “Thomas Aquinas combining religion purpose theory with Aristotelian philosophy purpose theory, he thought that the understanding of the religion purpose is necessarily based on the understanding of the object of philosophy (science). There is no incompatibility in both the Christian doctrine and Aristotle Philosophy purpose theory, and what scientific purpose has is no more than what Christian dogmatics purpose does. In Aquinas’s opinion, Christian dogmatics did not include secular eternity, while eternity of the universe was not far less than the eternity of God. Thus, there is actually implies a ‘subtext’ *the pursuit of science is more than the comprehension of what the God has taught*. Therefore, any individual can pursue science in the name of the comprehension of what the God has taught to

5 Kuhn, Thomas S. (1996). The Structure of Scientific Revolutions. The University of Chicago Press. P. 15.

understand all that the God gives and its unique creation”⁶. The thought of Thomas Aquinas is God give us ultimate Truth not concrete Truth, give us ultimate Reason not concrete Reason. The theological thought of Thomas Aquinas not only guard the Truth from God, but also leave us a reign to develop the mundane Truth.

Not only the contribution of Thomas Aquinas’s theological thought, philosophy of logic of Nominalism which base on the philosophical thought of William of Ockham lead to the collapse of pope`s reign, and end the scholasticism eventually. The great gift that Nominalism give to Science is the simplicity principle, which certainly accelerate the development of Science.

Last but not least, “Roger Bacon based the understanding of what ‘that world’ implied on the understanding of present world (i.e. ‘this world’). ‘The Bible’ teach people to get rid of the secular so as to chase after happiness in heaven. From Roger Bacon’s angle, mathematical astronomy was the best science to understand heaven. Astronomers helped us to correct errors in the calendar, to understand the shape and motion of celestial bodies. Thus, despite that all the worldly knowledge can be found in the ‘Bible’, the living humans in the world are more urgent to understand ‘this world’. Otherwise, it is impossible to reach the ‘that world’ which is far away from the secular world. In other words, ‘this world’ has become the key to ‘that world’. Not understanding the existence and law of ‘this world’, it is impossible to acquire the happiness of ‘that world’. Now that ‘this world’ is filled with personal lusts and suffering from a great deal of natural damages, how could the humans be guided to a happy ‘that world’? According to this logic, firstly, only when human beings have recognized ‘this world’ could they effectively master their own destiny which is the way to ‘that world’, if not, the ‘this world’ must be painful. Understanding ‘this world’ means studying present world, which is just the duty of science”⁷. Therefore, Roger Bacon introduce his philosophical thought of experimentalism, he believes that only experimental method can give Science the accuracy and definiteness. Empiricism philosophy better substitute the scholasticism which boost Science greatly.

All in all, having all these philosophical, logical and scientific preparation, the Renaissance is on its way, so as revolution of science.

3. Who is the first to separate science from religion? The significance of modern medical science revolution

In the Scientific Revolution during the Renaissance Time, who is the first to accelerate science to separate from religion?

To answer this question, let us read carefully some words of Copernicus who was a devout Christian and loved God more than anything!

In “Dedication of Paul III”, Copernicus wrote:

⁶ “History of the European Renaissance: Science and Technology Volume”, by Jinghua Liu, Gongyao Zhang and Minghan Liu; Beijing, Renming Press, 2008.3: p. 20.

⁷ Ibid., p. 20.

I am aware that a philosopher's ideas are not subject to the judgement of ordinary persons, because it is his endeavor to seek the truth in all things, to the extent permitted to human reason by God. Yet I hold that completely erroneous views should be shunned. Those who know that the consensus of many centuries has sanctioned the conception that the earth remains at rest in the middle of the heaven as its center would, I reflected, regard it as an insane pronouncement if I made the opposite assertion that the earth moves. Therefor I debated with myself for a long time whether to publish the volume which I wrote to prove the earth's motion or rather to follow the example of the Pythagoreans and certain others, who used to transmit philosophy's secrets only to kinsmen and friends, not in writing but by word of mouth, as is shown by Lysis' letter to Hipparchus. And they did so, it seems to me, not, as some suppose, because they were in some way jealous about their teachings, which would be spread around; on the contrary, they wanted the very beautiful thoughts attained by great men of deep devotion not to be ridiculed by those who are reluctant to exert themselves vigorously in any literary pursuit unless it is lucrative; or if they are stimulated to the non-acquisitive study of philosophy by the exhortation and example of others, yet because of their dullness of mind they play the same part among philosophers as drones among bees. When I weighed these considerations, the scorn which I had reason to fear on account of the novelty and unconventionality of my opinion almost induced me to abandon completely the work which I had undertaken. [Copernicus, 1992, p. 18]⁸

In his another statement, he said:

But while I hesitated for a long time and even resisted, my friends drew me back. Foremost among them was the cardinal of Capua, Nicholas Schönberg, renowned in every field of learning. Next to him was a man who loves me dearly, Tiedemann Giese, bishop of Chelmno, a close student of sacred letters as well as of all good literature. For he repeatedly encouraged me and, sometimes adding reproaches, urgently requested me to publish this volume and finally permit it to appear after being buried among my papers and lying concealed not merely until the ninth year but by now the fourth period of nine years. The same conduct was recommended to me by not a few other very eminent scholars. They exhorted me no longer to refuse, on account of the fear which I felt, to make my work available for the general use of students of astronomy. The crazier my doctrine of the earth's motion now appeared to most people, the argument ran, so much the more admiration and thanks would it gain after they saw the publication of my writings dispel the fog of absurdity by most luminous proofs. Influenced therefore by these persuasive men and by this hope, in the end I

⁸ Copernicus, Nicolaus. (1992). *On the Revolutions of Heavenly Spheres* [1543]. Trans. by E.Rosen. Baltimore: The Johns Hopkins University Press. Book 1: p. 18.

allowed my friends to bring out an edition of the volume, as they had long besought me to do. [Ibid., p. 11]

From these classical words before Copernicus publish his book of “*De Revolutionibus Orbium Coelestium*”, it is obvious that Copernicus kept his own scientific activities within Christian permitted extent, or proved God's greatness with his scientific research. Therefore, we cannot admit that Copernicus's scientific activities has got rid of religion.

However, “there was another revolutionary scientific work whose name is ‘*De Humani corporis fabrica*’ published in Basel, Switzerland, the same year when Copernicus's ‘*De Revolutionibus Orbium Coelestium*’ came out into the public. Perhaps Switzerland was far away from the center of Pope's domination, maybe the author of Vesalius had no such deep religious background as Copernicus, *this is a book that really completely got rid of the religious fetters, a scientific book that even had no religious cloak*, where the independence of scientific activities began to get fully embodied. That means, *Vesalius should be the earliest to make science get rid of religion in Basel, which is far away from Rome!*”⁹

As a fact, Vesalius's “*De Humani corporis fabrica*” is just a Medical Revolution on anatomic-physiological, in year 1529 which is 14 years earlier than the “*De Revolutionibus Orbium Coelestium*” and “*De Humani Corporis Fabrica Librorum Septem*” published in the same year [1543], Paracelsus (Bombast von Hohenheim) open a new world with his brand-new medical theory (just like I said before when I explain what is Scientific Revolution) on Therapeutic Principle.

In any case, whether Medical Revolution on anatomic-physiological or on Therapeutic Principle happen sooner than Copernicus's Revolution, according to their books we can see that Copernicus's “*De Revolutionibus Orbium Coelestium*” is still have relationship with religion, but the situation is totally opposite for Vesalius and Paracelsus.

Conclusion

Throughout history, people tended to pour a lot energy into the research on “Copernican astronomy revolution” and its relevant topics, but paid less attention to “Medical revolution” which is the earliest to make science really detach religion. Considering the particularity of medicine, which is easier to spread new revolutionary scientific thought because of its commonality and necessity to anyone in anywhere, “medical revolution” is more likely prepare the people's thought for later all kinds of “Revolution” and even “Scientific Revolution”.

I want to illustrate that the Medical Revolution is the “Protestant” of “Scientific Revolution” through my article. Undoubtedly, astronomy or subsequent physics revolution is a key sword help people master the scientific theory cut off the religious association thoroughly. But the medical revolution did equally or even more

⁹ “History of the European Renaissance: Science and Technology Volume”, by Jinghua Liu, Gongyao Zhang and Minghan Liu; Beijing, Renming Press, 2008.3: p. 23.

important contribution to later Scientific Revolution. The research on how Medical Revolution break the Ancient Greed mode especially break the tradition of Aristotle and his contemporary thinker like Hippocrates and Galen is as important as the research on how physics revolution did the same thing to Ancient Greek thinkers. Both of them can help us better understand what happened during “Scientific Revolutions”! That is the key to understand present Science and assist us get more great way to standard and control today`s Science to give us a better future.

The main purpose of my writing this article, I hope, is that scholars could review the science history with respect to *the significant role of medical revolution – to Scientific Revolution, and which could be recognized by scholars.*

