

CHRISTIAN AND CHINESE WORLD
VIEWS IN THE SEVENTEENTH
CENTURY

China was the first country beyond Europe with an important civilization to receive scientific theory from the West in the modern era.¹ Neither in India nor in Japan (where the first Western works arrived from China and were quickly banned²) nor *a fortiori* in other missionary countries was there an early acquaintance with European sciences. In China the first handbook of Western geometry was printed in 1607, the first treatise of astronomy in 1614. After 1584 a map of the world, inspired no doubt by that of Ortelius of 1570, was engraved in stone. Printed versions spread quickly in China and continued into Korea and Japan. The algebraic notation of Viète, plane and solid trigonometry, logarithms (called then the rules of Neper), the cosmology of

Translated by Scott Walker

¹ Lecture given to the Collège de France, 27 April, 1978.

² See Itô Tasaburô, "The Book Banning Policy of the Tokugawa Shogunate", *Acta Asiatica, Bulletin of the Institute of Eastern Culture*, XXII, Tokyo, 1972, pp. 36-61. This censorship was applied after 1630 indiscriminately to scientific as well as religious works.

Aristotle and the methods of astronomical calculation of Tycho Brahe were all introduced into China during the course of the 17th century.

That which the Jesuit missionaries did at the time to bring to China some knowledge of European sciences is admirable, nor must we overlook the utter newness and importance from the Chinese point of view of a large measure of this information. But here there are two errors to be avoided. The first consists in imagining that this scientific contribution was much more modern than it actually was. Secondly it is wrong to presume that the Chinese had only to learn from the West, and that the criticisms or hesitations that the teaching of the missionaries sometimes provoked in them can only be attributed to obscurantism, xenophobia and stubborn attachment to their traditions.³

The idea of the fundamental superiority of the West is deeply set in our thinking. Everywhere in the world and not just in China new ideas encounter sturdy resistance. Daniel Mornet⁴ has pointed out that until 1771 in France geocentric systems continued "to berate Copernicus substituting in place of this theory other astronomies less filled with calculations and with ellipses, although the Sorbonne had for a long time ceased condemning Galileo." Why can we not accept that the Chinese of the 17th century, all of whose traditions were quite different and who had to make a considerable effort of adaptation, were no different from the French of the 18th century? The truly astonishing factor is not that there were objections and criticisms, which is normal, but instead that numerous Chinese scholars showed an enormous capacity to imbibe that which the missionaries brought them and to judge this in an objective manner. Many were enthused by demonstrations of Greek geometry. Matteo Ricci, the famous Italian missionary who was the first to settle in Peking, speaks in his memoirs of a certain Chinese who in 1559 had understood

³ These two errors are precisely the ones committed by George H. C. Wong in his article, "China's Opposition to Western Science," *Isis*, LIV, 1, 1963, pp. 29-49. The author goes so far as to attribute Chinese hesitations to the fear of a "complete domination of Chinese society by Western technology". But such a fear cannot be justified simply because of several clocks which had to be set daily and repaired often, nor even by cannon which occasionally exploded accidentally killing their operators.

⁴ Daniel Mornet, *Les sciences de la nature en France au XVIIIe siècle*, Paris, A. Colin, 1911.

all alone the first book of the *Elements* of Euclid from a still rough translation, and “who refused afterward to consider proofs that were not in the manner of Euclid.”⁵

In any case to speak of a Western *contribution* in the sense of something brought freely is less than correct. If European sciences penetrated China at the end of the 16th century it is due less to the initiative of the missionaries than it is to the demands of the Chinese themselves. It was they who showed spontaneous curiosity and interest, they who requested and who collaborated most effectively in the work of adaptation and translation of the scholarly handbooks in use in the Jesuit colleges at Rome and Coimbra.⁶ It is important to remember that the missionaries did not come to China to teach European mathematics and astronomy, but to preach their religion. It was precisely this that had to be reminded to them occasionally. In 1614 Valentine Carvalho, provincial of the Jesuits of Japan and China, issued an order forbidding his missionaries to teach Chinese mathematics or any other science except the Gospel.⁷ The order was soon rescinded, but it indicates a fundamental opposition to secular activities. And the Jesuits in China did not hesitate to emphasize the secondary nature of their scientific teaching in comparison with the religious teaching they offered which dealt with more important and more elevated truths. If the work of adaptation and translation continued into the 17th century (the majority of such work was produced in this period), it is only because the sciences proved themselves to be most effective for attracting educated Chinese, leading them to a Christian conversion, bringing them at an early stage to the capital and retaining them there afterwards, even in periods of crisis. But there

⁵ Matteo Ricci, *Della entrata della Compagnia di Gesù e Christianità nella Cina*, book IV, chap. 5, original manuscript edited by Pasquale M. D’Elia in *Fonti Ricciane*, vol. 2, Rome, 1949, p. 55. The *Elements of Euclid* was a handbook of geometry composed by Clavius, teacher of Ricci at the Rome College and author of the Gregorian calendar reform.

⁶ On the content of these scholarly handbooks see Willard J. Peterson, “Western Natural Philosophy Published in Late Ming China”, *Proceedings of the American Philosophical Society*, vol. 117, August, 1973, pp. 295-322.

⁷ *Opere del P. Daniello Bartoli, Della Cina*, Turin, 1825, vol. III, chap. 63, p. 150. According to Henri Maître, “Adaptations chinoises d’ouvrages européens”, *Monumenta Serica X*, 1945, 1-57, the Jesuit visitor to Japan and China, Andrea Palmeiro, also manifested his disapproval of all scientific activity in 1629.

was even more; the discipline and the precision manifested in Western mathematics and astronomy were able to reinforce the authority of Western religion as well. By a simple kind of reasoning, if what Western scholars said of the visible world was proven true, the Chinese could then believe as well what Westerners said of the invisible world of angels, devils, hell, paradise and the existence of God the Creator.⁸ Profane sciences and religion were mutually supportive.

The first catechism printed in Chinese in 1584 combines a simplified account of Genesis with an Aristotelian conception of astronomy, proof of the connection which existed between science and religion in the minds of the missionaries. (This catechism even contains an explanation of eclipses!) Here we read that, "on the second day, the Lord of Heaven created nine heavens (beneath the empyrean, the domain of all the saints and elect of paradise). These heavens are enveloped one in another like the layers of an onion. The ninth heaven, *primum mobile*, turns at the speed of an arrow and makes a complete revolution in one day. The other heavens rotate in relation to this. The eighth is the heaven of the fixed stars which are like wooden pegs in a board." Then come the heavens of Saturn, Jupiter, Mars, the sun, Venus, Mercury, the moon. Created by an omnipotent God, the universe is bounded in space and composed of a series of crystalline spheres at the center of which is our earth, unmoving.⁹ The first astronomical handbook printed in 1614 fixes the distance from the earth of the ninth heaven at the rough equivalent of 323 million kilometers.

This world is limited in time as well. "About 5550 years ago," says the first catechism, "there was nothing other than the Lord

⁸ Certain Chinese seem to have accepted this reasoning. Ricci's first student in mathematics, at least, thought that scientific precision was one of the best means to combat the absurd concepts of Buddhism. P. D'Elia, *Fonti Ricciane*, II, p. 54 (Ricci's text): "E sapendo quest'huomo l'intentione de' Nostri che era d'estirpare la falsa setta degli idoli [Buddhism] e seminare la vera di Christo benedetto, disse al Padre che non era necessario confutar la dottrina degli idoli, ma che solo attendesse a insegnare matematica. Percioché, sapendo i Cinesi la verità delle cose del cielo e della terra materiali, per se stessi avevano da vedere la falsità de' libri degli idoli."

⁹ *T'ien-tchou chen-kiao che lou*, by Michel Ruggieri, Fonds chinois de la Bibliothèque nationale, N. 6815-6818, 4th §. The first version of this catechism, two copies of which are in the Roman archives of the Society of Jesus, contains the same details.

of Heaven. That is when he decided to create in six days Heaven and Earth in order to show his beneficence." The perfect order found in the universe is evident proof of the existence of God the Creator. "In creating the world, the Lord of Heaven put everything in its place. If he had not, there would be chaos. Thus the stars stay in Heaven and do not fall to Earth to mingle with the terrestrial vegetation, and the vegetation does not rise to Heaven to mingle with the stars. The Lord of Heaven is all-wise: Knowing that fish swim, he placed them in water; knowing that birds fly, he placed them in the air; knowing that earthly animals walk, he placed them on the earth." The Aristotelian notion of a natural place, a place where everything is in accord with its own nature, is assimilated into the idea of divine providence.

The missionaries proposed an image of the world which was based on a static conception of order and in which, through a systematic application of the principle of contradiction, scholastic reasoning permitted the creation of an entire series of classifications. Hence the origin of such absolutely irreconcilable opposites as animate and inanimate, sensible and insensible, corporeal and non-corporeal, substance and accident, body and soul.

The great apologetic treatise of Matteo Ricci, first printed in 1604,¹⁰ invokes on almost every page categories and methods of reasoning drawn from scholasticism. Efficient, formal, material and final causes; the three souls, vegetable, sensory and rational; the four elements of Empedocles, the three kinds of inclusion; the seven kinds of identity: all this logical apparatus facilitated reasoning and presented a rational, structured and definitive image of the universe. One and the same reason, a faculty belonging exclusively to the human soul and entirely independent of matter, serves equally well for explaining the visible in a methodical fashion or for presenting religious truths. Theology, cosmology, the physics of Aristotle and astronomy form an ensemble which is perfectly harmonious and in which it is futile to look for the slightest discord.

But, one may object, was there no evolution in the teaching of the missionaries between the end of the 16th century and roughly 1700 or even later? Is this not the period in which Kepler,

¹⁰ *T'ien-tchou che-yi* (in latin *Dei vera ratio*) in *T'ien-hiue tch'ou-han* ("First Collection of Christian Works"), 1628, republished in T'ai-pei in 1965.

Galileo, Descartes and Newton were fixing the foundations of modern science? This is true, but the religious schools were affected by these events only much later. In any case, these developments were unknown to the majority of people before the beginning of the 18th century.

Especially forbidden was anything which could raise any doubts about the Scriptures. When he published his *Epoques de la Nature* in 1778, Buffon still felt himself obliged to explain in ten pages at the beginning of the volume that his ideas were reconcilable with the teachings of Moses. Even in China, one had to be very careful not to change anything which had earlier been presented as immutable truth.¹¹ Thus there were no fundamental alterations but only changes in detail in the teaching of the Jesuits in China. For a long time it was thought that certain missionaries toward the middle of the 17th century had introduced the system of Copernicus to the Chinese. But on closer inspection it has recently been shown that the references in favor of this hypothesis were inconsistent and that neither from missionary texts nor from Chinese literature of the period is there any proof of the introduction in China of heliocentric theory. Not that the missionaries never mentioned the name of Copernicus. They did, but without speaking of his system and presenting him only as an obscure but honorable predecessor to Tycho Brahe. Nor did they omit mention of the discoveries made by Galileo with his telescope: lunar mountains, sun spots (known by the Chinese already roughly 2000 years ago), the satellites of Jupiter and Saturn. But they discussed these discoveries removing all trace of their dangerous novelty; they were presented only as curiosities which

¹¹ On the difficulties associated with modifications of earlier teaching in China see L. Pfister, *Notices biographiques et bibliographiques sur les Jésuites de l'ancienne mission en Chine*, Shanghai, 1932, II, p. 551 (quoted in J. Needham, *Science and Civilisation in China*, vol. III, p. 450). In 1710 Jean-François Foucquet (born in Vézelay in 1665, died in Rome in 1741) and others wished to use the new planetary tables published by La Hire in Paris in 1702. The Jesuit visitor was opposed "for fear that we give the impression of criticising what our predecessors had established with such care and so furnishing new accusations against our religion." In a letter of around 1733 P. Antoine Gaubil objects strongly to the imprudence of those missionaries who had shown the Chinese the different systems of numbering the years in the Septuagint and in the Vulgate. "This evil has been present for 80 years now . . . and you see how the Chinese have taken advantage of it." A. Gaubil, *Correspondance de Pékin, 1722-1756*, published by René Simon, Geneva, Droz, 1970, p. 355.

proved simply that this new instrument permitted very precise observations. The sole innovations in the history of Jesuit astronomy in China, an area excellently studied by Nathan Sivin,¹² were the introduction in 1630 of the system of Tycho Brahe which had the advantage of simplifying calculations by having the planets turn around the sun all the while remaining faithful to the orthodox thesis of the central and unmoving position of the earth; and in 1742 the adoption of elliptical orbits for the sun and for the moon with the exclusion of the planets. It was only in 1769, fourteen years after the suppression of the Jesuit order, that the Copernican system was presented for the first time in China; the *De Revolutionibus orbium coelestium* had just been removed from the Index in 1757. For the Chinese it was a most interesting new model which showed once more that these Westerners were incapable of holding on to a well established opinion.

Thus the missionaries offered China an image of the world which was, to use the words of Alexandre Koyré, that of a universe "of finite structure, hierarchically arranged and qualitatively differentiated from an ontological point of view." This Christian cosmos was one on whose ruins were constructed modern physics when the finite and heterogenous world of tradition was replaced by a world opened to infinite space, unified and governed by the same universal laws. One cannot maintain, therefore, that this first wave of Jesuit missionaries brought modern science to China.¹³ This only occurred in the 19th century. But the missionaries did accomplish a difficult and considerable task worthy of our admiration by giving the Chinese a glimpse of European ideas in the age of scholasticism, when faith and knowledge were one.

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It must be said that these ideas, which seem so strange to us even with the perspective of time, were still stranger to the Chinese. A few chosen texts, the majority of which date from the very period in which these first intellectual contacts between

¹² On all these questions see the remarkable study by Nathan Sivin, "Copernicus in China," in *Studia Copernicana*, Warsaw, 1973, p. 63 ff.

¹³ This is also the opinion of W. J. Peterson, *loc. cit.*

China and Europe took place, will allow us to grasp better the contrast at that time between Christian and Chinese world-views.

A first observation of great import is that in China the universe had never been conceived as an object created once and for all by a craftsman, to use the imagery of the Christian texts. It is not a question of creation but a process of natural evolution which explains the world as it is. At the beginning of the 17th century an author attempting to express the history of the universe adopted this formula: " 'What did our universe resemble in the earliest moments of its formation,' someone asked. 'This is something which is not easy to explain,' said Master Liu. Nevertheless, pointing to a pond before his library, he ordered it to be filled with sand and water into which he had cast numerous stones and pieces of tile. To this he added a small quantity of cereal and bean seeds. Finally he had the liquid, formless concoction stirred and mixed. 'This is how the earth must have looked in the period of the chaos,' he said. 'In three days when we return we will be able to see the beginnings of our universe.' When the day arrived, the mixture had settled and the lightest elements floated on the surface. 'There you have the heavens as they were in the period of the first stage. The shapeless mud deposited on the bottom is the earth at the period of the second stage. The pieces of tile and stones which protrude in the center are the mountains.' Then the cereal and bean seeds began to sprout, and after a month small insects plunged in the water and skated on its surface. 'This is like the appearance of man and all the countless species at the period of the third stage. . . . The active transformation of energy will be each day more flourishing, more lavish, and then this activity will begin to weaken progressively until these beings disappear and the vital mechanisms reach their final dissolution. Although Heaven and Earth have not yet been destroyed, when we reach the final stage of evolution we will begin a new period of chaos.' ”¹⁴

In Chinese thinking heaven and earth themselves exercise a continuous and undetectable action which assures their development and their decline. This action is attested to particularly by the germination, growth, flowering and withering of plants.

¹⁴ *Liu K'ouen tchö-hiue siuan-tsi* ("Selected Philosophical Writings of Liu K'ouen (1536-1618)"), edited by Heou Wai-lou and others, Peking, 1962, p. 77.

Instead of the static concept of Aristotle (a place for everything and everything in its place!), instead of divine Providence, a concept of universal dynamism predominates. The movement of cosmos is essential for its well-being. "If there were no heavenly revolution, the universe would cease to exist," said Lou Che-yi, an author of the 17th century.¹⁵ Everything is influx and energy in movement, two ideas which are fused into one Chinese term sometimes translated by the word ether. This ether or universal energy-matter is omnipresent and possesses an inherent principle of order. It condenses to form visible bodies, and bodies return to this state when they dissolve. Nothing is lost, nothing is created in the universe. This is the only physical theory found in China, expressed in a clear manner already in the 11th century.¹⁶ The rest is numerological speculation or explanation by means of symbols. However, physical theory, symbols and numerology are very frequently related.

"From before [the formation of] our universe until it will no longer exist, it is one and the same energy which flows," wrote the author already cited. "If this energy were to cease its effects, even if it were for only the slightest second, this universe would immediately be annihilated. In plants from germination to their withering, one sole and unique energy flows. If its action were to be interrupted for even the slightest instant, the vital process would stop. (It is the same with animals from the embryo to death. . . .) It is upon this energy that the permanence both of our universe and of its uncountable beings reposes."¹⁷

We find the same idea of a cosmic and inexhaustible energy expressed in different form in the writings of T'ang Tchen (1630-1704). In a chapter entitled "Vision of the Universe" T'ang Tchen speaks of the prodigious transformations which constitute the passage of universes from chaos to order and from order to chaos as well as of the chain of living beings, constantly broken but always reformed. He explains that these are phenomena which can have no end and which must then have a motor which is

¹⁵ Lou Che-yi (1611-1672), *Sseu-pien lou tsi-yao*, edited by Tchang Po-hing at the beginning of the 18th century, chap. 14.

¹⁶ The theses relative to the inevitable condensation and dissipation of universal energy were formulated by Tchang Tsai (1020-1077) in his *Tcheng meng*.

¹⁷ Liu K'ouen *tchö-hiue siuan-tsi*, p. 46.

neither life nor death. Using a poetic comparison he says, "In the full moon of the first month of spring, those who like to make lamps sometimes make them with an outer covering of paper and with figures which turn on the inside. There are standard-bearers with banners stirred by the wind or little ringing bells of war, men in armor with helmets and pikes, horsemen and foot-soldiers. All pass in review without interruption. It seems a marvelous mechanism. But there is nothing marvelous here. If the lamp is removed, everything stops; if it is replaced, the little people fly by once more. It is the [heat of the] lamp which excites them. Alternating moments of order and of chaos, interruptions and recommencings, births and deaths: all this is produced by an agent analogous to the [heat of the] lamp which moves the figures. Otherwise, once lives come to their end or seeds disappear or bursts of energy are absorbed, everything would be over and nothing could guarantee the inexhaustible transformations of the universe."¹⁸

For one of the most eminent thinkers of the 17th century, Wang Fou-tche, our impression of the permanence of nature comes from the continuity of its functions and not from the continuity of the substance of things. Even though always retaining the same form throughout the ages, the sun and its traditional associate the moon are continually being renewed in their substance. "The water of a river and the flame of a lamp seem the same today as they have always been, and yet they are neither the same water nor the same flame. Our finger nails and our hair grow each day, and the nails and hair from before disappear. These things we recognize because they are near to us. But we do not recognize that our skin and our flesh grow each day as the old skin and flesh fall away. In the same way we know that the Sun and the Moon of today cannot be that of yesterday."¹⁹

Matteo Ricci was wrong in believing the Chinese to be pantheists. It is not that they considered the raw matter of the universe to be animated by an omni-present divine power inherent in nature, but they saw everywhere the effects of a universal energy which acted on the biological cycle and on the annual cycle

¹⁸ T'ang Tchen, *Ts'ien chou*, chap. 29.

¹⁹ Wang Fou-tche (1619-1692), *Sseu wen lou wai p'ien, Tch'ouan-chan yi-chou*, ed. 1866, chap. 30, pp. 28b-29a.

of the seasons. Matter and life were for them continuous creation of rather incessant transformation.

Heaven and earth have a history. They were formed through the ages and so must one day begin their period of decline. They never cease to be transformed, but since there is no comparison between the extreme brevity of human life and the extremely long duration of these transformations, we can never be aware of them directly. Nevertheless, the downward slope of mountainous rocks bears witness to ancient cataclysms, and the filling in of valleys reveals the slow erosion of the heights.²⁰ This concept of an evolutionary universe has its counterpart in the idea that there is also a history of man. Wang Fou-tche, already mentioned, thought that the Chinese of the most remote antiquity were like the populations of Miao and Yao of southwest China, and that the men of the oldest eras "were like animals walking upright, making grunting noises to indicate when they were hungry and throwing away the remains of their food once they were satisfied."²¹

Only very long time periods permit the possibility of the idea of evolution. Christian theology excluded these long time periods and fixed the moment of creation at several thousands of years before the coming of Christ. Buffon in 1749 caused a scandal by fixing the age of the earth at 74,832 years, the time he estimated necessary for its cooling. A Chinese text of the 17th century, on the other hand, pushes the formation of our universe back to some 20 million years ago.²² It is true that this calculation is based on numerological theories. But the idea of a spontaneous and progressive formation of the universe seems to have been

²⁰ Cf. Wang T'ing-siang *tchö-hiue siuan-tsi* ("Selected Philosophical Writings of Wang T'ing-siang (1474-1544)"), edited by Heou Wai-lou and others, Peking, 1965, p. 8. The same kind of remarks, however, can be found in Chen Koua (1031-1094).

²¹ Wang Fou-tche, *op. cit.*, p. 44b.

²² Yang Kouang-sien (1597-1669), *P'i sie louen* in *Pou tö yi* (a collection of works written against the missionaries entitled "Finally I Must Explode"), chap. 1, p. 20b-21a. "From the year *keng-shen* of the *Yuan-cheou* period of the Han dynasty (date of the birth of Christ) to the year *ki-hai* of the *Cbouen-tche* era (1659), 1660 years have passed. From the year *kia-tseu* of the establishment of the world . . . till now there have been 19,379,496 years in all. . . . If Jesus is the Lord of Heaven, all the periods before the Emperor Ai of the Han dynasty lacked the Heaven (of God)."

shared by all Chinese. For its part Buddhism in China had long aided the expansion of the ideas of immeasurable cosmic periods and of the plurality of worlds.

“Although Heaven and Earth are immense,” wrote Teng Mou at the end of the 13th century, “they are no bigger than a tiny grain of rice in space. . . . It is as if space were a tree and our universe were one of its fruits, or as if space were a kingdom and our universe one person in this kingdom. . . . How unreasonable it would be to think that outside of the Heaven and Earth we see there were no other Heavens or Earths!”²³

A Buddhist monk in a work published probably in 1638 criticized the Christian dogma of creation and declared that “space, worlds and beings have no beginning nor end if we consider them not in themselves and individually but in their totality. They are eternal from this global point of view. They proliferate without end and during incalculable cosmic periods progress through successive stages of formation, stability, degradation and then a return to nothingness. The worlds are thus inexhaustible in that this one is in the stage of formation and that one is in the stage of decomposition while another is in the stable phase and still another has returned to nothing. . . . That this world is decomposing does not mean that all the others are doing likewise. . . . It is like a city and its houses. If it happens that those of a certain neighborhood burn, they will be replaced later as they were before. . . . Seen from afar, the city has not changed and we cannot distinguish the houses that were destroyed and replaced from those that were not. In the same way we cannot distinguish in infinite space those eternal worlds which have been destroyed and replaced and those which have not yet been destroyed. . . . From a point of view where all differences are leveled, space, beings and worlds are inexhaustible. . . . and consequently without beginning and without end.”²⁴ The author of this text reproaches Matteo Ricci for having pushed to an absurd extreme his deductions and his calculations on the universe and its beings because

²³ Text of Teng Mou (1247-1306) quoted by J. Needham, *Science and Civilisation in China*, vol. III, section 20, p. 221. See also Lo-shu Fu, “Teng Mu, a Forgotten Chinese Philosopher,” *T'oung Pao*, LII, 1-3, 1965, p. 60.

²⁴ *Yuan tao p'i sie chouo* of the monk T'ong-jong in *P'o sie tsi* (1639), Japanese re-edition of 1855, vol. VIII, pp. 6a-7b.

he had recourse only to discursive knowledge and immediate evidence. Thus he arrived at obscure and incomprehensible concepts which he himself was unable to clarify. Hence too his erroneous supposition of a Lord of Heaven without beginning and without end who is capable of producing the universe and its beings.

Something which particularly struck the Chinese in the teaching of the missionaries was the infinite distinctions and subdivisions (radical and arbitrary in their opinion) which the Jesuits introduced into nature. This fault was especially apparent in the important work of Ricci, *On the True Notion of God*, first printed in 1604 and continuously reprinted afterward until 1938. This book, the most read of all Christian works in Chinese, attacked with scholastic methods the concepts of educated Chinese as well as those of Buddhism. Ricci had understood quite correctly that one of the major obstacles to evangelization in China was the universally accepted thesis of the unity of the universe. According to a formula repeated endlessly by Chinese authors, "Heaven, the Earth and beings of all kinds are all one substance." Conversion implied in effect first being able to convince the Chinese of the existence of souls and spirits entirely independent of matter, and then to demonstrate to them the fundamental distinction between creation and the creative God. But there was nothing in Chinese tradition which even vaguely resembled the radical opposition between the sensible and the rational, nor anything which approached the absolute distinction between the active spirit and raw matter. All Chinese concepts went in exactly the opposite direction. "Body and spirit are not two fundamentally distinct realities", said Houang Tao-tcheou, a philosopher who died in 1646. The majority of Chinese critics of Christianity accused the missionaries of creating, as they said, "a Heaven outside of Heaven." And one critic declared, "If Heaven had been created by a God, it would no longer be anything more than a brute thing and would be incapable of giving birth to beings."²⁵ This would mean thus that the universe would no longer contain in itself its own principles of regulation nor its creative energy. Ricci explained in his treatise that the fundamental difference

²⁵ *P'i sie louen* of Yang Kouang-sien, chap. 1, p. 19b.

separating man from other animals is that only man possesses in addition to the vegetable soul of plants and the sensory soul of animals, a third soul, the rational soul. "Animals are only given a spirit which leads them mysteriously to accomplish the orders of the Sovereign above," said Ricci.²⁶ As is explained in a treatise printed in Chinese in 1670, *Essential Truths of Religion*, this rational soul does not come from our parents but is given to us by the Lord of Heaven on the fortieth day after conception for boys and on the eightieth day for girls.²⁷ Here is an example of what seemed to the Chinese absurd distinctions and incomprehensible subtleties. The radical distinction between men and animals went counter to classical Chinese tradition. "There is basically very little which separates man from animal," wrote Mencius some 300 years before Christ, noting that this minimal difference is not based on a capacity to reason but on a moral sense which can be developed through education.

All of scholastic thinking is based on the principle of contradiction, and it has been said that scholasticism was the art of repeating oneself without contradiction. Scholasticism opposed contradictory qualities which are mutually exclusive. But the Chinese, interested above all in the mechanisms of change, recognized only those contraries which can be combined in varying proportions, increasing and decreasing in the course of the phases they pass through. They strove to explain in a clear and simple manner the transformations of the universe by conceiving two fundamental kinds of being, the *yin* and the *yang*, the infinite combinations of which served to explain all things.

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One of the principal novelties which the Jesuit missionaries introduced in China was geometric representation of the planetary system. The Chinese had always retained a kind of astronomy analogous to that of the Babylonians, registering astronomic data over long periods and then establishing a system of concordances.

²⁶ *T'ien-tchou che yi*, p. 465.

²⁷ *Kiao yao siu louen* of P. Verbiest. See the note of Siu Tsong-tsö in his *Ming Ts'ing kien Ye-sou houei-che yi tchou t'i yao*, Tai-pei, 1958, pp. 162-163. According to the Church Fathers, the infusion of the soul by God is fixed uniformly at the 80th day after conception for both boys and girls.

In addition they had no more than a rudimentary geometry; for it was in algebra that they made the greatest progress, the apogee of Chinese algebra occurring in the 12th and 13th centuries A.D.²⁸ It seems even that there had been in Chinese tradition a refusal of any geometric model, since for them the explanation of principles hidden in nature could not be reduced to a single visual representation. This is a fundamental difference in attitudes which certain reactions can illustrate. When the thesis of the roundness of the earth, already accepted in the 11th century, was introduced in China around 1600, it provoked general surprise and shock,²⁹ not so much because it went against a well-defined geometric representation of the universe, but because it clashed with a whole complex of traditional notions which were rich with both social and cosmic implication. Height and depth, movement and rest, that which is circular like heaven and that which is divisible by lines that cut at right angles like inhabited areas, all these opposites were the expression of the two fundamental manners of being whose collaboration was indispensable to universal harmony and human order. These traditional concepts did not hinder most educated people and especially scholars interested in Western astronomy and geography from adopting the idea of a round and immobile earth with its grid of meridians and parallels similar to those of the heavenly sphere. However, one of the most determined adversaries of the missionaries, Yang Kouang-sien, in a text written in 1662, still did not believe in the thesis of the Western Barbarians (in the words of the Chinese text) according to which "beings are scattered across the surface of the Earth like ants."³⁰ He marshalled arguments from the physical order against that which he believed to be an absurdity.

²⁸ Since before 1300 the Chinese knew the so-called Pascal triangle used in the calculation of binomial coefficients, a method for approximating polynomial roots (called the Horner method), a process for resolving simultaneous systems of second degree equations, and they had discovered a theorem for the solution of simultaneous congruences. Cf. N. Sivin, ed., *Science and Technology in East Asia*, Science History Publication, New York, 1977, p. 209.

²⁹ Cf. the note of *Sseu-k'ou ts'iuan-chou tsong-mou t'i yao*, XXII, *Ts'ouen-mou* on the *Piao tou chouo* of Sabbatino de Ursis (1614). "At that time the theory of the roundness and the smallness of the earth surprised a great number of people when they heard the theory suddenly discussed."

³⁰ The statement can be found in Song Ying-sing (born in 1587), *Song Ying-sing yi-chou sseu tchong*, Shanghai, 1975, p. 101.

“I have never heard of people capable of holding themselves upright, perpendicular or upside down. Only snails and flies are capable [of such acrobatics] In a house, for example, I walk upright on the floor as is correct. Now if Father Schall [the nemesis of Yang Kouang-sien and author of a small *Treatise on the Earth*] is capable of walking upside down on the ceiling of the floor below, then I would believe in the existence of antipodes. Otherwise the Brazil which for the Far East is situated at 360° meridian is not the same Brazil which for the Far West is situated at the first meridian. . . . If the Earth is a globe, how do the seas keep from spilling out? I would like to ask Father Schall, who seems to love extraordinary things, if he has ever seen round water, or water clinging upright to a wall, or water that holds to the surface without flowing downward. . . .” Besides, Schall had placed the Western countries at the summit of his sphere and the Chinese almost opposite, upside down, thus placing Europe in the position of a sovereign with China as its subject. “One could say,” added Yang Kouang-sien, “that this is the very height of impoliteness.”³¹

But after these arguments based on common sense and the attack on the breach of protocol, there is an astonishing passage in the text. Admitting that the earth is round, “I would ask Father Schall if this little sphere floats in space or if it is fixed in some manner. If he thinks it floats in space, it would necessarily have to be moved by [the flow of] cosmic energy, moving itself continuously like Heaven and finding itself back in the same position after making a complete tour in one day’s time.” This conclusion which seems so unexpected to us is in agreement with the Chinese idea of universal energy. Contrary to the development of Western ideas where, starting from a geometric model of the universe, Aristarchos of Samos and Copernicus, for example, deduced that the earth must necessarily rotate on its own axis, it was the Chinese idea that the movement of the stars demonstrates the dynamic character of the entire universe which led Yang Kouang-sien to the conclusion that if the earth was round, it would not be immobile, but would turn on its

³¹ *Nie king* (“The Monsters in the Mirror”), preface dated in the summer of 1662 in *Pou tö yi*, vol. 2, pp. 67b-72a.

axis. (We should remember too that the idea of an annual movement of the earth toward the four points of the compass, an upward movement, is found in China already some 2000 years ago, and this idea was never completely discarded.)³² This same concept of cosmic energy to which Yang Kouang-sien refers is found already in the work of an eleventh century philosopher who explained that the sun, the moon and the planets are more or less slowed in their movement by the pull of the earth according to the proportion of energy *yin* or *yang* which they contain.³³ In the 17th century, a Chinese author well-versed in Western astronomy, Wang Si-chan, thought that the planets were attracted by fixed stars in the same way that a needle is drawn to a magnet.³⁴ There is the idea of a remote action of the heavenly bodies on one another. In the West and in China the premises were radically different: in one case a geometric model and, more precisely, the image of a machine energized from outside, and in the other a universal energy inherent in nature.

Nevertheless, the points of conflict in the Christian vision of the world introduced into China in the 17th century were found not only in the geometric representation of the universe, but in the more general concept which fixed the limits of space, time, and the types and number of souls. In his important treatise on the *True Notion of God*, Ricci distinguishes between that which has a beginning and an end like bodily creatures, that which has a beginning but no end like souls, and that which has neither beginning nor end, a quality which can be predicated only of God.³⁵ Aristotle's cosmology with its concentric heavens was an expression both of the perfection of the universe and of its limi-

³² As J. Needham points out (*Science and Civilisation in China*, III, p. 224) this idea can be found in a text of the first century before Christ. "At the winter solstice the Earth is in a high position to the north and then begins moving toward the west about 30,000 *li* (about 15,000 km). At the summer solstice it is in a low position and begins moving toward the east the same distance. At the two equinoxes it is in an intermediate position. The Earth is constantly in movement, but humans are not aware of it. They are like passengers on a large ship whose windows are closed; they feel nothing even though the ship is in movement." Wan Ting-siang at the beginning of the 16th century was even in favor of explaining changes in climate by the movements of earth relative to the sun.

³³ *Tchen meng* of Tchang Tsai, chap. 1, *San-liang p'ien*.

³⁴ See N. Sivin, "Copernicus in China", p. 74, who quotes Wang Si-chan.

³⁵ *T'ien-tchou che-yi*, chap. 1, p. 389.

tation. This idea seemed incomprehensible to the Chinese, one of whom wrote: "The Westerners speak of twelve concentric heavens which form a globe resting constantly on the knees of the Lord of Heaven. I do not know where the Lord of Heaven himself sits!"³⁶

Wrote another, "Those people say that the universe has only a certain number of layers (the crystal spheres of Aristotle) and that it has definite dimensions in all directions. . . . It is as if they wanted at all costs to erect walls in the great Void in order to partition it. How can the great Void accommodate walls? . . . Those people say that the Lord of Heaven is inconceivable and that it would be a great crime to try to conceive him. But they have never had any idea of what Buddhism calls inconceivable." There are two kinds of inconceivables. One is that absolute beyond discursive thought to which the Buddhas arrive at the end of incalculable cosmic periods. The other is space and time because space and time are inexhaustible. No matter what the limits are which one places on them, they extend always beyond those limits. "On the eyelash of an animal so minute that it could build its nest on the eyelash of a mosquito there is room for a kingdom." The author illustrates the possibility of indefinite contraction and extension of space and time by citing the titles of two Chinese tales. One is the story of a woodsman who remained so long absorbed by the songs and music of immortal Taoists he had encountered by chance that the handle of his ax had time to disintegrate. The other is the story of a poor scholar who receives a pillow from an immortal in the shape of a parallelepiped as is the tradition in the Far East, and this pillow permitted whoever slept on it to have the most pleasant dreams in the world. The scholar fell asleep just as some rice had been put on to cook. First he dreamt that he entered his pillow, then he married a girl who was both beautiful and rich. He was then received into the highest level of government and became an imperial commissary with command of an entire region, distinguished himself with a great victory, served as a government minister for thirty years, had five sons all of whom entered government service and ten grand-sons who married well. Finally he himself died at the age of 80. When he awakened the rice

³⁶ *Tso p'i* ("An Aid to Refutation"), vol. IV of *P'o sie tsi*, chap. 9, p. 38a-b.

was still not yet completely cooked. "Have I been dreaming?" he asked. "Thus are the affairs of this world," responded the immortal. The same text continues saying that, "the Barbarians from the West affirm that fixed limits can be imposed on the present and the past. . . . They even maintain that this world of ours from its beginning to our time is only 7000 years old and that before that time there was no world. . . . To speak like this is to admit a present and not to admit a past. . . . They also say that the number of souls is limited and that beyond that number there is no other speck of life."³⁷

* * *

One conclusion which becomes clear from these various and diverse texts is that Chinese concepts were in every respect contrary to those taught by the missionaries. Instead of the idea of a stable, fixed, heterogenous world the Chinese believed in a homogenous and evolutionary world existing in indefinite space and time. The open and unified world of modern physics would probably have shocked them less than the world presented them by the missionaries. In China there was not that fundamental distinction established by the Greeks and inherited by the Christians which opposed a perfect and incorruptible heavenly world, exactly obedient to the laws of geometry, to a sub-lunar world incomplete and subject to corruption, the realm of the less-than-perfect. Fontenelle astutely pointed out that the Chinese did not know this distinction. In his *Entretiens sur la pluralité des mondes* which first appeared in 1686 he wrote, "It is not so long ago that all our philosophers were convinced by their experiences to maintain that the heavens and all heavenly bodies were incorruptible and incapable of change, while at the same time other men at the other end of the earth saw the stars dissolve by the thousands. The difference is striking."³⁸ Need we recall

³⁷ *Ibid.*, chap. 4, pp. 23a-24a.

³⁸ Quoted by J. Needham, *Science and Civilisation in China*, III, p. 441. Needham, who thinks that the arrival of Chinese ideas in Europe contributed to the abandonment of the theory of the crystalline spheres, also quotes (p. 442) the following text, quite Sinophile, of the *Rosa Ursina* of Christopher Scheiner (1630), IV, 2, chap. 29, "Pro Coelo Liquido Auctoritates Astronomorum" (translated from Latin by Henri Bernard in *Monumenta Serica*, III, Tokyo, 1937). "The Chinese people never in all their innumerable and flourishing academies

the quite ancient interest the Chinese had manifested in novae, the appearances and disappearances of stars, meteors and sun spots?

Generally the Chinese judged what the missionaries gave them in light of their own traditions. They accepted more easily the things which seemed in accord with their traditions or which could easily be integrated with them. Often hesitant with regard to theology, they were willing to recognize the superiority of European sciences in certain areas. Bibliographic notes prepared shortly before 1782 on scientific works composed by the missionaries bear clear witness to the uneven reactions to that which came from the West. Says one of these notes, "Assuredly the Europeans are much advanced over our predecessors by the precision of their astronomical calculations and the ingenuity of their instruments. But no heterodox sect has ever been so far afield with exaggerations, falsehoods, absurdities and improbabilities. With its decision to retain their techniques and their talents and to forbid the diffusion of their doctrine, our dynasty has shown a profound wisdom."³⁹

A dialogue of 1615 declares, "The work has a preface by Emmanuel Dias where he leaves behind his own specialty (astronomy) and exalts the work of the Lord of Heaven. He even refers to that which he calls the fixed twelfth heaven where he places the abode of all the saints and the location of paradise. Those who worship the Lord of Heaven have the right to go up there. There is something there to please and excite fools. In fact he exhausts himself in his misleading attempt to use the exactness of his calculations and his deductions to prove the existence of the Lord of Heaven. But all that deals with astronomy is undeniably superior to our ancient methods. Let us leave aside then all his absurd and deceitful theories and keep only his

taught that the heavens were solid. At least this is what we must conclude from reading their books from all periods of the last 2000 years. There we can see that the theory of a liquid heaven is truly quite old and could be easily proven. This theory was given to all peoples, so they thought, by a natural revelation. The Chinese were so attached to this idea that they thought the opposite opinion was completely absurd, as those returning from China have told us."

³⁹ *Sseu-k'ou ts'iuan-chou tsong-mou t'i yao*, bibliographical note on the *Houan-yeou ts'iuan* of Francis Furtado (1628), XXII, *Ts'ouen mou*.

precise methods based on proofs. Let us eliminate the preface in order to avoid that certain people be misled. As to the absurdities which are in the body of the work and which would make the text incomprehensible if omitted, we can leave them in place and then refute their vicious ideas as we have just done.”⁴⁰

This hostility to Christianity should not cause us to forget that there were several prominent scholars, principally in the beginning of the 17th century, who were won over by both the sciences and the religion of Europe. But it would be difficult to admit that the conversion of these people, as fervent as it may have been, could go as far as the exchange of two systems of thought proper to two different civilizations without producing errors of interpretation. Around 1625 the successor to Ricci, Father Longobardo, attempted to determine the true thinking of one of the most celebrated converts of the period, only to discover that the person was in all good faith a terrible heretic.⁴¹ In addition those Chinese sympathetic to Christianity praised the religion in terms taken from Chinese philosophy and expressed it in their own ideas.

But the Chinese did reject, even in the scientific domain, all the philosophical implications of European sciences. What they

⁴⁰ Note on the *T'ien wen lue* of Emmanuel Dias, *ibid.*

⁴¹ Nicolas Longobardo, *Traité sur quelques points de la religion des Chinois*, printed in 1701 in Paris by the *Missions étrangères* (the first work to give an approximate idea of the philosophical concepts of Neo-Confucianism to Europeans, it later influenced Leibnitz), p. 96. Yang T'ing-yun (1557-1627), one of the most distinguished converts of the period, showed the Jesuits of Peking the treatises he had edited in Chinese of which one was called “An Explanation of and Commentary on the Ten Commandments of God”, *Si-hiue che-kiai tchou-kiai*. Wrote Longobardo, “Although in his explanation there were several good things that he had heard from our Fathers, there were also many things that he had taken from the ideas of the Scholars and which better illustrate their thinking. . . . He says in the preface that all things are of one and the same substance which is the *Li* (the principle of order inherent in universal energy) so that the only difference among things is their form and accidental qualities.” Yang T'ing-yun says in the same preface that all the ancient Sages of China were reincarnated angels. See also p. 97 in the same sense: “The *Ie Ko Lao* (a work of Ye Hiang-kaio, 1562-1627, one of the most effective defenders of the missionaries) says that the Sovereign above or the Lord of Heaven was incarnated in China several times in the persons of *Iao*, *Xun*, Confucius, several kings and even other less known figures. The Lord of Heaven was also incarnate in the West in the person of Jesus as the Jesuits tell us.” Therefore . . . “Jesus Christ is in the West what Confucius or other distinguished scholars are in China. . . . This Doctor Michel (Yang T'ing-yun) then goes on to say that the teaching of Confucius is perfect in all respects and the same as the teaching of God.”

principally retained from their Western teachers were techniques and methods of calculation. The knowledge of Western mathematics even stirred up during two centuries a surge of interest in the history of Chinese mathematics. The new ideas did not, however, cause them to doubt anything essential to their own world view.⁴² The Chinese, who had never known that wonderful Greek invention of a geometric representation of the system of the planets, were able nevertheless to see its practical value. It can even be shown that the substitution of geometry for numerical algebra by certain scholars intrigued by astronomy brought about a small revolution around 1700 in the history of Chinese thinking. However, even if the most competent among them were able to appreciate the ability of the Westerners to describe the movement of heavenly bodies, which forced them in turn to perfect their own theory, they all remained convinced of the insufficiency of those concepts.

"In my opinion," wrote the astronomer Wang Si-chan, "Western astronomy is excellent. But it is so only in the precision of its measurement and not in its profound knowledge of the universal order."⁴³

A sentiment of dissatisfaction is frequently expressed with regard to the newly-arrived Western ideas. "Westerners are skilled at investigating and measuring, but unskilled at penetrating the imponderable," wrote Fang Yi-tche, a philosopher of the 17th century.⁴⁴

⁴² In general the Chinese attempted to integrate with Chinese tradition information coming from outside which could be easily assimilated. A striking example of this attitude is found in Mei Wen-ting (1633-1721), one of the better informed astronomers and mathematicians of his time, along with Wang Si-chan well acquainted with Western sciences. Cf. what Mei Wen-ting says in relation to European astronomy in *Tch'eu-jen tchouan*, notes on astronomers and mathematicians of all times by Jouan Yuan, 1799, chap. 39, p. 473 of the edition of *Wan-yeou wen-k'ou*. "The order of the heavens can only be understood after a long time (i.e. after centuries of observation). Precision in matters of astronomy is attained only through (successive) revisions. Now that the new (Western) astronomy has arrived in China, are we to change entirely our method to adopt (that of the Westerners) and to reject as useless the previous method (which consisted in) accumulating observed data? ... If we study this new astronomy, it is because we intend to extract from it that which is superior and use it to supplement the insufficiencies of our ancient methods."

⁴³ *Tch'eu-jen tchouan*, chap. 34, p. 422 of the edition *Wan-yeou wen-k'ou*.

⁴⁴ Fang Yi-tche, *Wou-li siao-che*, chap. 1, p. 19 of the edition of *Wan-yeou wen-k'ou*.

In 1699 a certain Tchang Tch'ao wrote in reference to the missionaries, "These people are extraordinarily intelligent. Their studies include astronomy, the calendar, medicine, mathematics. Their morals are based on loyalty, good faith, constancy and uprightness. Their skills are marvelous. . . . The concepts of the West are certainly better than those of other teachings. It is only too bad, therefore, that they speak of a Lord of Heaven, a vulgar and repulsive concept which leads them into absurdities which our scholars cannot accept. If only they could forget this concept, they would be quite close to our Confucian tradition."⁴⁵ This is a superficial judgment, and Tchang Tch'ao was ready, like many Chinese, to become Christian as long as no one spoke to him of a Creator-God. But more profoundly his judgment betrays the rejection of the Western world view with all its implications for morality and knowledge as well as his attachment to another system of values and ideas.

⁴⁵ Preface to *Si-fang yao-ki*, "Essay on Western Countries", edited by the Revs. Buglio, Magalhaes and Verbiest and included in the *Tchao-tai ts'ong-chou*, Kia tsi, 5.