Religion and Science

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For someone like myself who was born in China and raised in its traditional culture, any discussion about the relationship of science and religion poses a number of almost insurmountable obstacles. In the 2,000 years of China's recorded history, one would be hard pressed to find any mention of the topic at all. And when it does crop up, little or nothing is said as to whether the relationship is ultimately complementary or conflictive.

Interaction of Religion with Chinese Culture

Many historians point to this as evidence that religion has not exerted a strong influence on Chinese culture. On the contrary, not only was religion a definite factor in the early stages of its formation, but it also played quite an important role in its subsequent development. Taoism, which is a religion native to China, traces its source back to the well-known philosopher Zhuangzi who lived during the 6th century B.C. And when Christianity finally arrived in the 7th century A.D., it came at a time when significant numbers of Chinese were turning to Buddhism and Islam. It is also a fact that the number of religious structures in China proportionate to the general population

(temples, monasteries, mosques and churches) does not lag behind that of Europe and the Middle East. And throughout its long history, all but a few of China's emperors took an active part in its religious activities. So it would not be quite accurate to surmise that religion is a missing ingredient in the mix of Chinese culture.

Interaction of Religion with Academic Circles

It is true, however, that the influence of religion in academic circles down through the centuries has been minimal. While religious culture did influence Chinese philosophical thought, it had little effect on the personal beliefs of Chinese intellectuals. For example, during the Tang Dynasty (618-905) when Taoism was the commonly held religious belief of most people, the Taoist worldview, such as the teaching that "everything is created from nothing" was never assimilated into the personal faith of the astronomers. In contrast to this, during the Middle Ages in Europe, Aristotelian philosophy had a deep and lasting influence on the faith of Christian scholars.

This phenomenon, peculiar to China, did not change with the arrival of modern science in the 15th century. It was Matteo Ricci who first introduced European astronomy and other Western sciences into China. Ricci also erected Catholic churches in Beijing and Guangzhou. Ricci's astronomy gradually found acceptance among the Chinese astronomers, and, in time, replaced traditional Chinese astronomy in calculating the annual imperial calendar. Ricci's Catholicism, however, never met with the same kind of acceptance among the Chinese scholar class. This example is typical of how Chinese intellectuals view the relationship of science and religion, which is markedly different from that of the West, and it also clearly demonstrated the basic attitude of the Chinese scholar towards religion in general. The formative agent of this attitude has been for the most part traditional Confucianism, where much emphasis is placed on morality and how it functions in society, but little or no thought is given to ontological considerations. Confucius is quoted as having said: "The worship of spirits and gods is alien to us." While the problem of the existence of God has been as much discussed in China as it has been in the West, the numbers of Chinese scholars participating in such discussions have been

negligible. Another saying of Confucius is often quoted in this context: "If we know so little about life, how can we talk about death?"

If our only interest lies in recording the interaction of science and religion within the framework of Chinese culture, then there is little need for us to proceed further in this discussion. However, if we wish to broaden our view and search out the subtleties of this relationship, then Chinese history can well provide us with an interesting case for a comparative study. Because of differences in cultural background, science developed differently in different places. A comparison between the development of science in China and that in the West can perhaps help us to understand the influence of religion on science.

Interaction between Science and Religion.

The interaction of science and religion has been both positive and negative, at times complementary, at other times conflictive. In the past much has been written about the negative aspects of their interaction, and these arguments are already quite familiar to us all. Therefore, I shall confine myself in this essay to evidence of some of the positive factors found in their inter-relationship.

It is generally acknowledged that scientific development cannot proceed without hypotheses or presuppositions, for these are the change agents and criteria for selection that move scientific investigation forward and make scientific progress possible. It is also a commonly accepted perception of scientists that such presuppositions or hypotheses are neither found in, nor can be deduced from, the scientific material itself. The choice of a working hypothesis or an *a priori* presupposition depends by and large on the cultural environment of the individual scientist. It is precisely at this point that religion interacts with science and plays an important role in furthering scientific development.

The most important presupposition of science is, of course, the *comprehensibility of nature*. This means simply that scientists believe the problems they encounter in their research are basically solvable. While in most cases this presupposition does not seem to be of great practical significance, when a problem arises that does not fall within the scope of our previous experi-

ence, it becomes an urgent priority for us to believe that we can take positive action to resolve it. In a word, no matter what the problem confronting us may be, we proceed from the hypothesis that ultimately it can be understood. Therefore, the scientific presupposition of comprehensibility is most important.

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Western astronomers of past ages directed their attention to solving one major problem: why do planets and stars hang in the sky and not fall to earth like the rest of the objects around us? Thinkers from Aristotle to Newton studied, discussed and offered various possible solutions to this problem. From the point of view of modern physics, of course, the pre-Newtonian responses were not accurate. But what is more worthy of note here is that those thinkers continued to believe that the problem was basically solvable. Faced with the problem of orbiting heavenly bodies that did not fall to earth, western scholars, adopted as a working hypothesis the presupposition of comprehensibility.

The Chinese approach was completely different. What distinguished the ancient Chinese astronomer from his Western counterpart was the latter's constant attempts to question and analyze the why of abnormal or unusual phenomena in the orbiting of the planets and stars. For the Chinese astronomer, it was enough merely to observe and record them. According to 3rd century Chinese records, some citizens of the city of Qi worried about the sky falling and questioned when it was likely to do so. In radical contrast to the West, this problem failed to arouse the interest of scholars not only of that time but also of those in the centuries that followed. The most common response was that there was no plausible answer to the question. During the Tang Dynasty, Li Bai, one of its leading poets, wrote: "The people of Qi worry without reason whether the sky will fall." It later became proverbial to compare those obsessed with groundless fears to "The people of Qi worrying about the heavens". When

faced with the question of why celestial bodies do not fall to earth, Chinese scholars adopted a presupposition of incomprehensibility. I offer this example to support my thesis that, in general, the reason scientific presuppositions differ from place to place--in this case nature's essential comprehensibility or incomprehensibility--is due entirely to cultural differences.

Disparity of Presuppositions: Disparity of Cultures

Why such a disparity between Chinese and Western presuppositions? The only practical explanation seems to lie in the disparity of the two cultures. And religion is one of the important factors in this disparity. While there is a great difference between religious and scientific theorems, Western theological systems do make use of the presuppositions of comprehensibility when exploring the responsibilities and capabilities of the human person. Many traditional theological formulations go far beyond the mundane problem of orbiting stars to address such transcendental questions as the existence and nature of God. Few people exposed to this kind of religious tradition will doubt whether an answer can be found to the question why celestial bodies do not fall to earth. The presupposition of comprehensibility, then, comes, at least in part, from the Western religious tradition. In such circumstances, the presupposition that "problems which cannot be deduced directly from our experience and those which transcend our experience remain comprehensible" is one result of the interaction between religion and science, and it is a positive interaction.

A second point of contrast between ancient Chinese and Western astronomers can be seen in the way each viewed the movements of celestial bodies. While the stars circulated according to a fixed orbit, the five planets of the solar system that are visible to the naked eye seemed to be exceptions to the norm. The orbiting of planets unlike the stars did not seem to follow any fixed pattern. At times they appeared to move slowly, at times accelerating; at times they even seemed to move backwards, or come to a sudden halt. Both Chinese and Western astronomers recorded these phenomena with almost identical accuracy, but each had his own method for calculating their various movements.

Where the Western astronomers differed from the Chinese was in their constant search to find some logic in what appeared

to be unusual or abnormal behaviour in the heavens. Their most important project came to be the production of a table of patterns which would serve to demonstrate that the various movements do in fact share a common identity and have the same essential character. With this kind of motivation, the foundation was laid on which Copernicus was later to build his theory of heliocentricism, which established that celestial bodies did indeed follow fixed orbital paths around the sun. The apparent changes observed in their movements--when they appeared to accelerate or slow down, back-up or come to a stop--were not due to the stars, but reflected the movement of the earth itself. In summary, the Western astronomers selected and worked from the presupposition of identity: "the sameness of essential or generic character in different instances."

Chinese astronomers, by comparison, seemed to be more curious about these unusual phenomena in themselves. Ancient Chinese astronomical records are filled with incidents of unusual and abnormal celestial behaviour. The arrival of meteors and comets, lunar and solar eclipses, the appearances and disappearances of novas and supernovas are noted in much greater numbers and with much more detail in Chinese records than in those of the West. Actually, the Chinese astronomers were willing to accept without question all kinds of unusual phenomena and abnormal behaviour as being part and parcel of the general design of things. And, as a result, they did not consider the unusual movements of the planets to be more worthy of their serious attention than the other unusual phenomena to be found in the heavens.

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The responses of the Chinese and Western astronomers to questions posed by observing the planets and stars were not the same. Part of the reason for this is to found in the different religious traditions of their two cultures. Western religious doctrine, especially the Judeao-Christian tradition, emphasizes that all of creation is the work of a single Creator. This way of

looking at material reality facilitates the adoption of the theory of identity as a presupposition in astronomy. Taoism likewise supports this fundamental view. In the ancient Taoist classic *Tao Te Ching*, we find the following: "The Tao begets one, one begets two, two begets three, and three begets all things." However, as we mentioned earlier, unlike Confucianism, Taoism never became an important system of thought in Chinese culture.

Presupposition of Identity

In summary then, we can say that the second important interaction of religion and science is in the presupposition of identity. Perhaps it was their absolute faith in this that caused Western scholars to leave unrecorded the presence of certain unusual phenomena in the heavens. But there can be little doubt that by adopting the presupposition of identity they were eventually able to unravel the secrets of the movements of the planets and stars. And this has been a more positive interaction of religion and science.

Theory of Relativity

We can point to the theory of relativity as the third and our final example of a positive interaction between religion and science. In *A Dialogue Between Two Important World Systems* Galileo wrote the following famous passage:

> Imagine yourself below decks enclosed in the hold of a ship...place before your eyes a large bowl of water containing a few fish...observe how the fish move freely in every direction...now command the ship to move forward (the speed of the ship is unimportant as long as it moves at an even pace). You will now discover that there is not the slightest alteration in any of the phenomena mentioned above, and from observation of any of the phenomena, you will not be able to determine whether the ship itself is moving or not.

It is generally acknowledged that this passage marks the first time mention is made of the theory of relativity in the history of physics. Such an assertion is not an exaggeration, for those sentences played a very important role in Galileo's formulation of the law of inertia, Newton's physics, and ultimately Einstein's theory of relativity. What is even more interesting is that almost the identical words appear in the Chinese classic *Shang*

Shu Wei, which was written over a thousand years before Galileo's *Dialogue*. I quote:

> With regard to movement over a level surface which is not perceived, should a person be sitting in the cabin of a boat with the portholes closed and covered, if the boat was set in motion, he would not be aware of its movement.

The general purport of the author of these lines is much the same as that of Galileo. Both are responding to a question about the earth's movement. If the earth is moving at a high rate of speed, why is it that we have no perception of it? Unfortunately *Shang Shu Wei* had no influence on the later development of Chinese physics. Fang Yizhi, who was a Chinese scholar and a contemporary of Galileo's, wrote a book entitled *Wuli Xiaoshi* (*Learning about Physics*) introducing the results of Galileo's research to China. While he did make a passing reference to the theory of relativity as contained in *Shang Shu Wei*, he did so only in an off hand sort of way.

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The reaction of the Chinese to the theory of relativity was different from that of the Western scientist. It is related to the fact that in traditional Chinese science there was no concept of universality. Because the Chinese did not hold to a belief in the existence of universal principles and because they failed to discover the universal laws governing motion, the phrase, "there is no feeling of motion when you are moving in an enclosed vessel" had no special import to them, except as a limited analogy to explain why we do not perceive the earth as being in motion. Galileo's words were founded on the vague presupposition that there is no essential difference between astrophysics and geophysics. This is precisely the presupposition. Many cases in the history of physics have already demonstrated that the existence of universal principles can be proven through an analysis of certain analogies, just like in an ideal experimental method. This kind of success can only be arrived at under the presupposition of universality. While we cannot claim that the

concept of universality has its origin in the Western religious tradition, for the concept was already highly developed in ancient Greece, the Western religious tradition did serve to support and reinforce a belief in the existence of universal principles and helped to trigger a zeal to search them out in the cosmos. Therefore, we can add the principle of universality to the list of positive points of contact between science and Western religion.

Conclusion

From this brief comparative analysis, we can readily conclude that the old dichotomy between modern science and religious culture becomes less and less important with the passage of time. The points of interaction between science and religion are readily discernible in the formulation and choice of presuppositions or hypotheses which are an essential part of scientific activity. And that is as it should be. Human culture is holistic, it cannot be partitioned off into separate compartments, for each component of this whole inevitably influences and complements all of the other parts. If we observe carefully the forms and structures of scientific thought, we will understand this: the concurrence and interaction of every component of human culture, including science and religion, is not only important but necessary.