

CHINA'S OPPOSITIONS TO WESTERN RELIGION AND SCIENCE
DURING LATE MING AND EARLY CH'ING

by

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We have carefully read the thesis entitled China's Opposition to Western Religion and Science during Late Ming and Early Ch'ing submitted by George H. C. Wong in partial fulfillment of the requirements of the Doctor of Philosophy and recommend its acceptance. In support of this recommendation we present the following joint statement of evaluation to be filed with the thesis.

Mr. Wong's thesis represents a piece of painstaking research work dealing with one of the most interesting and important periods of China's intellectual history. The outcome of an extensive survey of both Chinese and Western sources, it stands as probably the most comprehensive treatment of the subject matter in question. Conclusions are supported with ample data, and interpretations are offered with scholarly restraint.

Mr. Wong identifies the various attitudes of Chinese scholars and officials toward Western religion, science, and technology, gives explanations for their generally hostile attitudes towards them, and shows, with pertinent details, the forces and circumstances which led these men to reject Westernization. It is the opinion of the undersigned that Mr. Wong has made a useful contribution to the study of modern Chinese history.

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ABBREVIATIONS USED IN THIS WORK

<u>CJC</u>	Juan Yüan, <u>Ch'ou-jen-chuan</u>
<u>CSLC</u>	<u>Ch'ing-shih lieh-chuan</u>
<u>Fang Hao</u>	Fang Hao, <u>Chung-Hsi chiao-t'ung-shih</u>
<u>Li Yen</u>	Li Yen, <u>Chung-kuo suan-hsüeh shih</u>
<u>LCSL</u>	<u>Ta-Ch'ing li-ch'ao shih-lu</u>
<u>Needham</u>	Joseph Needham, <u>Science and Civilization in China</u>
<u>Pfister</u>	L. Pfister, S.J., <u>Notices biographiques et bibliographiques sur les Jésuits de l'ancienne mission de Chine (1552-1773)</u>
<u>Sarton</u>	George Sarton, <u>Introduction to the History of Science</u>
<u>SCPHC</u>	Hsü Ch'ang-chih, <u>Sheng-ch'ao p'o-hsieh chi</u>
<u>THL</u>	<u>Tung-hua lu</u>
<u>Wylie</u>	A. Wylie, <u>Notes on Chinese Literature</u>

CHINA'S OPPOSITIONS TO WESTERN RELIGION AND SCIENCE DURING LATE MING AND EARLY CH'ING

CHAPTER I INTRODUCTION

This special study, an aspect of Chinese intellectual history, covers the era from late Ming to early Ch'ing. This period includes many significant and crucial events, chief of which is the introduction of Western religious and scientific ideas by the Jesuits. The various issues at stake, and the resultant historical problems, together with the ideas, actions and accomplishments of the Jesuits, have been carefully narrated to some extent by a number of reputable authors of Far Eastern history. However, no one has examined and analyzed the underlying factors and fundamental forces involved in the reactions of the Chinese scholar-officials. Most of the latter, in their desire to preserve and defend Chinese cultural heritage from foreign infiltration,

disapproved the Jesuits' attempts to synthesize Catholicism with Chinese thought, as well as their utilization of Western scientific ideas and techniques as a device by which to gain an audience with the Emperor and approval for the establishment of a more permanent Chinese mission. To examine the Chinese scholar-officials' opposition to Western religion and science, primarily in terms of basic traditional beliefs and speculations, is the paramount concern of this research. The significance of the thesis lies in the fact that despite the Jesuits' utmost efforts to introduce Western religion and science into China, the majority of the native scholars, entrenched in the ethnocentric cultural tradition, were not seriously affected by the new elements of Western thought. This state of affairs, which has not been clearly shown in writings of Western historians, helps to explain the nonreligious-mindedness of the Chinese, and the slow development of Chinese science under Ming. Excepting a few officials who embraced Catholicism and Western science, Chinese traditionalism was too deep-rooted for any drastic change in Chinese thought to come about, particularly in the spheres of religion and science. In this connection, it should be mentioned at the outset that this study does not pretend to be a detailed study of Chinese thought and science during the period of late Ming and early Ch'ing; these will, however, be considered generally in the following chapters,

in order to clarify later argumentation. (Those who are interested in Chinese thought and science of the period should consult the bibliographical remarks in the introduction and the works listed in the bibliography.)

Relating to a broader area of knowledge, this study of traditional opposition may be regarded as one approach to an understanding and interpretation of the intellectual and political situation of the empire during late Ming and early Ch'ing. The reluctance of the scholar-officials to accept alien ideas was part of a continuing process; it foreshadowed the concepts of, and acted as a precedent for the whole movement of opposition to Westernization advanced by the traditionalists and the anti-reformists in nineteenth century China.

In examining this particular historical problem, it seems necessary, first of all, to characterize the politics of late Ming and early Ch'ing, to describe the Chinese thought prior to the seventeenth century, and to evaluate Chinese science, particularly in the fields of astronomy and calendar-making, mathematics, technology and geography--fields in which China had a glorious past--prior to the arrival of the Jesuits. Following this is an examination of the Jesuits' activities in China, with particular emphasis on their evaluation of Chinese thought, their contributions, scientific and otherwise, and the Chinese reactions towards

the Jesuits' activities in China. This background, the writer hopes, will help to reveal the ideological and scientific differences between the Chinese scholar-officials and the Jesuits, and thus to clarify the main problem, viz., the Chinese opposition to Western religion and science during late Ming and early Ch'ing.

The body of this study consists of two main parts: one deals with the opposition to Western religion as manifested by the Buddhists and the Confucianists; the other is concerned with the disputes over Western science as seen through the eyes of late Ming and early Ch'ing scholar-officials. In the part dealing with the opposition to Christianity, attention is directed toward the examination of the ways in which the Jesuits were caught in the intellectual battle of the age; the arguments advanced by the Buddhists and the Confucianists in opposition to Western religion; and the means by which the Chinese scholar-officials sought to safeguard Chinese traditionalism from Western infiltration and to maintain the status quo within Chinese traditional thought. With regard to the part dealing with the resistance of Western science, particular attention is given to an analysis of the opposition to Western astronomy, mathematics, technology and geographical knowledge by the traditionalists in light of their speculations and understanding of native science. In general, this opposition

attempted to isolate traditional Chinese science from Western scientific influences, to negate the Jesuits' use of scientific knowledge as a tool to reach their religious objectives, to deny the superiority of various aspects of Western science over those of the Chinese and to minimize the Jesuits' scientific contributions.

With regard to the organization of the chapters, the theme necessitated the use of a topical order. Each chapter makes a definite stage in the chain of events, and close attention is paid to distinguishing the over-all Chinese from the Jesuits' side, and the "traditional" Chinese science from "modern" Western science. These will be subjected to reconsideration in the light of later discussion.

As a project, this research has been carried out by a systematic examination of Chinese official documents as well as those of a nonofficial nature insofar as they have been published and are accessible in this country. Western sources, where pertinent, have also been utilized. A major part entailed by this study consists in translation of Chinese sources. The works consulted appear in the bibliography.

First of all, the bibliographical guides, both Western and Chinese, which are most helpful to this historical topic, particularly to the study of the Jesuits' activities in China during late Ming and early Ch'ing,

consist of standard works such as Henri Bernard, S.J., "Les adaptations chinoises d'ouvrages européens: bibliographie chronologique depuis la venue a la les Portugais à Canton jusqu'à la mission française de Pekin, 1514-1688," Monumenta Serica, 10 (1945), pp. 1-57 and pp. 309-388; Henri Cordier, L'Imprimerie Sino-Européenne en Chine, Bibliographie des ouvrages publiés en Chine par les Européens au XIIIe et XVIIIe siècles (Paris, 1901); and Hsü Tseng-tse 徐宗澤, Ming-Ch'ing chien Yeh-su-hui-shih i-chu t'i-yao 明清間耶穌會士譯著提要 (An Annotated Bibliography of the Works Written or Translated during the Ming and Ch'ing Dynasties into Chinese by the Jesuits) (Shanghai, 1949). Special credit should be given to L. Pfister, S.J., for his detailed and careful biographies of the Jesuits in his Notices biographiques et bibliographiques sur les Jésuites de l'ancienne Mission de Chine (1552-1773) (Shanghai, 1932).

For the most important and useful guide to Chinese sources in Chinese, including those written by the Jesuits, there is Ssu-k'u ch'üan-shu tsung-mu t'i-yao 四庫全書總目提要 (An Annotated Bibliography of the Books in the Ssu-k'u ch'üan-shu Encyclopaedia), a work compiled by Chi Yün and others between 1773 and 1782 under the patronage of Sh'ien-lung 乾隆, the Emperor, and famous particularly for its descriptive notes and critical evaluations. In this connection, it should be pointed out that these descriptive

notes contain some mistakes and occasionally show prejudice, particularly against the Jesuits' writings; on the whole they show the Chinese scholar-officials' reluctance to accept alien ideas and their profound reverence for traditionalism and antiquity. A comparable work is the Ku-chin t'u-shu chi-ch'eng 古今圖書集成. The best guide to Chinese literature in English is A. Wylie's Notes on Chinese Literature (Shanghai, 1901); this work, however, according to Joseph Needham, sometimes fails to do justice to Chinese books of scientific interest.

Chinese sources which have direct bearing upon our topic are few in number. The most important is the indispensable Sheng-ch'ao p'o-hsieh-chi 聖朝破邪集 (Collected Works on the Sacred Dynasty Exposing Heterodoxy, 1855), a collection compiled by Hsü Ch'ang-chih 徐昌治 which consisted mostly of critical treatises hostile to Western religion and science, written not only by Buddhists, but also by Neo-Confucianists and different schools of thought, during the period of late Ming and early Ch'ing. Of equal importance is the Ch'ou-jen chuan 畴人傳 (Biographies of the Mathematicians, 1799), a work which more closely approximates a history of Chinese science than any other works written in China; this was prepared by Juan Yüan 阮元, one of the anti-Western-science school, and it aimed to criticize Western science in light of Chinese traditional beliefs and

understanding. The anti-Western ideas, on both religion and science, of Yang Kuang-hsien 楊光先, a determined defender of Chinese culture and science, and a skilled campaigner against Western missionaries, may be located in a collection entitled Pu-te-i 不得已 (I Could Not Do Otherwise). A fourth work, entitled the Nan-kung shu-tu 南宮墨蹟 (Record from the Nanking Magistrate), is an important source which consists primarily of findings and complaints of foreign missionaries and native converts in connection with the Nanking Religious Incident, 1616-1622; unfortunately it is not available in this country. To fill the gap, one has to rely exclusively on Chang Wei-hua's 張維華 "Nan-ching chiao-an shih-mo" 南京教案始末 ("A Complete Account of the Nanking Religious Incident"), Ch'i-ta yüeh-k'an 齊大月刊, 1:2-3 (November, 1930), for information.

Other Chinese Imperial collections and documents which contain severe indictment of Western ideas, particularly those of science, with the objective of minimizing the Jesuits' contributions, and of whitewashing the underdevelopment and inaccuracy of Chinese traditional science, include the Ming-shih 明史, the official history of the Ming dynasty, compiled in the early Ch'ien-lung period; this history devotes the last thirteen chüan to the description of foreign countries; the Huang-ch'ao wen-hsien t'ung-k'ao 皇朝文獻通考, a source which describes every phase of Chinese civilization; the Ta-Ch'ing i-t'ung-chi 大清一統志,

a comprehensive topographical record of the whole empire; and the K'ang-hsi cheng-yao 康熙政要 (Important Political Documents concerning the K'ang-hsi Administration), a work which, although it included material favorable to the Jesuits and to the K'ang-hsi Emperor's decision to adopt Western astronomy, also contained statements of opposition. Since most of the imperial editions under consideration (aside from the K'ang-hsi cheng-yao, which is the words of an Emperor, generally unchallenged by scholars) were the products of Hanlin scholars, we may say they represented the consensus of opinion of the best educated stratum of society.

Furthermore, for the shaping and changing of Imperial decisions regarding the Jesuits, for biographical data on famous Chinese scholar-officials who were connected with the opposition to Western religion and science, and to a lesser extent, for information concerning the Jesuits' activities in China, the Ming-shih chi-shi pên-mo 明史紀事本末 (A Completed Record of the History of Ming), the Ch'ing-shih lieh-chuan 清史列傳, the Tung-hua-lu 東華錄 and the Ta-Ch'ing li-chiao shih-lu 大清歷朝實錄, have been constantly consulted.

Aside from the above-mentioned sources, there are other important recent Chinese works, some of which must be mentioned here. Most significant are the numerous works by Fang Hao 方豪, particularly Vol. 4-5 of his Chung-Hsi chiao-t'ung-shih 中西交通史 (A History of Sino-European Cultural

Relations, 1954), which contains, among other things, articles on the Jesuits' scientific contributions and the Chinese traditional opposition to Western science and religion. Contributions by other scholars include: Chang Wei-hua 張維華, "Ming-Ch'ing chien Chung-Hsi ssu-hsiang chih ch'ung-t'u yü ying-hsiang" 明清間中西思想之衝突與影響 ("The Ideological Conflict between China and the West during the Late Ming and Early Ch'ing and Its Effects," Hsüeh-ssu 學思, 1:1 (January, 1942), pp. 19-24, and his "Ming-Ch'ing chien Fo-Yeh chih cheng-pien" 明清間佛耶之爭辯 ("Arguments between Buddhists and Christians during the Late Ming and Early Ch'ing"), ibid., 1:2 (January, 1942), pp. 12-17; Ch'ên Teng-yüan 陳登元, "Hsi-hsüeh lai-Hua shih kuo-jen chih wu-tuan t'ai-tu" 西學來華時國人之武斷態度 ("The Chinese Dogmatic Attitude toward Western Knowledge when It Was First Introduced into China"), Tung-fang tsa-chih 東方雜誌, 27:8 (April, 1930), pp. 61-67; T'ang Pai-huang 唐璧黃, "Ming-chi Ch'ing-ch'u Hsi-lai t'ien-suan tui-yü Ch'ing-tai hsüeh-shu ying-hsiang" 明季清初西來天算對於清代學術的影響 ("The Effects of Late Ming and Early Ch'ing Scholarship"), Chung-kuo wên-hua chiao-yü k'uan chi-k'an 中國文化教育館季刊, 3:2 (April, 1939), pp. 447-460; and Ch'ên Shou-yi 陳受頤, "Ming-mo Ch'ing-ch'u Yen-su-hui ti Ju-chiao-kuan chi ch'i fan-ying" 明末清初耶穌會士的儒教觀及其反應 ("The Jesuits' Conception of Confucianism in the Late Ming And Early Ch'ing and Its Repercussion in China"), Kuo-hsüeh chi-k'an 國學季刊, 5:2 (1939),

pp. 1-31. Here, special attention should be given to Ch'ên Shou-yi's "San-pai nien ch'ien ti chien-li Kung-chiao lun" 三百年前的建立孔教論 ("An Early Sixteenth-Century Treatise Championing the Cause of Confucianism as China's State Religion"), Li-shih yü-yen yen-chiu-so chi-k'an 歷史語言研究所集刊, VI:2 (1936), pp. 133-162, a treatment devoted to the scholar-philosopher Wang Ch'i-yüan 王啟元, who through his rare religious treatise, the Ch'ing-chu ching-tan 清署經談 (1623), aimed at presenting the essence of the religious aspects of Confucianism, hoping to disarm the Jesuits in their attempt to synthesize Christianity with Chinese thought, or rather, Early Confucianism.

Of religious treatises composed by the Jesuits in Chinese, which attempt to harmonize Christian teachings with those of Chinese thought, to synthesize Christianity with pre-Han Confucianism, and to discredit Buddhism, Taoism and Neo-Confucianism, the most important are: Michel Ruggieri's T'ien-chu sheng-chiao shih-lu 天主聖教實錄 (A True Record of the Sacred Teaching of the Lord of Heaven: 1584); the T'ien-chu shih-i 天主實義 (The True Meaning of Lord of Heaven, 1599) and the Chi-jen shih p'ien 畸人十篇 (Ten Essays on Extraordinary Man, 1608) by Matteo Ricci; Julius Aleni's San-shan lun-hsüeh 三山論學 (Discussing Learning on the San-shan, 1625); Johann Adam Schall von Bell's Chu-chih ch'ün-cheng 主制羣徵 (Of Divine Providence as Proven by Various

Reasons, 1629); Ferdinand Verbiest's Chiao-yao hsü-lun 教要序論 (An Introduction to Religious Doctrines, 1670); Francois Noël's Jen-tsui chih-chung 人罪至重 (The Heaviest of Man's Sins, 1698); and Alexander De la Charme's Hsang-li chên-ch'üan 性理真詮 (True Explanation on the Immortality of the Soul, 1753). They have been consulted again and again. With regard to more recent Western works which have direct bearing upon this particular subject, they are few in number. On the period under consideration, the contributions which have scholarly standing are the various works on the Jesuits written by Bernard, Arnold H. Rowbothan's Missionary and Mandarin: The Jesuits at the Court of China (Berkeley: University of California Press, 1942) and to a lesser extent, the Jesuit Adventure in China: During the Reign of K'ang-hsi (New York, 1941) by Elsie Talcote Hibbert.

Among products of contemporary scholarship, both Chinese and Western, which illuminate Chinese science relating to our research, are George Sarton's five-volume Introduction to the History of Science and Joseph Needham's first two volumes of Science and Civilization in China, which hardly need introduction. The writer has benefited from the former for a detailed mention of many Chinese scientists and their works; from the latter he has profited from Professor Needham's excellent treatment of the subject, particularly the section on "The Fundamental Ideas of Chinese Science"

available in Vol. 11, pp. 216-345. It is most unfortunate that Professor Needham's subsequent volumes on different branches of Chinese science have not appeared in time for the writer to benefit by his research. In some ways equally important is Isis, a scientific journal which contains many scholarly essays on Chinese science. The same could be said about the T'oung Pao and the Revue des Questions Scientifiques. Monographs dealing with the four different branches of Chinese science under investigation, viz., astronomy, mathematics, technology and geography, particularly during the period of late Ming and early Ch'ing, are indeed very few. Nevertheless, for a general treatment of the Jesuits' scientific contributions, as well as for some information on the Chinese traditional opposition to Western science, the following works are of some help: Chang Yin-lin 張蔭麟, "Ming-Ch'ing chih-chi Hsi-hsüeh shu-ju Chung-kuo k'ao-lüeh" 明清之際西學輸入中國考略 ("A Brief Study of the Introduction of Western Knowledge to China during the Late Ming and Early Ch'ing"), Ch'ing-hua hsüeh-pao 清華學報, 1:1 (June, 1924), pp. 38-69; Yao Pa-yü 姚寶猷, "Chi-tu-chiao chiao-shih shu-ju Hsi-yang wên-hua k'ao" 基督教教士輸入西洋文化攷 ("The Introduction of Western Civilization into China: A Study of the Activities of the Christian Missionaries"), Shih-hsüeh chuan-k'an 史學專刊; 1:2 (February, 1936), pp. 1-66; Henri Bernard, S.J., Matteo Ricci's Scientific

Contribution in China (translated by Edward Chalmers Werner) (Peking, 1935) and his "Notes on the Introduction of the Natural Sciences," Yenching Journal of Social Studies, 3 (1941), pp. 220-241. On astronomy and mathematics, two interrelated subjects in Chinese science, there are the Chung-kuo suan-hsüeh shih 中國算學史 (History of Mathematics in China) (Shanghai, 1937) and the Chung-kuo suan-hsüeh-shih lun-ts'ung 中國算學史論叢 (Essays on the History of Mathematics in China) (T'ai-pei, 1954) by Li Yen 李儼, Ch'ien Pao-tsung's 錢寶琮 Chung-kuo suan-hsüeh shih 中國算學史 (A History of Chinese Mathematics) (Peking, 1932), and Y. Mikami's The Development of Mathematics in China and Japan (Leipzig, 1913). Concerning technology, articles such as Cheng Shih-hsü 鄭師許, "Ming-Ch'ing liang-tai ti chün-ch'i pien-ko chi ch'i ying-hsiang," 明清兩代的軍器變革及其影響 ("Changes in Military Equipment during the Ming and Ch'ing Dynasties and Their Effects"), Hsin-Chung-hua 新中華, 2:6 (1944), pp. 59-70 and Fang Hao, "Ming-mo Hsi-Yang huo-ch'i lui-ju wo-kuo chih shih-liao" 明末西洋火器流入我國之史料 ("Historical Materials Concerning the Introduction of Western Arms into China in the Late Ming," Tung-fang tsa-chih, 40:1 (January, 1944), pp. 49-54, are of some assistance. With regard to geography, the most penetrating and helpful is Wang Yung 王庸, Chung-kuo ti-li hsüeh-shih 中國地理學史 (History of Chinese Geography) (Changsha, 1938), Kenneth

Ch'ên's "Matteo Ricci's Contribution to and Influence on Geographical Knowledge in China," Journal of the American Oriental Society, 59:3 (September, 1939), pp. 327-337; Weng Wên-hao's 翁文灝 "Ch'ing-ch'u ts'e-hui ti-t'u k'ao" 清初測繪地圖考, Ti-hsüeh tsa-chi 地學雜誌, 111 (September, 1930), pp. 405-438; and particularly the various articles concerning Matteo Ricci's geographical contributions listed in the Yü-kung 禹貢, 5:34 (April, 1936).

In passing, it should be pointed out that most of the Chinese works used in this topic, including those composed by the Jesuits, may be conveniently located in various Ts'ung-shu 叢書. The ts'ung-shu are generally collections of miscellaneous works, but occasionally there have been published ts'ung-shu the contents of which have been limited to one subject. The Ts'ung-shu for our special concern consist of the following: the Shou-shan k'o-ts'ung-shu 守山閣叢書; the Hai-shan hsien-kuan ts'ung-shu 海山仙館叢書; the Ts'ung-shu chi-ch'eng 叢書集成; the Chi-hai ts'ung-shu 指海叢書; the Chao-tai ts'ung-shu 昭代叢書; the Chi-fu ts'ung-shu 畿輔叢書; the Ssu-pu ts'ung-shu 四部叢書; the Mei-shih ts'ung-shu 梅氏叢書輯要; and the Wên-hsuan-lou ts'ung-shu 文選樓叢書.

CHAPTER II

CHINESE THOUGHT AND SCIENCE BEFORE THE ARRIVAL OF THE JESUITS

Before we go on to discuss Chinese thought and science, a few words should be said about the politics of the time. Unlike the early part of the dynasty, particularly the Yung-lo 永樂 era (1360-1424) (when Chinese armies reconquered Annam and held back the Mongols; when Chinese naval expeditions, under the command of Cheng Ho 鄭和 and others, covered the China Seas and the Indian Ocean going as far as the east coast of Africa; and when the Yung-lo ta-t'ien 永樂大典, the most immense and best organized encyclopaedia ever produced in China, was being compiled), the period of late Ming, not only saw the growth of social discontent and economic problems which signaled the end of the dynasty, but also witnessed the decline of Chinese thought and science. This situation was partly due to the forays of European adventurers and Japanese pirates on the southeastern coast; partly due to the costly and drawn-out wars against the Mongols, against the newly risen Manchus, and against the Japanese invasion of Korea; and partly due to the severe

internal struggles between the censorate and the eunuchs.¹

(A) Chinese Thought prior to the Seventeenth Century

Chinese thought, down to the period of late Ming, had undergone many modifications to meet new situations, as the result of forces both within and without; however, some of the traditional concepts cultivated in ancient China, such as profound reverence for antiquity, stability of ancestral precedents, and the search through China's past for endorsements and justification of changes, continued to play an important part in Chinese thought through its whole history, particularly when encountering alien ideas. When the latter situation occurred, Chinese thought tended to apply the dictum, "use Chinese ways to change the barbarians," and to apply Lao Tzu's 老子 theory on the Sinization of the barbarians. An outstanding example was the reaction to the

¹No over-all study of the decline and fall of the Ming dynasty has yet been published, but surveys can be found in most modern general histories of China, especially those in Chinese and Japanese. See particularly Hsiao I-shan 蕭一山, Ch'ing-tai t'ung-shih 清代通史 (Shanghai, 1927), Vol. 1; Franz Michael, The Origin of Manchu Rule in China (Baltimore: Johns Hopkins Press, 1942); Heinrich Busch, "The Tung-lin Academy and Its Political and Philosophical Significance," Monumenta Serica, XIV (1945-1955), pp. 1-163; Charles O. Hucker, "The Tung-lin Movement of the Late Ming Period," in John K. Fairbank (ed.), Chinese Thought and Institutions (Chicago: University of Chicago Press, 1957), pp. 132-162; Ch'ên Mou-heng 陳懋恆, Ming-tai wo-k'ou k'ao-lieh 明代倭寇考略 Yenching-hsüeh pao Special Monograph, 1934; and Li Kuang-ming 黎光明, Chia-ching yü-wo Chiang-che chu k'e chün k'ao 嘉靖禦倭江浙主客考, Yenching Journal of Chinese Studies, Monograph Series No. 4.

introduction of Buddhism, an alien body of thought from India, in the late Han dynasty. Since the time of its transmission, Buddhism, alternately favored and persecuted, was given Chinese color and connotations, the ideas which were common or close to Chinese thought were embraced and those which were strange to the Chinese mind were disregarded; thus, through the acceptance-rejection process, Buddhism in China became more Chinese and less alien.²

Here, it seems appropriate to note some of the traditional characteristics of Chinese thought which were contrary and unacceptable to the Jesuits upon their arrival in China at the end of the sixteenth century; the differences between Chinese and Western thought--or rather, the religious beliefs represented by the Jesuits--provided at a later stage some of the basis for the Jesuit-Chinese intellectual battle of the age.

Since these differences will be more fully dealt with later, suffice it to say that Chinese thought in the period of late Ming was predominantly Neo-Confucianism, involving

²There were three sects of Buddhism indigenous to Chinese soil: Ch'an, T'ien-t'ai, Avatamsaka. For examples of the Chinese rejection of Buddhism, see Arthur F. Wright, "Fu I and the Rejection of Buddhism," Journal of the History of Ideas, XII:1 (January, 1951), pp. 33-47; Kenneth Ch'en, "On Some Factors Responsible for the Anti-Buddhist Persecution under the Pei-ch'ao," Harvard Journal of Asiatic Studies, 17 (June, 1954), pp. 261-273; E. Balazs, "Buddhistische Studien; der Philosoph Fan Dschen [Fan Chen] und sein Traktat gegen den Buddhismus," Sinica, 7 (1932), pp. 220 ff.

common acceptance of the so-called Syncretistic Creed, a combination of Confucianism, Buddhism and Taoism.³ Nevertheless, largely due to the rationalization of the Neo-Confucianists, who in this followed Master Kung himself, kept aloof from spiritual entities and emphasized cosmological-metaphysical problems rather than religious issues and interpretations. Thus a hidden movement of divorcing religion from Chinese thought was taking place.⁴ In other words, Confucianism, with deeper roots in metaphysics and moral concepts, emphasized the cultivation of the individual, the exhaustive study of principles, the investigation of things, the attainment of knowledge, and the like. The mysteries of creation were satisfactorily explained in terms of metaphysics;⁵ the ancient religious characteristics of pre-Ch'in time, religious aspects of Taoism and Buddhism in some traditional thought, the belief in an almighty God as the ruling

³See Chapters III (A) and IV.

⁴Confucius refused to answer questions about the unknowable; instead, he directed his attention primarily to the ordering of human society. The following is a well-known example: One day Chi Lu 季路 asked Confucius about serving the spirits of the dead, the master said: "While you are not able to serve men, how can you serve the spirit?" Chi Lu added: "I venture to ask about death." He was answered: "While you do not know life, how can you know about death?" Legge, Confucian Analects, pp. 240-241.

⁵Such as Chou Tun-yi's Diagram of the Supreme Ultimate; Chang Tsai's Theory on Cosmology in reference to the Condensation and Dispersion on Ch'i 氣; Ch'eng Yi's Explanation concerning ti 帝, t'ien 天 and the hexagram ch'ien 乾; and Chu Hsi's Principle of the Supreme Ultimate.

deity of men, and the Han and T'ang idea of Confucianism as a state religion, were eclipsed from the scene. Chu Hsi-ism was the moral order and the spirit of the day, and the basis on which Chinese traditionalism and cultural heritage were to be later defended.⁶ This body of thought, in contrast to Christianity, believed in an impersonal God (Heaven or tao 道) instead of a personal one in the form of a Creator; held everything was without beginning or end; asserted the origin of everything to be from the same substance; denounced immortality and deity; contended man was fundamentally good and had the power to reach perfection and become a sage, even without God's help; believed the growth of creatures was by li 理 (organic law) instead of by the Creator; and rebuffed the idea that mind or conscience was bestowed by God. Also, within this period, attention should be paid to the fact that although the I-Ching 易經 and the Yin-Yang 陰陽 principles, the classical terminology such as t'ien 天 and shang-ti 上帝 and the like were frequently referred to in the examination of the cosmological phenomena and other similar aspects, indicating that these ideas still continued to have their importance in Chinese thought, they were, as shall be seen later, given new philosophical and intellectual twists, like pouring new wine into old bottles. In the new

⁶Cf. Vincent Shih, "The Mind and the Moral Order," a paper read before the Seventh Annual Meeting of the Far Eastern Association, 1955.

interpretation, the power of shang-ti and t'ien was seen primarily in the seasonal order; the I-ching, together with the ideas of yin and yang, became more than just a book of divination. To give an example, in the rationalization of ancient terms such as shen 神 (God) and kuei 鬼 (demon), the Neo-Confucianists, without altering the terminology, used the former to express the yang concepts of shen 伸 (expansion, disaggregation) and san 散 (dissipation and dispersion), and the latter to express the yin concepts of ch'ü 屈 (contraction, aggregation) and chü 聚 (collection, condensation).⁷ Furthermore, ancestor worship, although still practiced, had become more a social order, a sort of family reunion between the dead and the living, rather than a purely religious matter. Thus from the above, it seems there was, prior to the arrival of the Jesuits, a religious vacuum among Chinese intellectuals.

(B) Chinese Science before the Arrival of the Jesuits

In any examination of Chinese "traditional" science prior to the arrival of the Jesuits, one encounters the controversial issue of whether Chinese science developed independently on Chinese soil or whether it had its origin in

⁷See Table 21, "Rationalization of Confucian terms by the Neo-Confucians," in Joseph Needham, Science and Civilization in China (Cambridge: Cambridge University Press, 1956), Vol. II, p. 490. Hereafter abbreviated as Needham.

the West. Many late Ming and early Ch'ing scholar-officials, such as Ch'en Yüan-lung 陳元龍 who in his Ko-chih ching-yüan 格致鏡原 (1735), sought to show that all the important scientific discoveries had been made anciently in China but somehow had been forgotten through the ages.⁸ This interpretation has been disregarded by many Western authors who, largely due to their unfamiliarity with Chinese texts, have the notion that a large portion of Chinese science was derived from Western sources.⁹ This interpretation is not shared, however, by other eminent authors on Chinese science, notably Joseph Needham who, having labored through a vast amount of Chinese scientific works, suggests that "Chinese science, for two millennia before the coming of the Jesuits, and in spite of

⁸Cf. Chapter V.

⁹For example, in "Some points on the History of Science in China," Journal of the Royal Asiatic Society, North China Branch, 61 (1930), pp. 10-19, G. Vacca assumed nearly everything of value in Chinese science came from the West: he believed that the Chou-pei geometry was Western in origin, that the early Chinese calculations of the value of π were inspired from the West, and that the first Chinese astronomer of any importance was the Buddhist I-hsing 一行 of the T'ang. Perhaps more interesting is L. Levy-Bruhl who in his Les Fonctions Mentales dans les Sociétés Inferieures (English translation by L. A. Clare with the title, How Natives Think), p. 380, says that "Chinese scientific knowledge . . . has produced immense encyclopaedias of astronomy, physics, chemistry, physiology, pathology, therapeutics and the like, and yet to our minds all this is nothing but balderdash. How can so much effort and skill have been expended in the long course of ages, and yet their product be absolutely nil?" In this connection, a very common suggestion had been that the Yin-Yang dualism of Chinese thought was an importation of Iranian origin.

opportunities of intellectual intercourse much greater than has often been pictured, had very little in common with that of the West."¹⁰

Recognizing the existence of this controversy, a short narration of Chinese science is attempted here. Historically speaking, the emergence of technological discoveries and inventions in ancient China preceded the development of scientific thought. Before the end of the sixteenth century, Chinese scientific development was closely related to the theory of the Five Elements, the Two Fundamental Forces, Yin and Yang, in the universe, and scientific, or rather proto-scientific, use of the elaborate symbolic structure, the I-ching--three traditional theories of Chinese science which had been worked out in the earliest times.¹¹

¹⁰Needham, Vol. 1, p. 239. Cf. another statement (*ibid.*, p. 157) that "it is probable that our final conclusion will be that there was far more intercourse and reaction between the Chinese and their Western and southern neighbors than has often been supposed, but nevertheless that the essential style of Chinese thought and culture patterns maintained a remarkable and perennial autonomy. This is the real meaning of the 'isolation' of China; contacts there were, but never abundant enough to affect the characteristic style of the civilization, and hence of its science."

¹¹Here, it does not seem necessary to go into the description of these three theories in connection with the development of Chinese science. For the best treatment, consult Needham, Vol. 11, pp. 216-345. Also see Ch'ên Meng-chia 陳夢家, "Wu-hsing chih ch'i-yüan" 五行之起源 ("On the Origin of the Five Elements"), Yenching hsüeh-pao, 24 (1938), pp. 35-53; Ku Chieh-kang 顧頡剛, "Wu-tê chung-shih-shuo hsia ti cheng-chih ho li-shih" 五德終始說下的政治和歷史 ("The Theories of the Rise and Fall of the Five Elements in Relation to Government and History:), Ching-hua hsüeh-pao, 6 (1930),

In technology, a body of mechanical, military, nautical and hydraulic inventions, along with the discoveries of paper and of printing, was achieved. Likewise, a considerable development was made in fields such as mathematics, astronomy and calendar-making, physics, chemistry, biology, medicine and the like. Nevertheless, it should be added that it is highly probable that Chinese science was affected by external influences only after it had reached a certain stage of independent development. This external influence (particularly in the field of astronomy and calendar-making), may have been Arabic, brought by Muslim astronomer-mathematicians attached to the Mongolian Court, or Western in a general way carried by Nestorian refugees, or Hindu introduced by the Buddhists, or Manichaeism, introduced through Taoist or Buddhist channels. Later Chinese opposition to Western science essentially centered on (1) astronomy and calendar-making, (2) mathematics, (3) technology and (4) geography and maps; consequently only these four branches of Chinese science will be evaluated here. It is hoped that this background will

pp. 71-268; Li Ching-ch'ih 李鏡池, "Chou-i kua-ming k'ao-shih" 周易卦名考釋 ("A Study of the Names of the Sixty-four Hexagrams in the Book of Changes," Lingnan hsüeh-pao, 9 (1948), and his "Chou-i shih-tz'u hsü-k'ao" 周易筮辭考 ("A Further Study of the Explicative Texts in the Book of Changes"), ibid., 8 (1947), pp. 1-66; and Liang Ch'ü-ch'ao, "Yin-yang wu-hsing shuo chih lai-li" 陰陽五行說之來歷 ("On the Earliest Philosophical Use of the Terms Yin and Yang and the Five Elements"), Tung-fang tsa-chih, 20:10 (May 25, 1923), pp. 70-79.

reveal, among other things, some independent development of scientific ideas and techniques by the Chinese, as well as certain foreign influences which to an extent enriched Chinese science, in spite of the slow development and low state into which science had fallen during late Ming, creating a situation which the Jesuits sought to fill with the scientific attainments of Europe in these four fields.

(1) Chinese Astronomy and Calendar-Making. In Imperial China, the establishment of the Imperial Astronomical Board in charge of calendar-making, together with the construction of astronomical instruments, was looked upon as the Emperor's guarded prerogative; when rebellion or famine occurred, it was often concluded that something was wrong with the calendar and the existing astronomical system, and the scholar-officials who were well-versed in astronomy and mathematics, or foreign scientists attached to the Court, would be ordered to reconstruct them.¹² Throughout Chinese

¹² According to the li-chih (astronomical section) of the Ming-shih (chüan 37), p. 1b, throughout Chinese history, "the calendar had been changed six times from Huang-ti to the Ch'in dynasty; four times during Han; fifteen times from Wei to Sui; fifteen times from T'ang to the Five Dynasties; seven times under Sung; five times from Kin to Yüan. However, the Ta-t'ung-li 大統曆 of the Ming was actually the Shou-shih-li 授時曆 of the Yüan dynasty; it has been used for two hundred and seventy some odd years and it has never been changed." Here, it does not seem necessary to list all the calendars used by different dynasties up to the Ming. However, before the arrival of the Jesuits, significant calendars utilized by the Chinese included Lo Hsia-hung's 洛下閤 T'ai-ch'u-li 太初曆 (second century B.C.); the San-t'ung-li 三統曆 composed by Liu Hsin 劉歆 of Western Han; the Lin-tê-li 麟德曆 compiled by the T'ang astronomer-mathematician

history, owing to the Imperial interest and concern in astronomical matters, not only were the solar and lunar eclipses carefully recorded in the various Dynastic Histories, but also data on the obliquity of the ecliptic, the movements of the planets, the harmony of the spheres, the precession of the equinoxes, the length of the year, and the eccentricity of the solar orbit would be noted in these documents.

In view of the fact that the story behind Chinese traditional astronomy and calendar-making is a long, complicated and controversial one, it is not possible here to consider on the related problems in any detail. We confine ourselves to mentioning a few points of interest, with particular emphasis on the accomplishments of Chinese astronomers, which the author hopes will help to illustrate the independent development of this branch of Chinese science before the arrival of the Jesuits. It can be said at the outset that Chinese ancient and medieval cosmological ideas, generally speaking, appeared to have had three conceptions: the k'ai-t'ien 蓋天 theory, in which the heavens were

Li Shun-feng 李淳風 in 664; the Ming-t'ien-li 明天曆 completed by Chou Ts'ung 周琮 in 1065; the Hsi-cheng k'eng-wu yüan-li 西征庚午元曆 proposed by the Mongol astronomer-soldier-statesman, Yeh-lü ch'u-ts'ai 耶律楚材 in 1220; the Shou-jih-li 授時曆 by the Chinese astronomer Hsü Hêng 許衡 who was at the same time the Grand Secretary and President of the Astronomical Board under Kublai Khan; the Shou-shih-li undertaken and completed by the astronomical-mathematical genius Kuo Shou-ching 郭守敬 in 1280; and the Ta-t'ung-li prepared by Liu Chi 劉基 in 1370.

regarded as a hemispherical dome; the hun-t'ien 渾天 school, according to which the universe was represented by a celestial sphere, with the stars depicted on the outer space; and the Hsüan-yeh 宣夜 teaching which signified the symbol of infinite empty space, similar to the Ptolemaic system.¹³

Turning our attention to the Chinese traditional calendar for a moment, it can be said that it was soli-lunar, for it was based on the movements of both the sun and the moon.¹⁴ Needless to say, such a combination was complicated;

¹³For detailed studies on traditional Chinese astronomy, see H. Chately, "Ancient Chinese Astronomy," Royal Asiatic Society (Occasional Notes of the Royal Astronomical Society), No. 5 (1939), pp. 65 ff; H. Maspero, "L'Astronomie Chinoise avant les Han," T'oung Pao, 26 (1929), pp. 267 ff; L. de Asussure, Les Origines de l'Astronomie Chinoise (Paris, 1930); A. Forke, The World-Conception of the Chinese; Their Astronomical, Cosmological and Physico-Philosophical Speculations (London, 1925); W. Eberhard, R. Müller and R. Henseling, "Beiträge zur Astronomie der Han-Zeit. 11," Sitzungsberichte der Preussischen Akademie der Wissenschaften (Phil.-Hist. Klasse), 23 (1933), pp. 937 ff; and W. Eberhard, "The Political Function of Astronomy and Astronomers in Han China," in John K. Fairbank, Chinese Thought and Institutions, pp. 33-70.

¹⁴In other words, the traditional Chinese calendar combined the lunar and solar reckoning. Indeed, such a combination is complicated; because it takes 29 days, 12 hours, 44 minutes and 3 seconds for the moon to make a complete revolution around the earth, and 365 days, 5 hours, 48 minutes, 46 seconds for the earth to do likewise around the sun. The second period is not divisible by the first. However, Chinese traditional astronomers found a solution to the problem. They kept the lunar month (of 29 or 30 days) but provided an additional (intercalary) month (inserted in the calendar to harmonize it with the solar calculation) in 7 out of every 19 years. Thus the average number of days in the years in each of these 19 years worked out at about the time needed for the earth to cover its complete orbit around the sun. It was said that this type of calendar was first employed in China not later than 600 B.C., or about 170 years before a similar one came into use in ancient Greece.

in order to make the lunar year correspond with the solar year, traditional Chinese astronomers inserted seven intercalary months every nineteen years.

Following this, we mention some of the accomplishments by Chinese astronomers, particularly achievements connected with Chang Hêng 張衡 (78-139),¹⁵ Tsu Ch'ung-chih 祖冲之 (429-500)¹⁶ and Kuo Shou-ching 郭守敬 (1231-1316),¹⁷ three of the most eminent astronomers in Imperial China. Serving under two Han emperors, An-ti 安帝 and Shun-ti 順帝, respectively, Chang Hêng distinguished himself as an astronomer, and above all, an inventor of astronomical instruments. It was said that he enumerated in a kind of astronomical catalogue, in addition to the sun and moon, the five planets, and the twenty-eight solar mansions, 124 ever-visible stars, 320 stars with names, plus 25,000 bigger and 11,520 smaller stars unnamed.¹⁸ Concurrently, he, succeeding Lo Hsia-hung 洛下閎 and sharing the same fame with his contemporary Ch'ao Ts'ung 晁錯, was regarded as one of the earliest inventors of a copper astronomical instrument to represent the structure

¹⁵For biography, see CJC, chüan 3, pp. 13a-21a; Sarton, Vol. 1, p. 278.

¹⁶For biography, see CJC, chüan 8, pp. 1a-20a; Lin Yen, "Tsu Chung-chih, Great Mathematician of Ancient China," People's China, 24 (December, 1956), pp. 34-37; Sarton, Vol. 1, p. 410.

¹⁷For biography, see CJC, chüan 25, pp. 1a-15a; Yüan-shih, chüan 164, pp. 4a-9b; Sarton, Vol. 2, p. 1022.

¹⁸Y. Mikami, Development of Chinese Mathematics (Leipzig: Truber, 1913), pp. 46-47; Sarton, Vol. 1, p. 278.

of the heavens, known as the Hun-t'ien-i 渾天儀 (armillary sphere), an instrument set in motion by water to form an astronomical clock, indicating various periods during the day and year. Other apparatus credited to him includes the Ti-chen t'se-yen chi 地震測驗器 (seismoscope) and the Ti-lou 滴漏 (clepsydra). To describe the structure of these instruments, he composed the Hun-i-t'u-chu 渾儀圖注 and the Lou-shui chuan hun-t'ien-i t'u-chu 漏水轉渾天儀圖說, along with the Ling-hsien 靈憲, a book on cosmology and astronomy.¹⁹ In later dynasties, Chinese astronomers who were associated with the manufacturing of the armillary sphere included the Buddhist monk I-hsing 一行 of T'ang and Chang Ssu-hsün 張思訓 and Su Sung 蘇頌 of Sung. The latter wrote in 1092 a description of this apparatus entitled the Hsing-i-hsiang fa-yao 新儀象法要, together with sixty minute illustrations and maps of stars for both the northern and southern hemispheres.²⁰

In the case of Tsu Ch'ung-chih, one of China's greatest astronomer-mathematicians, Chinese traditional astronomy, or rather, calendar-making, underwent great

¹⁹ Tsin-shu 晉書 (Astronomical Section), chüan 1, pp. 5a-7a. Cf. Joseph Needham, "Chinese Astronomical Clockwork," Nature, 177 (March 31, 1956), pp. 600-602, and "The History of Water-Wheel in China," International Congress of Orientalists, 23rd Proceedings, Cambridge, 1954, pp. 282-283.

²⁰ Hsin-T'ang-shu 新唐書 (Astronomical Section), chüan 21; CJC, chüan 14-16; ibid., chüan 20, pp. 8a-11a.

improvement. (Tsu as a mathematician will be discussed in the following section.) Fundamentally discontented with his predecessors who inserted seven intercalary months every nineteen years, Tsu changed the situation by putting 144 intercalary months in every 391 years. Here, some of Tsu's astronomical calculations, even in terms of modern scientific knowledge, seem to be amazingly accurate. For example, according to his calculation, the length of a tropical year--the interval between two successive passages of the sun through the vernal equinox--was said to be 365.2481481 days, only 50 seconds off the computations of modern astronomers. Again, he figured the time required by the moon to revolve around the earth to be 27.21233 days, a difference of less than one second from 27.21222 days, the number accepted by modern scientists. Moreover, Tsu said that the period required by the planet Jupiter to make seven revolutions in the celestial sphere was 84 years, which today's astronomers hold to be 83.02 years.²¹

In conjunction with these findings, Tsu Ch'ung-chih published in 426 the Ta-ming-li 大明曆 (Calendar of Great Brightness) which remained in use from 510 to 589, taking into account the precession of equinoxes.²² He asserted

²¹Li Yen, "Tsu Chung-chih," p. 36.

²²The phenomenon of precession is that the point at which the winter solstice occurs moves westward; and the sun, apparently revolving around the earth from the point of the winter solstice, does not return to the same point at the winter solstice of the following year.

that it took 45 years for the point to move one degree westward.²³ Indeed, Tsu's application of precession of the equinoxes, had a great effect on calendar-making; it differentiated the tropical year from the sidereal year--the time in which the sun's center, departing eastward from the ecliptic meridian of a given star, returns to that meridian.

As to Kuo Shou-ching, "the sage among astronomers" celebrated at the Mongol court, much is known. Suffice it to say that, aside from contributing many astronomical treatises, he, together with Wang Hsün 王恂 and others, computed the Shou-shih-li 授時曆 in 1280; this was put into practice from 1281 to 1367 and many of its significant details were later incorporated into the Ming calendar, the Ta-t'ung-li 大統曆.²⁴ Also, he conducted many astronomical observations, chief of which was the accurate determination of the winter solstice of 1280. Perhaps more remarkable were the seventeen astronomical instruments he constructed, of which the most important were the compendium instrument, the armillary sphere, the gnomon, the pole observing instrument, the celestial globe, the height-observing instrument, the solar and lunar eclipse instrument, and the star dial.²⁵ Two of these, the armillary sphere and the compendium

²³Li Yen, "Tsu Chung-chih," p. 36.

²⁴Yüan-shih, chüan 52-55.

²⁵Ibid., chüan 48, pp. 2a-8b.

instrument, dated 1279, are still extant in Peking.²⁶

Before we end this section on Chinese astronomy and calendar-making, a few words should be devoted to the question of foreign influences on this branch of Chinese science. Partly due to the transmission of Buddhism in China during Sui and T'ang, and partly due to the flourishing of Sino-Arabian trade in the Sung dynasty, Indian and Arabian scientists appeared on the Chinese scene. As might have been expected, the Indian astronomy, the Chiu-chih-li 九執曆 (navagraha), which placed great emphasis on the calculation of solar and lunar eclipses, was highly prized at the T'ang court.²⁷ Later, owing to the superior results it achieved in the prediction of solar and lunar eclipses, not only Ch'ü-t'an Lo 瞿曇羅 and Ch'ü-t'an Hsi-ta 瞿曇悉達, two members of the Gautama school, were appointed T'ai-shih-ling 太司令 (Director of the T'ang Imperial Observatory), but also the Chiu-chih-li was translated by Ch'ü-t'an Hsi-ta in 718, along with the compilation of the Ta-T'ang K'ai-yüan chan-ching 大唐開元占經 which contains a detailed account of several systems of astronomy, notably the Chiu-chih-li.²⁸ Likewise

²⁶For a description of these astronomical instruments, see Wylie, Chinese Researches, pt. 3, "The Mongol Astronomical Instruments in Peking," pp. 2-20.

²⁷During the Sui dynasty, Hindu astronomy penetrated into China. The Sui-shu, chüan 34 (經籍志) contains a list of their astronomical treatises.

²⁸Hou-T'ang-shu (Astronomical Section), chüan 32; Hsin-T'ang-shu (Astronomical Section), chüan 26; CJC, chüan

in the Yüan dynasty, Cha-ma lung-ting 札馬魯丁 (or Jamal du-Din) who prepared the Wan-nien-li 萬年曆 (Ten-Thousand-Year Calendar) in 1267, and constructed seven Western-style astronomical instruments which included an armillary sphere, a triquetrum, two different kinds of sundial, a celestial and terrestrial sphere and an astrolabe, was appointed T'i-tien 提點 (or Director) of the Hui-hui ssu-t'ien-t'ai 回回司天台 (Department of Arabian Astronomy) in 1271.²⁹

Again in the Ming dynasty, aside from utilizing Arabian astronomy for calendrical calculations and the maintenance of the Department of Arabian Astronomy, Cheng A-li 鄭里亞, Li Hsiang 李祥, Wu Po-tsung 吳伯宗 and Ma-sha-i-hei 馬沙亦黑 were ordered (1368-1384) to compile through the medium of Arabian astronomy the Hui-hui-li 回回曆 (Muslim Calendar), which primarily dealt with the movements of the sun and moon, movements of planets, calculations of the latitude of the planets and of solar and lunar eclipses, along with another

13, pp. 9b-12a; Yabuuti Kiyosi, "Indian and Arabian Astronomy in China," translated by Leon Hurvitz, in Silver Jubilee Volume of the Zinbun Kagaku-Kenkyusyo, Kyoto, 1954, pp. 586-589; Sarton, Vol. 1, p. 475.

²⁹W. Hartner, "The Astronomical Instruments of Cha-ma-lu-ting, Their Identification, and Their Relations to the Instruments of the Observatory of Maragha," Isis, 41 (July, 1950), pp. 184-194; Yabuuti Kiyosi, op. cit., pp. 589-595; Fang Hao 方豪, Chung-Hsi Chiao t'ung-shih 中西交通史 (A History of Sino-European Relations, 1954), Vol. 3, pp. 141-145 (hereafter abbreviated: Fang Hao). Cf. M. C. Johnson, "Greek, Moslem and Chinese Instrument Design in Serving Mongol Equalaborials in 1279 A.D.," Isis, XXXII:35 (January, 1947), pp. 27-43.

Ming calendar, the Ta-t'ung-li 大統曆.³⁰ In spite of the fact that during the T'ang, Yüan and Ming dynasties, China saw the introduction of two comparatively advanced astronomical systems, the situation, somewhat similar to the experiences witnessed by the Jesuits, revealed that the Chinese were more interested in the findings of the solar and lunar eclipses than in the methods of the foreigners. In other words, the foreign methods were used exclusively by foreign astronomers, while the Chinese continued to calculate in their own traditional way, only comparing and making use of the findings of the foreigners.

Finally, we examine briefly the conditions of traditional astronomy and calendar-making under Ming. At the beginning of the Ming dynasty, Ming Tai-tsu 明太祖 ordered the compilation of the Ta-t'ung-li and the Hui-hui-li, which borrowed exclusively from Kuo Shou-ching's Shou-shih-li and the Arabian astronomy, respectively; otherwise, Ming astronomy, comparatively speaking, was much weaker and lower than that of previous dynasties.³¹ Not only were no outstanding astronomers produced in the Ming dynasty, but also the two existing astronomical systems often failed to give accurate prediction of the solar and lunar eclipses. From the reign

³⁰ Ming-shih, chüan 32-39; Yabuuti Kiyosi, op. cit., pp. 591-592.

³¹ Ming-shih (Astronomical Section), chüan 31.

of Hsien ts'ung 憲宗 (1456-1487) to the Wan-li 萬曆 (1573-1620), there were attempts among the scholar-officials, such as Hua Hsiang 華湘, Chou Lien 周廉, Li Chih-tsao 李之藻 and Hsing Yün-lu 邢雲路 to revise the Ming astronomy.³² Such revision, however, did not take place until after the arrival of the Jesuits; under the influence of these men, Chinese astronomy and calendar-making were challenged and supplemented by those of the West.

(2) Chinese Mathematics. Chinese numerical science, one of the significant branches of learning, had developed, without much outside influence to a comparatively high degree long before the arrival of the Jesuits. This was particularly true of the principle of T'ien-yüan shu 天元術 (Method of the Celestial Element), the Chinese algebra, and the formula for computing the circumference of a circle known as Yüan-chou-shou 圓周率.³³

Broadly speaking, as early as the Chou dynasty, it is recorded that children from six to eight years old were

³²Ibid.

³³Joseph Needham indicates in his Science and Civilization in China, Vol. 2, p. 292, that: "From the Han onwards the whole effort of Chinese mathematicians could be summarized in one sentence; how to fit a particular problem into a certain pattern or model problem and solve it accordingly. During the Sung, alongside of the Neo-Confucians, a great school of Chinese algebraists grew up, who maintained their lead over the rest of the world for a couple of centuries." Cf. his "Mathematics and Science in China and the West," Science and Society, XX:4 (Fall, 1956), pp. 320-343.

taught arithmetic. Then came the Han dynasty, the crucial period of Chinese mathematics, when a few significant treatises on this field were composed. Later in the Sui (581-618), T'ang (618-906) and the Sung (960-1279) dynasties, the Imperial government instituted a system of examination in mathematics. During the reign of Chen-kuan 貞觀 (627-649) of the T'ang dynasty, the Imperial Bureau of Mathematics had 3,260 persons engaged in research, and in the re-edition and evaluation of ancient texts. The great attention the T'ang dynasty paid to mathematics laid the foundation for the flowering of this science in the Sung dynasty.

Before we discuss the stage to which Chinese mathematics had developed in the Ming dynasty, we attempt to mention some of the discoveries made by Chinese mathematicians. Most notable of all was the principle of T'ien-yüan shu, the Chinese system of algebra. It was said that it was introduced by the Sung mathematical genius, Ch'in Chiu-shao 秦九韶 in his Shu-shu chiu-chang 數書九章 (The Nine Sections of Mathematics: 1247).³⁴ Later in the Ts'e-yüan hai-ching

³⁴The t'ien-yüan method consists essentially in the application of the use of computing rods to algebra. It is also known as li-t'ien-yüan i 立天元一 (Setting up the Celestial Monad) (i.e., the unknown quantity). The unknown quantity is represented by a unit or monad, the zero by a circle. According to Sarton (Vol. 11, pt. 2, p. 626), "the Chinese zero may have come directly from India with Buddhism, or it may have been imported later by Muslims." For further information about the t'ien-yüan theory, consult L. van Hée, "La notion algébrique en Chine," Revue des questions scientifiques (October, 1913), pp. 574-587; Wylie, pp. 181-182; Mikami Yikami, Development of Mathematics in China and Japan (Leipzig, 1913), pp. 63-78; Li Yen, pp. 63-95.

測圓海鏡 (Sea-Mirror of the Circle Measurement: 1248), an outstanding work by another mathematical giant, Li Yeh 李冶 (1192-1279),³⁵ the principle of t'ien-yüan was further developed and elaborated.³⁶ Of equal importance was the formula for computing the circumference of a circle known as the Yüan-chou-shou. In the Chou-peí suan-ching 周髀算經 (The Arithmetical classic of the Gnomon and the Circular Pathus: 1st century),³⁷ the ratio of the circumference of a circle to its diameter was given roughly as 3; in other words, the circumference was taken to be three times the length of the diameter.³⁸ This figure was somewhat improved by the Han astronomer-mathematician Chang Hêng 張衡 (78-139)³⁹ who put $\pi = 3.16$.⁴⁰ During the period of the Three Kingdoms (200-280), Liu Hui obtained the result in 263, $\pi = 3.14$, by successively doubling the number of sides of regular polygons inscribed in a circle.⁴¹ Two hundred years later, Tsu Ch'ung-chih, one of the greatest mathematicians of Imperial China,

³⁵For biography, see CJC, chüan 24, pp. 4a-7a; Sarton, Vol. 2, pp. 627-628; Mikami, op. cit., pp. 79-84.

³⁶See Appendix I.

³⁷Ibid.

³⁸Sui-shu (Astronomical Section), chüan 15, p. 3b.

³⁹For biography, see CJC, chüan 3, pp. 13a-21a.

⁴⁰Sui-shu (Astronomical Section), chüan 15, p. 3b.

⁴¹Ibid.

in his Chui-shu 綴術, a work which was lost in the twelfth century, accurately estimated the "approximate" value (約率) of π to be $22/7$ and the "accurate" value (密率) to be $355/113$ ⁴²--a formula which was not known in Europe until it was recalculated by the German scholar Valentin Otto in 1573. Likewise, the "approximate" value which Tsu Ch'ung-chih gave to π , between 3.1415926 and 3.1415927, was not improved until the fifteenth century, when al-Kashi of Samarkand gave a value of π correct up to 16 decimal places.⁴³

Other significant mathematical achievements by Chinese mathematicians, in brief, include the following: The Chou-chang suan-ching outlined a method for solving some types of algebraic equations ; his method was not known in Europe until the seventeenth century when it was discovered by the great German mathematician Leibnitz. Likewise, the formula of interpolation for equidistant intervals was discovered by Liu Cho, a famous Chinese mathematician, as early as the sixth century. In the seventh century, it was said that the Buddhist monk I-hsing discovered the interpolation formula for nonequidistant intervals. Also, as early as 1080, Liu Yi 劉益 had already used a method of finding square roots similar to that used by English mathematician W. G.

⁴²Sui-shu (Astronomical Section) chüan 15, p. 3b.

⁴³Ibid.; cf. Chapter V.

Horner.⁴⁴ Along Liu's line, Chia Hsien 賈憲 and Ch'in Chiu-shao worked out, in 1200 and 1247 respectively, what we know as Horner's method; this was five or six hundred years before Horner's time.⁴⁵ Moreover, Pascal's Triangle was known to the Chinese mathematician, Yang Hui, as early as 1261, or 400 years before its discovery by Pascal.⁴⁶ Furthermore, China's early mathematicians, such as Chang Ch'iu-chien 張立建, knew the equation for the approximate value of cube roots, viz., $\sqrt[3]{a^3 + \gamma} = a + \frac{\gamma}{3a^2 + 1}$ several hundred years before other countries.⁴⁷

Similarly, the mathematical process of inference and proof was, to some extent, known to Imperial China. For example, Chao Chun-ching used geometrical proof of what is known as Pythagoras' theorem, which stated that the square of the hypotenuse of a right-angled triangle is equal to the sum of the squares of the other two sides. Another illustration was the Ta-yen chiu-i-shu 大衍求一術 (Method of Unity Finding), written by Ch'in Chiu-shao in 1247, along with treatises written by many authors, which contains formulae for finding the sum of series.⁴⁸

⁴⁴ Li Yen, pp. 137-138.

⁴⁵ Ibid.

⁴⁶ Ibid., pp. 109-110.

⁴⁷ Ibid., p. 83; CJC, chüan 6, pp. 9b-10b.

⁴⁸ Li Yen, pp. 127-130.

Finally, we examine briefly the situation into which Chinese mathematics had fallen during the Ming dynasty. Suffice it to say that Ming mathematics, comparatively speaking, was much lower than that of the previous dynasties, particularly the Sung and Yüan; in fact, it was known as the "quiescent" period. Nevertheless, two developments deserve our special attention, namely, the Imperial interest shown in the preservation of mathematical classics, both ancient and medieval, as reproduced in the Yung-lo ta-tien 永樂大典 (1403) and the popular application of the suan-p'ian 算盤, or abacus, in calculation.

Originally known as the Wên-hsien ta-ch'eng 文獻大成, the Yung-lo ta-tien, comprising 22,937 chüan, forming 11,095 volumes, was the most immense and best organized encyclopaedia ever produced in China; it took four years (1403-1407) to complete, with more than two thousand scholars engaged in research.⁴⁹ In the section dealing with mathematics (chüan 16329-16364), twenty important texts were included (most of them will be mentioned in Appendix I) either in full or

⁴⁹ The Yung-lo ta-tien was a kind of ts'ung-shu 叢書, with many rare books included in it. On account of its bulk, it was never printed; only two further copies were made. Walter T. Swingle, "Report of the Library of Congress for 1923," pp. 187-195. Unfortunately, the main collection perished in the destruction of the Yüan-ming-yüan 圓明園 during the Boxer Rebellion of 1901. Some 370 surviving volumes are known to exist which are scattered in libraries all over the world. Sarton, Vol. III, pt. 2, p. 1549; Needham, Vol. 1, p. 145.

extracted forms. This collection remains one of the indispensable works for the study of Chinese mathematics. With regard to the suan-p'ian, although the exact period of the invention of this mathematical instrument is uncertain,⁵⁰ it is safe, in view of the emphasis put on this subject by Ming mathematical studies, such as Wu Ching's 吳敬 Chou-chang suan-fa pi-lui ta-ch'uan 九章算法比類大全 (1450), Ch'êng Ta-wei's 程大位 Suan-fa t'ung-tsung 算法統宗 (1592), K'o Shang-ch'ien's 柯尚遷 Shu-hsüeh t'ung-kuei 數學通軌 (1578), Chu Tsai-yü's 朱載堉 Suan-hsüeh hsin-shuo 算學新說 (1603) and Huang Lung-yin's 黃龍吟 Suan-fa chih-nan 算法指南, to say that it was popular in the fifteenth and sixteenth centuries.⁵¹ Indeed, the techniques of calculations by means of the abacus revolutionized Chinese mathematics; henceforth, it was commonly used by Chinese people on all levels.

⁵⁰ There are differences of opinion as to when the Chinese did begin to use this mathematical instrument. The Ch'ing mathematician-astronomer, Mei Wên-ting 梅文鼎 (1633-1721), in his Li-suan ch'üan-shu 曆算全書 indicates that they began in the first years of the Ming dynasty. Some contemporary authors, notably Li Yen, in his Chu-suan chih-tu k'ao 珠算制度考 and in his Chung-kuo suan-hsüeh shih, pp. 171-173, share the same conclusion. However, Ch'ien Ta-hsin 錢大昕 (1728-1804), the eminent Ch'ing historian and geographer, in his Shih-chia chia-yang hsin-lu 十駕齋養新錄 suggests that the suan-p'ian was already in use during the Yuan dynasty. In the Introduction to the History of Science (Vol. 1, p. 299, and vol. III, pt. 2, pp. 1585-1586), George Sarton reveals that Hsü Yueh's 徐岳 Shu-shu chi-i 數書記遺, a work composed in the second or the beginning of the third, contains "possibly the earliest trace of suan-p'ian."

⁵¹ For a detailed description of the suan-p'ian or chu-suan 珠算, see Li Yen, pp. 171-183.

However, despite China's mathematical development, and despite the two Ming achievements noted, the Ming mathematicians would not carry on the tradition handed down from the past. Either the principles or the exact contents of some of the texts, originated or composed by their predecessors, particularly on the principles of t'ien-yüan and spherical trigonometry, were not known to the Ming mathematicians. For example, it was said that Ku Ying-hsiang 顧應祥, when he republished Li Yeh's Ts'ê-yüan hai-ching in 1550, cast aside the latter's addenda, being ignorant of the principle of t'ien-yüan, and furnished in its stead a series of rules listed in his Ts'ê-yüan hai-ching fen-lui shih-shu 測圓海鏡分類釋術 (1553); accordingly, the true meaning of Li Yeh's work was lost sight of. Similarly, in the re-edition of Kuo Shuo-ching's Hu-shih suan-shu by the same author in 1552, the principle of spherical trigonometry was misunderstood and disregarded.⁵² Thus it was under these circumstances that Chinese mathematics was challenged by the West represented by the Jesuits, a subject which will be mentioned later.

(3) Chinese Technology. Likewise, Chinese technology, prior to the arrival of the Jesuits, was not without its achievements: it varied from the invention of paper for

⁵²CJC, chüan 30, pp. 3b-13b; Wylie, Chinese Researches, p. 188; Li Yeh, p. 164.

cultural purposes to the discovery of gunpowder for subsequent military uses. The significance of Chinese medieval technology has been recognized in recent Western writings.⁵³ Particularly, Joseph Needham, in his Science and Civilization in China concludes that "Chinese technological inventions poured into Europe in a continuous stream during the first thirteen centuries of the Christian era, just as later on the technological current flowed the other way."⁵⁴

⁵³As illustrations, see Lynn White, "Technology and Invention in the Middle Ages," Speculum, 15 (1940), pp. 14 ff.

⁵⁴Needham, Vol. 1, p. 239. On another occasion (pp. 240-241), Needham, while discussing the East-West transmission of mechanical techniques, says that "China produced a profusion of developments which reached Europe and other regions at times varying between the 1st and the 18th centuries: (a) the square-pallet chain-pump; (b) the edge-runner mill and the application of water-power to it; (c) metallurgical blowing-engines operated by water-power; (d) the rotaryfan and winnowing machine; (e) the piston-bellows; (f) the horizontal-warp loom (possibly also Indian), and the drawloom; (g) silk reeling, twisting and doubling machinery; (h) the wheelbarrow; (i) the sailing-carriage; (j) the wagon-mill; (k) the two efficient harnesses for draught-animals, i.e., the breast-strap or position harness, and the collar harness; (l) the cross-bow; (m) the kite; (n) the helicopter top and the zoetrope; (o) the technique of deep-drilling; (p) the mastery of cast iron; (q) the 'Cardan' suspension; (r) the segmental arch bridge; (s) the iron-chain suspension-bridge; (t) canal lock-gates; (u) numerous inventions in nautical construction, including water-tight compartments, aerodynamically efficient sails, the fore-and-aft rig, and (v) the stern-post rudder; (w) gunpowder and some of its associated techniques; (x) the magnetic compass, used first for geomancy and then, also by the Chinese, for navigation; (y) paper, printing, and movable-type printing; and (z) porcelain." With regard to important mechanical elements which the West was able to contribute to Chinese civilization at the time of the Jesuits, the same author points out (in pp. 241-242) that they consisted only of (a) the screw; (b) the Ctesibian double force-pump; (c) the crankshaft; and (d) clockwork.

Since this aspect of Chinese science is well known, no effort is attempted to supply a full description here. For our purposes, it seems sufficient to say that mechanically speaking, China's cardinal achievements, in addition to the astronomical instruments mentioned in the section on astronomy and calendar-making, and include the development of the compass which proved to be useful for later maritime purposes; the invention and constant improvement of the chih-nan-ch'e 指南車 (South-pointing Carriage), operating on mechanical principles and governed by a magnet; the manufacturing of the Ch'ien-li-ch'uan 千里船 (Thousand-li Boat), propelled by paddle-wheels, a boat which was said to travel many miles a day; and the contrivance of the wheelbarrow and water-mill, and other labor-saving devices for grinding grain, irrigation and the like.⁵⁵ Among all Chinese technological inventions, perhaps the most certain and most complete was in the sphere of paper-making and printing. Indeed, the cultural value connected with the discovery of paper in the Han, the coming of blockprinting in the T'ang, and the invention of movable-type printing in the Sung, can

⁵⁵For example, consult Chang Yin-lin 張蔭麟, "Chung-kuo li-shih shang chih ch'i-ch'i chi ch'i tso-che" 中國歷史上之奇器及其作者 ("Scientific Inventions and Inventors in Chinese History"), Yenching hsueh-pao, 3 (June, 1928), pp. 359-381; Li Shu-hua 李書華, "The Origin of the Compass" 指南針的起源, Ta-lu tsa-chih 大陸雜誌, VII:9 (November 15, 1953), pp. 1-7, and VII:10 (November 30, 1953), pp. 1-10.

hardly be exaggerated.⁵⁶ In the military sense, the discovery of gunpowder during Sung, apparently as a result of the Taoists' activities in the field of science, for destructive purposes; its application to the manufacturing of igniters, grenades, mines, rockets, fire-lances and the like from the beginning of the Sung; and its relation to the development of barrel-guns and other novel inventions for bombardments in the Sung, Yüan and Ming, marked a revolutionary development in the art of war, on both land and sea.⁵⁷ Contemporaneously, running parallel to the development of firearms was China's nautical technology, both commercial and warlike, in late Sung, Yüan and early Ming. During this period, the Chinese

⁵⁶For accounts of China's contribution in paper-making and printing, see Thomas F. Carter, The Invention of Printing and Its Spread Westward (New York: 1925); Friedrich Hirth, "Die Erfindung des Papiers in China," T'oung Pao, Vol. 1 (1890), pp. 1-14; Edouard Chavannes, "Les livres chinois avant l'invention du papier," Journal Asiatique (1905), pp. 5-75; Sarton, Vol. 1, p. 451, p. 604, p. 633 and p. 723, and Vol. III, pt. 2, pp. 144-145 and pp. 729-731; Needham, Vol. 1, p. 126 and p. 131; L. Carrington Goodrich, A Short History of the Chinese People (New York: Harper and Brothers Publishers, 1943), pp. 134-135, pp. 140-141 and pp. 149-150.

⁵⁷Feng Chia-sheng, 馮家昇, "Huo-yo ti fa-hsien chi ch'i ch'uan-pu" 火藥的發現及其傳佈 ("The Invention and Spread of Gunpowder"), Shih-hsüeh chi-kan, V (December, 1937), pp. 27-84; L. C. Goodrich and Feng Chia-sheng, "The Early Development of Firearms in China," Isis, 36:2 (January, 1946), pp. 114-123; L. C. Goodrich, "Notes on a Few Early Chinese Bombards," ibid., 35:3 (Summer, 1944), p. 211; Wang Ling, "On the Invention and Use of Gunpowder in China," ibid., 37:3-4 (July, 1947), pp. 160-178; Gustav Schlegel, "Invention and Use of Gunpowder in China," T'oung Pao, ser. 2V.111 (1902), pp. 1-11; and E. T. C. Werner, Chinese Weapons (Shanghai, 1932).

merchant vessels were not only "ocean liners boasting state-rooms, wineshops, and the service of negro stewards," but also they were "sturdily built, with watertight bulkheads, and the larger ones had lifeboats in tow"; this enabled them to capture the monopoly of shipping business from the Arabs.⁵⁸ In the constructing of warships, the Chinese first turned out paddle-wheel boats, galleys, rams and many vessels of strange design. Later, with cotton coming into common use as sails, the experimental types were abandoned in favor of seagoing ships.⁵⁹ By the end of the fourteenth century, each Ming warship carried "four guns with muzzles the size of rice bowls, twenty guns of smaller caliber, ten bombs, twenty rockets, and a thousand rounds of shots."⁶⁰

Down to the period just before the arrival of the Jesuits, the Chinese level of mechanical technology, as manifested in Sung Ying-hsing's 宋應星 T'ien-kung k'ai-wu 天工開物 (Natural Resources Utilized for Manufacturing: 1637), was apparently as high as the material resources and sciences of the day permitted. It was primarily the need to counter the threat from outside during late Ming and to strengthen

⁵⁸Lo Jung-pang, "The Emergence of China as a Sea Power during the Late Sung and Early Yüan Period," Far Eastern Quarterly, XIV:4 (August, 1955), p. 500.

⁵⁹L. C. Goodrich, "Cotton in China," Isis, 34:1-5 (Summer, 1943), pp. 408-410.

⁶⁰J. P. Lo, op. cit., p. 501.

the military power during early Ch'ing that prompted the employment of the Jesuits in the manufacturing of armaments, on Western models, a topic which will be taken up again as the research proceeds.

(4) Chinese Geography and Map-Making. Through various means--the conquests of Chinese generals, the despatching of Chinese envoys abroad, the peregrinations of Buddhist pilgrims and travelers, the explorations of Chinese seafarers, and from the foreign diplomatic missions, merchants and travelers who had come to China--the Chinese had accumulated considerable information on foreign lands, both maritime and continental, before the arrival of the Jesuits. Nevertheless, down to the Ming dynasty, the traditional concept of the centrality of the Middle Kingdom still prevailed. To illustrate the geographical outlook of the Chinese, a survey of the development of Chinese geographical knowledge, primarily in terms of the world that surrounded them, from the Han dynasty down to the Ming period, seems to be appropriate.⁶¹

Some geographical works appeared prior to the Han dynasty; however, the content of these ancient geographies

⁶¹For summaries of early Chinese geographical knowledge, consult Kenneth Ch'ên, "The Early Expansion of Chinese Geographical Knowledge," T'ien Hsia Monthly, XI:1 (August-September, 1940), pp. 52-62; and Ho Ch'ang-ch'un 賀昌郡, "Han i-hou Chung-kuo-jen tui-yü shih-chiai ti-li chih-shih chih yen-chin" 漢以後中國人對於世界地理知識之演進 ("Evolution of the Knowledge of World Geography of the Chinese after the Han Period"), Yü-kung, V:3-4 (April 11, 1936), pp. 121-136.

included many fables, myths, and speculations.⁶² After the Han period, a more accurate picture of other cultural worlds began to appear. As a result of Chang Ch'ien's 張騫 missions to Central Asia and Pan Ch'ao's 班超 westward expedition, the Chinese, before the end of the Han dynasty, had obtained considerable knowledge of Central and Western Asia (Fergana, Samarkand, Bactria and Arabia) and a general concept of the Roman Empire.⁶³ It was about this time that Pei Hsin 裴秀 (271-319) completed his Yu-kung ti-yü t'u; he, by using one-inch squares to designate an area of 100 square li, formulated the fundamental principles of Chinese cartography.⁶⁴

Contemporaneously, the introduction of Buddhism into China, beginning with the Han dynasty, directed Chinese interest to India and other sections of the Buddhist world, namely, Annam, Cambodia, Siam, Borneo, the Malay Peninsula, Sumatra and Java. Thus, not only did ocean travel become more common between China and the Indian Ocean, but also the

⁶²Most famous are the "Western Royal Mother," the myth of the "Three Islands" in the Easter Sea, the speculation on other land masses as embodied in Tsou Yen's "Nine Great Continents" theory and the legend of the "Kingdom of Women."

⁶³See F. Hirth, "The Story of Chang K'ien, China's Pioneer in Western Asia," Journal of the American Oriental Society, Vol. 37 (September, 1917), pp. 89-152; Fang Ho, Vol. 1, Chapters 6, 7, 8 and 13.

⁶⁴Edouard Chavannes, "Les deux plus anciens spécimens de la cartographie chinoise," Bulletin de l'Ecole française d'Extrême-Orient, 3 (1903), pp. 214-247; Sarton, Vol. 1, p. 341.

various Chinese pilgrims to the Holy Land of Buddhism acquired geographical knowledge concerning that part of the world. Among these pilgrimages, the most famous was the one undertaken by Fa Hsien 法顯 who started from Ch'ang-an in 398, traveled westward into Central Asia, and then southward across the Himalayas into India, covering that entire country as well as Ceylon. It was said that he visited Java on his way home via the sea route.⁶⁵ Upon his return, he narrated an account of his travels, entitled the Fo-kuo chi 佛國志.⁶⁶ After Fa Hsien many other pilgrims traveled to India and Central Asia.⁶⁷ Consequently, by the middle of the eighth century, the whole Buddhist world had been thoroughly explored by Chinese pilgrims.

Utilizing the information gathered by previous travelers and writers, two epoch-making maps appeared in the Sui

⁶⁵Fang Ho, Vol. 1, chapters 10, 16 and 17.

⁶⁶This work has been translated into French by Abel Remusat, entitled Foë kouë ki, or Relation des Royaumes bouddhiques (Paris, 1836); into German by Carl F. Neumann, entitled Pilgerfahrten Buddhistischer Priester von China nach Indien (Leipzig, 1833); and into English by H. A. Giles in 1877 and James Legge in 1886.

⁶⁷See Edouard Chavannes, Voyage de Song Yun [Sung Yun] dans l'Udyana et le Grandhara, 518-522 (Hanoi, 1903); T. Watters, On Yuan Chwang's [Hsüan Chuang] Travels in India (London, 1904-5), 2 vols.; Sylvain Lévi, "Les Missions de Wang Hsüen-ts'e [Wang Hsüan Ts'e] dans l'Inde," Journal Asiatique, XV (1900), pp. 297-341; J. Takakusu, A Record of the Buddhist Religion as Practiced in India and the Malay Archipelago (Oxford, 1896); Sylvain Lévi and Edouard Chavannes, Voyages des Péletins bouddhistes, L'Itinéraire d'Ou-k'ong, 751-790 (Paris, 1895).

and T'ang dynasties: the Hsi-yü t'ü-chi 西域圖記 (Map of Western Regions) and the Hai-nei Hua-i t'ü 海內華夷圖 (Map of China and Foreign Countries within the Ocean).⁶⁸ The former, prepared by P'ei Chü 裴矩, was said to embrace the entire region stretching from Tun-huang to the Eastern Mediterranean, although the map itself has disappeared;⁶⁹ whereas the latter, produced by the famous T'ang cartographer, Chia Tan 賈耽, (730-805) in 801, was a large-scale map, 30 feet long and 33 feet wide, with each square inch representing 100 square li, and with description of both caravan and sea routes from Canton to the Persian Gulf.⁷⁰ Not only did these two maps add a new page to Chinese geographical studies, but also they became the basis of all maps produced in China up to the Yüan dynasty.

⁶⁸ Fang Ho, Vol. 2, chapter 2; Edouard Chavannes, "Les deux plus anciens spécimens de la cartographie chinoise," Bulletin de l'Ecole française d'Extrême-Orient, Vol. 3 (1903), pp. 214-247; Paul Pelliot, "Deux itinéraires de Chine en Inde à la fin du VIII^e siècle," ibid., Vol. 4 (1904), pp. 131-413.

⁶⁹ Kenneth Ch'ên, op. cit., p. 56; Sarton, Vol. 1, p. 476.

⁷⁰ T'ang-shu, chüan 138, p. 11; Enoki Kazuo 榎一雄, "Concerning the Geographic Works and 'Record and Routes' of Chia Tan's" 賈耽の地理書と道里記稱とに就て 2 Rekishigaku Kenkyu 歴史學研究, VI:7 (July, 1936), pp. 81-88. Other significant geographical works by Chia Tan were the Huang-hua ssu-ta chi 皇華四達記 (10 chüan) presented to the throne in 789 and the Ku-chin chun-kuo hsien-tao ssu-i shu 古今郡國縣道四夷述 (40 chüan) in 801. In the Sung dynasty, small replicas of Chia's map were made entitled the Chang-shan Hua-i t'ü 掌上華夷圖.

Turning again to the accumulation of Chinese geographical knowledge, from the beginning of T'ang to the end of Sung, partly due to the trade between China and Western Asia, especially Arabia and Persia, and partly due to the fact that China was cut off from Central Asia and obliged to shift her attention to the sea, more detailed and accurate information about maritime countries, together with fuller descriptions of sea routes, became available. Among the first works to appear was Chou Chu-fei's 周去非 Ling-wai tai-ta 嶺外代答 (1778) which contained valuable information on the Arab trade and on foreign countries such as Java, Cambodia, the Byzantine Empire, Spain, Korea, Tongking, and Ceylon.⁷¹ Another was the Chên-lu fêng-t'u chi 真臘風土記 (Mémorial on Cambodian Customs), a travelogue written by Chou Ta-kuan 周達觀 who accompanied, in 1296, an envoy sent by the Yüan court to Cambodia. Perhaps more significant was Chao Ju-kua's 趙汝适 Chu-fan chih 諸蕃志 (Description of Barbarian Peoples or Record of Foreign Nations: 1225), which contains valuable ethnographic and commercial information concerning Tongking, Annam, Java, Arabia, Asia Minor, Egypt, Africa (Eastern and Northern), Sicily and Spain.⁷² Of equal

⁷¹ Fang Ho, vol. 2, pp. 53-55. The Ling-wai tai-ta may be located in the Chih-pu chu ts'ung-shu.

⁷² Sarton, Vol. 11, pt. 2, pp. 645-646; Fang Ho, Vol. 2, pp. 56-59; Friedrich Hirth and W. W. Rockhill, Chou Ju-kua (St. Petersburg: Imperial Academy of Sciences, 1911). The Chu-fan chih was included in 1805 by Chang Hsi-p'eng 張海鵬 in his collection entitled Hsüeh-ching t'ao-yuan 島夷志略.

importance was the Tao-i chih-lüeh 島夷志略 (A Brief Description of Island 'Barbarians': 1349), an account written by Wang Ta-yüan 汪大淵 describing the seaports and the people of the Malay archipelago. From the above sources composed in the T'ang and Sung dynasties, the Indian Ocean from the Philippines to the eastern coast of Africa became fairly well known to the Chinese.⁷³

With the coming of the Yüan dynasty, another significant era of Chinese geography and map-making commenced. Several accounts were left behind as a result of the Mongolian army's westward expeditions. An illustration of this nature was the Hsi-yu lu 西遊錄 (Account of a Journey to the West), a travelogue written by Yu-lü ch'u ts'ai 耶律楚材 who accompanied Genghis Khan in his expedition into Persia in 1221-1224.⁷⁴ Another was Chiu Ch'u-chi's 邱處幾 Hsi-yu chi 西遊記 (Travels to the West), a record of a journey made by a Taoist monk from China to Samarkand in 1220-1224.⁷⁵ Still another was the Hsi-shih chi 西使記 (Record of an Embassy to the Western Region), written by Ch'ang Té 常德, who was

⁷³E. H. L. Schwarz, "The Chinese Connection with Africa," Journal of the Royal Asiatic Society, Bengal Branch, IV (1937), pp. 175-193; J. J. L. Duyvendak, China's Discovery of Africa (London, 1949); "Some Remarks on the Country of Ta-ch'in as known to the Chinese under the Sung," Asia Minor, IV:1 (August, 1954), pp. 1-19.

⁷⁴Fang Ho, Vol. 3, pp. 56-61.

⁷⁵Ibid., pp. 61-65.

despatched by Mangu Khan to his brother Hulagu, then at the head of an expedition against Bagdad.⁷⁶

Perhaps the most notable advancement was in cartography, an advancement achieved by the traveler-linguist-geographer, Chu Ssu-pên 朱思本, in the late thirteenth and early fourteenth centuries.⁷⁷ Following the tradition set forth by Pei Hsiu and Chia Tan who introduced the principle of dividing maps into squares to indicate distances, Chu compiled between 1311 and 1320 an elaborate map entitled Yü-t'u 輿圖 or Yü ti-t'u 輿地圖, a map which included all the territories "from the Chang Hai 漲海 [The South China Sea] in the southeast to the desert in the northwest and all the strange lands of the foreign nations."⁷⁸ In addition, he also published a number of small maps: eleven on China's frontier, one on Central Asia, and eight on maritime countries.⁷⁹ Even after the introduction of Ricci's Maps of the

⁷⁶ Ibid., pp. 65-67.

⁷⁷ Naito Torajiro 内藤虎次郎, "The Geographer Chu Ssu-pên" 朱思本 Tokushi Soraku 讀史叢錄 (1929), pp. 391-410, translated by Wu Han 吳晗 in the Bulletin of the National Library of Peiping, VII:2 (March-April, 1933), pp. 11-22.

⁷⁸ Walter Fuchs, The "Mongol Atlas" of China by Chu Ssu-pen and the Kuang-yü (Peiping, 1946). It was said that the original of Chu's map was lost, but the tradition was continued by Lo Hung-hsien 羅洪先, in his atlas Kuang yü-t'u 廣輿圖. Sarton, Vol. 111, pp. 807-808; Arthur Hummel, Report of the Library of Congress, p. 246 (1927); pp. 174-176 (1937).

⁷⁹ For a discussion of these maps, see Wang Yuang 王庸, Chung-kuo ti-li hsüeh-shih 中國地理學史 (History of Chinese Geography) (Changsha, 1938), pp. 89-92.

World, the above-mentioned maps maintained their supremacy in China and remained the models for maps produced in the Ming and early Ch'ing.

Still another geographical accomplishment achieved in the Yüan dynasty was the construction of a wooden sphere, an instrument signifying the comprehension of the concept of the global world. According to the Yüan-shih, Cha-ma lu-ting 札馬魯丁 (Jamal al-Dīn), a Persian astronomer attached to the Mongol Court, constructed a model of the globe in 1273 which should be regarded as an outstanding achievement in world geography. "On the wooden sphere he constructed, he covered seven parts green as water and covered three parts white as land. He drew rivers, lakes and seas on it. . . . He also drew small squares [longitude and latitude] to measure the width and length of the world."⁸⁰ Thus at the end of the thirteenth century, the theory of the sphericity of the earth, along with the application of longitude and latitude to measure the width and length of the earth, were comprehended by the Chinese.

Then came the Ming dynasty, the period of our concern. Cheng Ho's 鄭和 seven sea expeditions (1405-1430) marked another huge Chinese maritime endeavor; indeed, they, half a century before Da Gama's voyages, were the greatest

⁸⁰ Yüan-shih (Astronomical Section), chüan 48, p. 8b. Cf. Juan Yüan, Tseng-tzu shih-pien, chüan 4, pp. 6a-7a.

undertaking in sea exploration before the Industrial Revolution.⁸¹ These voyages, touching upon thirty or more foreign countries, again widened Chinese geographical knowledge. In connection with these sea explorations, three popular accounts, with a good deal of detailed information, appeared: Ma Huan's 馬歡 Ying-yai sheng-lan 瀛海聖觀 (1416); Fei Hsin's 費信 Hsing-ch'a sheng-lan 星槎聖覽; and Kung Chen's 瞿珍 Hsi-yang fan-kuo chih 西洋番國志.⁸² From these records, one understands that Cheng Ho in some of his trips traveled as far west as Hormuz, Aden and even to the eastern coast of Africa.⁸³

⁸¹Fang Hao, Vol. 3, pp. 180-210; Kuan Ching-ch'eng 管勁丞, "Chang Ho hsia Hsi-yang ti ch'uan" 鄭和下西洋的船 ("The Ships of Cheng Ho in His Voyages to the Western Ocean"), T'ung-fang tsa-chih, XLIII:1 (January 15, 1947), pp. 45-51.

⁸²Fang Ho, Vol. 3, pp. 180-181.

⁸³For countries visited by these voyages, see P. Pelliot, "Les grands voyages maritimes Chinois au debut du XV siecle," T'oung Pao (1933), pp. 237-452; "Notes additionnelles sur Tch'eng Houo et sur ses voyages," ibid. (1935), pp. 274-314; "Encore a propos des voyages de Tch'eng Houo," ibid. (1936), pp. 210-222; J. J. L. Duyvendak, "The True Dates of the Chinese Maritime Expeditions in the Early Fifteenth Century," ibid. (1939), pp. 341-412; Ma Huan Re-Examined (Amsterdam, 1933); George Phillips, "The Seaports of India and Ceylon, Described by Chinese Voyagers of the 15th Century," Journal of the North China Branch, Royal Asiatic Society (1885), pp. 209-226 and (1886), pp. 30-42; W. P. Groneveldt, Notes on the Malay Archipelago and Malacca (Batavia, 1877); Carrington L. Goodrich, "Geographical Additions of the XIV and XV Centuries," Monumenta Serica, XV (1956), pp. 203-212.

By late Ming, it may be concluded that, in addition to the basic geographical theories, a large portion of the world surface was already known to the Chinese. The substantial amount of scientific geographical knowledge introduced by the Jesuits, however, helped to establish modern geography and map-making in China.

CHAPTER III
THE JESUITS' ACTIVITIES IN CHINA:
LATE MING AND EARLY CH'ING

As stated in the previous chapter, the existing intellectual regression in sixteenth century China, particularly in the spheres of religion and science, together with the politics at court, created a situation favorable to the Jesuits when they, equipped with scientific knowledge of fifteenth and sixteenth century Europe, began to seek re-entrance into China during the reign of Wan-li^{萬曆}, 1573-1620. Thus a new era of Sino-European cultural exchange, renewed and intensified largely by the missionary interest of the Roman Catholic Church, commenced.¹

¹Although China's contact with the Western world existed long before the sixteenth century, the earlier relationship was limited mostly to commerce, with a few despatches of European diplomatic and religious missions to China; there was no extensive cultural contact between China and Europe. Sino-European relationship, historically speaking, centered upon the following: (1) the development of an indirect trade between China and Europe as the result of Ch'ang Ch'ien's mission to Western Asia under Wu-ti in 128 B.C.; (2) the growth of the overland silk traffic between China and Europe during the first six centuries of the Christian era; (3) the activities of the Nestorian Missions in T'ang China, 635-845; (4) the contact between China and Europe through the Arab trade during the Five Dynasties (907-960) and the Sung (960-1279); (5) the revival of European religious and commercial interests in China, as the

Aware that China was distinguished for her traditionalism, in addition to her magnificent culture of several thousand years--a culture richer in many respects than that of Europe--the Jesuits, of whom the philosopher-scholar-scientist-diplomat, Matteo Ricci (利瑪竇 1552-1610),² was

result of the expansion of the Mongol Empire, the services of the Polos at the Court in Peking and the arrival of the Nestorian and Franciscan Missions in China; and (6) the all-sea route to China, together with the Portuguese trading post at Macao and China's maritime policy, during the Ming dynasty (1368-1644). Since each of the above topics has been carefully dealt with by both Chinese and Western scholars, it seems unnecessary to stress them here. For satisfactory treatments of Sino-European relations concerning the period prior to the arrival of Matteo Ricci in China in 1582, consult G. F. Hudson, Europe and China (London, 1930); Harry E. Burton, The Discovery of the Ancient World (Cambridge, 1932); E. R. Hughes, The Invasion of China by the Western World (London, 1935); L. C. Goodrich, A Short History of the Chinese People (New York, 1934); K. S. Latourette, A History of Christian Missions in China (London, 1929); and Ch'en Shou-yi, "Sino-European Cultural Contacts since the Discovery of the Sea Route," Nankai Social and Economic Quarterly, III:1 (April, 1935). For works in Chinese, see Chang Hsing-lang 張星烺, Chung-Hsi chiao-t'ung shih-liao hui-pien 中西交通史料彙編 (A Miscellaneous Collection of Historical Materials on Contact between China and the West) (Peking: Fu-jen University, 1928), 6 vols.; Fang Hao 方豪, Chung-wai wen-hua chiao-t'ung-shih lun-ts'ung 中外文化交通史論叢 (Essays on Sino-European Cultural Relations) (Chungking: Tu-li ch'u-pan-she, 1944); Fang Hao, Chung-kuo T'ien-chu-chiao-shih lun-ts'ung 中國天主教史論叢 (Essays on the History of Catholicism in China) (Chungking: Commercial Press, 1944); and Hsiao Ta 何達, Chung-Hsi chiao-t'ung-shih 中西交通史 (A History of China's Contact with the West) (Shanghai: Chung-hua Book Company, 1934).

²For biography of Ricci, see Henri Bernard, La Père Matthieu Ricci et la société chinoise de son temps (1552-1610) (Tientsin, 1937), 2 vols.; China in the Sixteenth Century: The Journal of Mathew Ricci: 1583-1610, translated by Louis J. Gallagher, S.J. (New York, 1953); CJC, chüan 44, pp. 1a-8b; Vincent Cronin, Matteo Ricci: The Wise Man from the West (New York: 1955); and Nakamura Hisajiro, 中村久次郎, "Li Ma-tou ch'uan" 利瑪竇傳 ("Biography of Matteo Ricci"), translated by Chou I-liang 周良, Yü-kung, V:3-4 (April 11, 1936), pp. 73-96.

the pioneer, adopted a policy of conciliation and persuasion, a policy directed to the top level of the society. Even in the field of science, Ricci, two years after his arrival in China (1584), had the following eulogistic words to say: "In their sciences, the Chinese are very learned: in medicine, moral physics [the science of morals], mathematics and astronomy, arithmetic, and finally all the liberal and mechanical arts. It is admirable that a nation, which has never had any relations with Europe, should have reached by its own means almost the same results as we with the collaboration of the whole universe."³

(A) The Jesuits' Evaluation of Chinese Thought

Accordingly, with an aim to win the support of late Ming and early Ch'ing scholar-officials, both central and local, the Jesuits, aside from "growing their hair and addressing themselves as Confucianists" (蓄髮稱儒) concentrated on mastering the Chinese language, so as to overcome the existing East-West barriers.⁴ Thus, in later years, as pioneers in the field of Sinology and as the media of Sino-European cultural exchange, they were able, among other

³Quoted in Henri Bernard, S.J., Matteo Ricci's Scientific Contribution in China, translated by Edward Chalmers Werner (Peking: Henri Vetch, 1935), p. 39.

⁴Originally, the Jesuits, unfamiliar with the Chinese scene, dressed themselves as monks and declared themselves to be Buddhists.

things, to evaluate Chinese thought in light of their religious dogma, and to compose both religious and scientific treatises, often with the assistance of native converts,⁵ chief of whom were Hsü Kuang-ch'i 徐光啟 (Paul Hsü, 1562-1630),⁶ Li Chih-tsao 李之藻 (Leo Li, 1570-1630)⁷ and Yang T'ing-yün 楊廷筠 (Michael Yang, 1557-1627).⁸

From the beginning, unlike the Dominicans who condemned compromise with local prejudices or any attempt to make the path of evangelization easier by a surrender of even the least important principles; and the Franciscans who, pledged to the vow of poverty, went begging their way

⁵Ming-shih, chüan 31, (On History of the Calendar), and chüan 326 (On Italy), pp. 12a-15a. For further information, see Henri Cordier, L'Imprimerie Sino-Européenne en Chine, Bibliographie des ouvrages publiés en Chine par les Européens au XIII^e et XVII^e Siècles (Paris, 1901); L. Pfister, S.J., Notices biographiques et bibliographiques sur les Jesuites de l'ancienne mission de Chine 1552-1773 (Shanghai, 1932) (hereafter abbreviated: Pfister); Henri Bernard, "Les adaptations chinoises d'ouvrages européens: bibliographie chronologique depuis la venue des Portugais à Canton jusqu'à la Mission Française de Peking, 1514-1688," Monumenta Serica, X (1945), pp. 1-57 and pp. 309-388; and Hsü Tsung-tse 徐宗澤, Ming-Ch'ing chien Yen-su-hui-shih i-chu t'i-yao 明清間耶穌會士譯著提要 (An Annotated Bibliography of the Works Written or Translated during the Ming and Ch'ing Dynasties into Chinese by the Jesuits) (Shanghai: Chung-hua Book Company, 1949).

⁶For biography, see Ming-shih, chüan 251, pp. 11a-12b; Hummel, op. cit., pp. 316-319.

⁷Ibid., pp. 452-454.

⁸Ibid., pp. 894-895.

through the provinces to gain the ear of the masses; the Jesuits busied themselves with the task of harmonizing the teachings of Christian dogma with those of Chinese thought and of synthesizing Christianity with Confucianism. Following their training in Western theology, they appealed to the Confucian canon, pure and undefiled, to formulate their own conception of Confucianism.⁹ Realizing on the one hand that the current Chinese thought, dominated by Neo-Confucianism, was nonreligious and concentrated in the sphere of metaphysics, they made great efforts to recreate the ancient religious characteristics of the pre-Han period. On the other hand, to facilitate Chinese acceptance of their religious dogma, and at the same time to avoid antagonizing China's

⁹On the whole, the Jesuits agreed that Chinese thought had been monotheistic but had become corrupted through the centuries. According to the Jesuits, the forces of corruption first found their expression in Taoism and later in Buddhism. From this, the Jesuits gradually came to interpret Chinese thought as a kind of dualism, with Confucianism on one hand, representing the remains of the truth, and the false sects of Taoism and Buddhism on the other. A dualistic conception of the Chinese system was convenient, since it held the same implications as the Christian system of a definite division into two classes, the "saved" and the "unsaved," or, more correctly, those capable of salvation on the one hand, and those incapable of salvation on the other. In order to make this comparison appear likely, the Jesuits, of course, had to prove their contention that there was nothing in the ceremonies of the Confucianist to prevent his being infused with the supernatural grace without which spiritual salvation is impossible. It was for this reason that the Jesuits, aside from showing that the modern Confucianist was an agnostic, expended so much energy to demonstrate the ancient purity of the Chinese cult and to show that Confucianism had a respectable origin.

long-term traditionalism, particularly Confucianism, they adopted Chinese ways by paying tribute to the reigns of the Three Sages, emphasized the similarities between Christianity and confucianism as a persuasive argument for possible acceptance of the former, and stressed Christianity as a supplementary means through which Confucianism might achieve its perfection--a Confucianism "superior to that of the Golden Age of Yao 堯 and Shun 舜 and the Three Dynasties (Hsia 夏, Shang 商 and Chou 周)." ¹⁰ On these points, Alexander de la Charme (孫璋, d. 1767), perhaps the greatest critic of Chinese thought next to Ricci, said in his Hsing-li chên-ch'üan 性理真詮 (True Explanation on the Immortality of the Soul: 1753): ¹¹

Not only does China have the Book of Poetry, the Book of History, the Book of Changes, the Book of Rites, the Spring and Autumn [which are called] the Five Classics; but the religion of the Lord of Heaven also has the Book of Poetry, the Book of History, the Book of Changes, the Book of Rites, and the Spring and Autumn. However, the classics belonging to the religion of the Lord of Heaven, free from the Ch'in fire, remained complete; whereas all the Chinese classics, having witnessed the Ch'in fire, became damaged and incomplete. ¹²

¹⁰For a detailed treatment of this, consult Ch'ên Shou-yi, "Ming-mo Ch'ing-ch'u Yen-su-hui ti Je-chiao-kuan chi ch'i fan-ying" 明末清初耶穌會士的儒教觀及其反應 ("The Jesuits' Conception of Confucianism in the Late Ming and Early Ch'ing and Its Repercussion in China"), Kuo-hsüeh chi-k'an 國學季刊 5:2 (1935), pp. 1-31.

¹¹Pfister, No. 324, pp. 721-722.

¹²Hsing-li chên-ch'üan, chüan 4, p. 345.

On another occasion, with particular reference to the Five Classics,¹³ he indicated:

The Five Classics are profound doctrines and refined principles of ancient sages who, through their personal deeds and experiences, exhausted the principles of li and hsing, thus providing the teachings for all generations. Nevertheless, the teaching in the Five Classics is so profound and so deep that not many can fully comprehend the meaning. Moreover, after the Ch'in fire, [the Five Classics] became damaged and incomplete. Even though in every age sages were born who continuously tried to restore [the Five Classics], they could only regain a minute portion of them. Alas! the complete meaning of the Five Classics has not been heard of since then. ¹⁴

Thus, taking the instance of the burning of books during the Ch'in dynasty (221-207 B.C.), the Jesuits, throughout their religious writings from the sixteenth to the eighteenth century, attempted to enrich and supplement Chinese thought, or rather Confucianism, by introducing the Christian ideas of cosmogony centered upon God the Creator, the only Incarnation of God on Earth, the Intercession of Christ as necessary for Salvation, the Coming of God in Final Judgment, and the Soul, as a prerogative of man and not of other sentient beings, bestowed by God¹⁵--ideas which were contrary to the

¹³Originally there were Six Classics--Poetry, History, Music, Li, I-ching and the Ch'un-ch'iu--associated with the name of Confucius, but one of these the Book of Music, was lost.

¹⁴Alexander de la Charme's preface to the Hsing-li chên-ch'üan.

¹⁵Aside from the Hsing-li chên-ch'üan, the major religious works composed by the Jesuits expressing these ideas consisted of the following: Michel Ruggieri's

current Chinese thought of the time.

However, in their critical evaluation of Chinese classics, the Jesuits made distinctions between Early Confucianism and Later Confucianism, that is, between "early" 先 or "genuine" 真 Confucianists and the "later" 後 or "conventional" 俗 Confucianists.¹⁶ On the whole, somewhat in the vein of the revival of the New and Old Textual controversy, the Jesuits embraced Confucianism in its most ancient phase but rejected the Confucian development after Han and T'ang, especially the Neo-Confucianism of the Sung. Likewise, they recognized the early Confucianists, but not the Confucianists of the later sages. One of the reasons, according to the Jesuits, was that the earliest Confucianists

T'ien-chu sheng-chiao shih-lu 天主聖教實錄 (A True Record of the Sacred Teaching of the Lord of Heaven: 1584); the T'ien-chu shih-i 天主實義 (The True Meaning of Lord of Heaven: 1599) and the Chi-jen shih-p'ien 畸人十篇 (Ten Essays on Extraordinary Man: 1608) by Ricci; Julius Aleni's San-shan lun-hsüeh 三山論學 (Discussing Learning on the San-Shan: 1625); Johann Adam Schall von Bell, Chu-chih ch'un-cheng 主制羣徵 (Of Divine Providence as Proven by Various Reasons: 1629); Ferdinand Verbiest's Chiao-yao hsü-lun 教要序論 (An Introduction to Religious Doctrines: 1670); and Francois Noël's Jen-tsui chih-chung 人罪至重 (The Heaviest of Man's Sins: 1698).

¹⁶ These distinctions were clearly made by Alexander de la Charme who, in his Hsing-li chen-ch'üan said: "What is meant by early Confucianists? [They are those who] believe in the Classics and disregard the commentaries and who discuss only the Classics while paying no attention to the commentaries. What determines the later Confucianists? [They are those who] believe both in the Classics and the commentaries and who discuss the Classics in conjunction with the commentaries."

believed in the immortality of the soul.¹⁷ Furthermore, in their earliest attempt to synthesize Christianity with Confucianism, some of the Jesuits, notably Ricci, not only utilized Chinese terms such as Shang-ti 上帝 and t'ien 天--the highest deity in the Confucian classics--to designate the Christian God, but also allowed ancestral and Confucian worship, saying that such acts had a social and political, and not a religious, significance. As might have been expected, the coloring of Catholicism with Chinese terminology, together with permitting the native converts to continue ancestral worship, initiated the famous Rites Controversy, a subject which will be briefly discussed later.

Beyond this, the Jesuits, in order to gain a place for Catholicism in Chinese thought, attacked Buddhism for its "Emptiness," Taoism for its spiritism and "Non-being," and Neo-Confucianism for its "Supreme Ultimate" and other similar aspects. As expected, the outstanding spokesman was Ricci, who, in his T'ien-chu shih-i 天主實義 (The True Meaning of the Lord of Heaven: 1599),¹⁸ a religious treatise

¹⁷For example, see Charne's Hsing-li chên-ch'üan, chüan 2, p. 47, and chüan 3, pp. 76-77; Ricci's T'ien-chu shih-i, chüan 1, p. 32 and pp. 37-38.

¹⁸Ssu-k'u ch'üan-shu tsung-mu, chüan 125, p. 8a; Pfister, No. 9, pp. 34-35; Wylie, pp. 172-173. The T'ien-chu shih-i first appeared as the T'ien-hsüeh shih-i 天主實義 (The True Meaning of Catholicism); it is the second publication issued by the Jesuits. Because of its philosophical depth and breadth, as well as its literary brilliancy, Liang Ch'i-ch'ao, in his Chung-kuo chün-san-pai-nien hsüeh-shu

aiming "to supplement Confucianism and to replace Buddhism," (補儒易佛), expressed his ideas in the form of a dialogue between a Chinese and Western scholar:

The Chinese scholar says: ". . . In our country there are three religions each of which forms its own sect. The Taoists say that things come from wu 無 (Non-being), with "Non-being" as its Way; the Buddhists assert that forms come from k'ung 空 (Emptiness), with "Emptiness" as its fundamental; and the Confucianists proclaim that in the I-ching there is the t'ai-chi 太極 (Supreme Ultimate), consequently they use yu 有 (Being) as its principle and ch'eng 誠 (Sincerity) as its root of learning. I do not know what your opinion will be?

The Western scholar answers: "What the [former] two sects call "Non-being" and "emptiness" are vastly contrary to the doctrines of the Lord of Heaven; that they are not worthy to be honored is obvious. With regard to what the Confucianists call "Being" and "Sincerity," even though I have not fully heard their explanation, these are not far from [being correct]." 19

On another occasion, Ricci said:

. . . [Among these three religions] one upholds "Non-being," another "Emptiness," and the third "Being" and "Sincerity." In all things within this world, nothing

shih 中國近三百年學術史 (A History of Chinese Academic Thought during the Past Three Dynasties) (Shanghai, 1926), p. 13, praises Ricci's work as "an imperishable piece." This work, in addition to having a few more editions in China (1601, 1603 and later), was translated into Japanese in 1604 and later into Korean. Also, it may be found in the T'ien-hsüeh ch'u-han 天學初函 (The First Collection on Catholicism), a work compiled by Li Chih-tsao, which consists of twenty of the most important religious and scientific essays of the period under discussion. In this connection, it is significant to point out that primarily because of Pope Clement XI's ordinance in 1704, the usage of the Chinese terms t'ien and shang-ti to designate the Christian God disappeared from editions published after that date. For further information about this work, see Hsü Tsung-tse, op. cit., pp. 142-148.

¹⁹ T'ien chu shih-i, chüan 1, p. 11.

is more divergent than "abstract" and "real," or "being" and "non-being." If they [the Chinese] could combine "Being" with "Non-being," and "abstract" with "real," then I could join water with fire, a square with a circle, east with west, and heaven with earth; and there would be nothing in this world which could not be done. 20

More harsh was Ricci's criticism of the San-han-chiao 三教, the syncretistic creed derived from and consisting of Taoism, Buddhism and Confucianism. Using again the form of a conversation between a Western and a Chinese scholar, he wrote:

The Western scholar says: "In the ancient times, Your Honourable Nation had three religions and people selected only one of them. In recent years--we do not know from where it comes--there has been an apparition with one body and three hands, called the San-han-chiao."

The Chinese scholar replies: "I have often heard of this, but the Confucianists have nothing to do with it. I wish you would point out the errors."

The Western scholar answers: "Allow me to list four or five true facts to indicate the mistakes. Some argue that the three religions are all true; some claim that they are all false; and some say that one is real and the other two false. If they are all true, it is sufficient to follow only one of them; what good will it do to follow the other two? If they are all false, then we should rebuke all of them. If there is one which is true and the other two false, then we should only follow the one which is true; what good will the false ones do us? . . . Some argue that originally the three religions were established as three different sects by three different people: Confucius had no use for the teaching of Lao Tzu, so he established Confucianism. The Buddhists were not happy with Taoism and Confucianism, so they introduced Buddhism into China. In view of the fact that from the beginning these three sects were not the same, is it not also a mistake to argue with obstinacy that after two thousand years they are the

²⁰ Ibid., chüan 2, p. 56.

same?²¹

Ricci's criticism was shared by many of his contemporaries and successors. For example, Francois Noël (衛濟方, d. 1729),²² in his Jen-tsui chih-chung 人罪至重 (The Heaviest of Man's Sins: 1698),²³ aside from demonstrating religious similarities between Early Confucianism and Catholicism, made the following remarks:

The Buddhists devote life to becoming Buddha, with the final motive of ascending to Heaven; the Taoists hope to live eternally as immortals, finally roaming through the sky; the Conventional Confucianists aim to live peacefully while alive, with the soul disappearing after death. Buddhism fails by being empty, Taoism by being false and Confucianism being worldly. Is it worth while to have deep discussion with them? ²⁴

However, among these three sects, the Jesuits were most hostile towards Buddhism, particularly the Buddhist Theory of Reincarnation and the Prohibition of Taking Lives.²⁵ Mistakenly perhaps, they blamed Buddhism as the root of all evil. To give an illustration, in the Pien-hsüeh-i-tu 辯學遺續 (Collected Documents on Dialectics),²⁶

²¹Ibid., chüan 2, pp. 55-56.

²²Pfister, No. 169, pp. 414-416.

²³Ibid., p. 416.

²⁴Jen-tsui-chih-chung, p. 25.

²⁵See T'ien-chu shih-i, chüan 2, section 5, pp. 1-16, and section 7, pp. 51-55, for an example of the Jesuits' attack on Buddhism.

²⁶Ssu-k'u-ch'üan-shu tsung-mu, chüan 125, p. 7b; Wylie, pp. 173-174.

a controversial work which was said to contain a reply from Ricci to Yu Shun-hsi 虞淳熙, a firm believer in Buddhism, the former said:

Although Buddhism entered China more than two thousand years ago, with Buddhist monasteries everywhere now and monks and nuns filling the streets, the people's mind and the morals of Your Country show no signs of being superior to those of T'ang 唐 and Yü 虞 and the Three Dynasties. Instead scholars often remark that the present is not like the past. 27

Concerning Neo-Confucianism, the Jesuits attacked its nonreligious attitudes and cosmological-metaphysical theories (such as Chou Tun-yi's Diagram of the Supreme Ultimate, Chang Tsai's theory on cosmology in reference to the condensation and dispersion of ch'i 氣, Ch'eng Yi's explanation concerning t'ien 帝, t'ien 天 and the hexagram ch'ien 乾 and Chu Hsi's Principle and the Supreme Ultimate), together with its Buddhist and Taoist influences and tendencies. In this connection, perhaps the element which was most objectionable to the Jesuits was the Neo-Confucianists' theory of the "Supreme Ultimate." According to the Catholic priests, the "Supreme Ultimate," without feeling or sense, was nothing but a principle and could not be the Creator of

²⁷ Pien-hsüeh 1-tu, p. 6. The above criticism of Buddhism was often copied by native converts. Cf. Hsü Kuang-ch'i's statement in the Tseng-ting Hsü Wên-ting-kung-chi 增訂徐文定公集 (Supplement to the Works of Hsü Kuang-ch'i) (Shanghai, 1933), chüan 1, p. 13; see also P'i-shih-shih chu-wang 關諸氏諸妄 (Exposing the Various Fallacies of Buddhism) by the same author and Yang T'ing-yün's Tai-i-pien 代疑篇 (1621).

all things. In Julius Aleni's (艾儒略, 1582-1649)²⁸ San-shan lun-hsüeh 三山論學 (Discussing Learning on the San-shan: 1625),²⁹ the aim to undermine the importance of the "Supreme Ultimate" could be observed:

The theory of the t'ai-chi 太極 (Supreme Ultimate) does not go beyond the two words of li 理 (Principle) and ch'i 氣 (Ether); it never says whether it has intelligence or perception. Since it has no intelligence and perception, how can it be the Creator of all things? . . . The Confucianists also say that each thing has its t'ai-chi; in view of this, is not the t'ai-chi of the same substance as other things? Since it is of the same substance as other things, it is constrained to things, and cannot be the master of Heaven and Earth. ³⁰

Along this line, the Jesuits discredited the "so-called Principle, Way or Heaven," the Neo-Confucianism source of all things, for being "empty" and "abstract." For such criticism, the following portion from Francois Noël's Jen-tsui chih-chung are worth quoting:

Whenever the conventional Confucianists talk about li 理 (Principle), tao 道 (Way or Truth) and t'ien 天 (Heaven), they claim that these are the origins of all things. However, upon examination of their so-called li, tao and t'ien, they all result in abstract words. Take li into consideration: sometimes they call it t'ien and sometimes hsing 性 (nature); as to tao, sometimes they call it t'ai-chi 太極 (Supreme Ultimate), sometimes wu-chi 無極 (Ultimateless) and sometimes ch'i 氣 (Ether). But where do t'ien, hsing, hsin 心 (mind), t'ai-chi, wu-chi and ch'i come from? In view of the fact that li comes from hsin, hsin from hsing and hsing

²⁸For biography, see Pfister, No. 39, pp. 126-131; CJC, chüan 44, p. 19a.

²⁹Pfister, No. 39, p. 133; Wylie, p. 175.

³⁰San-shan lun-hsüeh, pp. 6-7.

from t'ien, then where does t'ien come from? Is it from li? Since t'ien, li and ch'i are not self-created, then they must derive from other sources which are already in existence. Since they are derived from sources which are already in existence, it is understandable that they are not the origin of all things. From this, what the conventional Confucianists call the true principle of the creation of things, ends up in abstract theories and essays. The theories of the conventional Confucianists often do damage to the true meaning of the genuine Confucianists. 31

Then, the Jesuits, in contrast to the Neo-Confucianists, argued that the growth of things could not be by li, nor were things of the same substance; instead, they stressed the Christian ideas centered upon God the Creator. Johann Adam Schall von Bell (湯若望, 1592-1666),³² in his Chu-chih ch'ün-cheng 主制羣徵 (Of Divine Providence as Proven by Various Reasons: 1629),³³ a work which distinguished the differences between God and Heaven, particularly the Chinese t'ien, said:

What I call the Almighty God, even though He cannot be seen and cannot be heard, His virtue does not rest on His being unseeable and unhearable. His virtue derives from the fact that His form, the most pure and the most divine, is entirely different from Heaven and Earth and all things. Neither is He created by the

³¹Jen-tsui chih-chung, pp. 23-24.

³²For biography, see Ch'ên yüan 陳垣 "T'ian Jo-wang yu Mu Ch'ên-wên" 湯若望與木陳志, ("Johann Adam Schall von Bell and Mu Ch'ên-wên"), Fu-jen hsüeh-chih, 7:1-2 (December, 1939), pp. 1-28; Vaeth Alfons, S.J., Johann Adam Schall von Bell, S.J., Missionar in China, Kaiserlicher Astronome und Ratgeber an Hofe von Peking, 1592-1666, Ein Lebens und Zeitbild, Köln, 1933; CJC, chüan 45, pp. 1a-13a; Pfister, No. 49, pp. 162-177.

³³Ibid., p. 178.

t'ai-chi nor does He belong to the yin and yang; instead, the t'ai-chi, the yin and yang, and all things are created by Him and listen to His command. His power is so great that it cannot be predicted by men.³⁴

(B) The Jesuits' Scientific and Other Contributions

This conciliatory-persuasive policy of the Jesuits, directed to the top level of the society, with the final aim to gain an audience with the Emperor whereby the approval of establishing a more permanent Chinese mission might be secured, exhibited itself more fully and more effectively in the realm of science. Added to this was the slow development of native science and low state into which it had fallen during late Ming, a situation which supplied opportunities for the Jesuits, during the period under consideration, to be active as experts, consultants and teachers in conjunction with the further development of Chinese science.³⁵ Since this page of Jesuit scientific contributions to China has been sufficiently narrated by both modern Western and Chinese scholars, a detailed account does not seem to be necessary here. What is considered in the following pages

³⁴Chu-chih ch'ün-cheng, p. 11.

³⁵It is said that during the period roughly from 1600 to 1800, the Catholic missionaries and their Chinese co-workers translated and published seventy-one works of a scientific character: eleven of these dealt with science and machinery, twelve with arithmetic, geometry and trigonometry, forty-four with astronomy and four with geography. Cyrus H. Peake, "Some Aspects of the Introduction of Modern Science into China," Isis (December, 1934), p. 174.

is only a brief treatment of the significance of the Jesuits' scientific contributions in astronomy, mathematics, technology and geography; and of Chinese opposition to this science.

Before we give a short account of the Jesuits' contributions in these major fields, a few words seem to be appropriate here to describe their activities in music, linguistics, medicine, painting and architecture--fields in which the Chinese had less interest in and consequently manifested little or no opposition. With regard to Western music, Ricci, aside from presenting the court harpsichords for entertainment, composed the Hsi-ch'in pa-ch'u 西琴八曲 (Eight Ballads for the Western Piano: 1601).³⁶ Perhaps more important was the Lü-lü cheng-i 律呂正義 (1723-1756), a full treatment of Western music.³⁷ Concerning linguistics, then a relatively modern science, there was Nicholas Trigault's (金尼閣, d. 1629)³⁸ Hsi-ju êrh-mu tzu 西儒耳目資 (1626),³⁹ a guide to the pronunciation of Chinese and

³⁶Ming-shih, chüan 326, pp. 12b-15a; Ming-shu (in the Chi-fu ts'ung-shu 欽定四庫全書), chüan 166, pp. 19a-19b; Ssu-k'u ch'üan-shu tsung-mu, chüan 125, p. 8a; Pfister, No. 9, p. 36.

³⁷This work, closely connected with mathematics, can roughly be divided into three parts; the first deals with the theory of music, along with the proportional dimensions of wind and stringed instruments; the second discusses the instruments in use in China; and the third describes, in clear and simple language, the European system of music, illustrated by specimens of European musical notation. Wylie, pp. 120-121.

³⁸Pfister, No. 32, pp. 111-116.

³⁹Ssu-k'u-ch'üan-shu tsung-mu, chüan 44, p. 6a; Pfister, No. 32, p. 117.

European languages. As to medicine, there were Jean Terrenz's (登玉函, d. 1630)⁴⁰ T'ai-Hsi jen-shen shuo-kai 泰西人身說概 (A Brief Account of the Human Body based on Western Science: 1625) and Tacobus Rho's (羅雅谷, d. 1638)⁴¹ Jen-shen t'u-shuo 人身圖說 (On the Human Body: 1638), which together introduced physiology into China; in fact, during the reign of K'ang-hsi, the Jesuits gave lectures on this subject at the Imperial Court. On painting, the foreign priests, under artists like Giuseppe Castiglione (郎士寧, 1698-1766),⁴² Jean-Denis Attiret (巴德尼, d. 1768),⁴³ Joseph Panzi (潘廷璋, d. 1812)⁴⁴ and Ignace Sichelbarth (艾啟蒙, d. 1780),⁴⁵ introduced the European ideas of perspective and the use of chiaroscuro.⁴⁶ As to the Western

⁴⁰ Ibid., No. 46, pp. 153-155; CJC, chüan 44, pp. 23a-24a.

⁴¹ Ibid., chüan 44, pp. 23a-24a; Pfister, No. 55, pp. 188-190.

⁴² Ibid., No. 293, pp. 635-639.

⁴³ Ibid., No. 356, pp. 787-792.

⁴⁴ Ibid., No. 437, pp. 971-973.

⁴⁵ Ibid., No. 382, pp. 830-832.

⁴⁶ J. C. Ferguson, Chinese Painting (Chicago, 1927), pp. 179-184; Paul Pelliot, "La peinture et la gravure européennes en Chine du temps de Mathieu Ricci," T'oung-pao, Vol. XX (1921), pp. 1-18. On the whole, the Chinese of this age were too closely bound to the traditional technique of the brush to profit greatly by the new methods of the Westerners. However, there were several paintings done in this period by native artists in which the Jesuit influence may be clearly seen. For further information, see Hsiang Ta

style of architecture, the outstanding example was the Yüan-ming-yüan Summer Palace, with its beautiful pavilions and gardens, built under the supervision of Benoit, which until 1860 constituted the chief record of the Jesuit labors in China.⁴⁷

(1) Astronomy and Calendar-Making. In astronomy, the Jesuits, represented by some prominent scholar-scientists, were able to place at the disposal of the Chinese the scientific attainments of Europe in this field, as subsidiaries or alternatives to the inaccurate traditional Ta-t'ung-li and the Hui-hui-li.⁴⁸ In the course of time, the foreign priests, partly through their astronomical knowledge, and

向達, "Ming-Ch'ing chih-chi Chung-kuo mei-shu suo-shou Hsi-yang chih ying-hsiang" 明清之際中國美術所受西洋之影響 ("European Influences on Chinese Arts during the Period of Late Ming and Early Ch'ing"), Tung-fang tsa-chih, XXVII:1 (January 10, 1930), pp. 19-38.

⁴⁷ For European influence on Chinese architecture, see Carroll B. Malone, History of the Peking Summer Palaces under the Ch'ing Dynasty (Urbana: Illinois Studies in the Social Sciences, 1935), Vol. XIX, particularly chapter 5; Fang Hao, "Chia-ch'ing ch'ien Hsi-yang chien-chu liu-ch'uan Chung-kuo shih-lüeh" 嘉慶前西洋建築流傳中國史略 ("A Historical of the Introduction of Western Architecture into China prior to the Chia-ch'ien Era"), Ta-lu tsa-chih, VII:6 (September 30, 1953), pp. 4-9.

⁴⁸ Within the period of late Ming and early Ch'ing, the Jesuits who were active in promoting Western astronomy in China either through writings or otherwise included Matteo Ricci, Diego de Pantoja (龐迪我, 1571-1618), Sabbatinus de Ursis (熊三拔, 1575-1620), Nicholaus Longobardi (龍華民, 1582-1645), Emmanuel Diaz (陽瑪琏, 1574-1659), Joannes Terrenz, Joannes Adam Schall von Bell, Tacobus Rho, Ferdinandus Verbiest, Ludovicus Ruglio (利類思, 1606-1684), Ignatius Kögler (戴進賢, 1680-1746), Andreas Pereyra

partly through their close contact with native converts as the result of their scientific competence, not only won recognition from the court, but also were able to replace the traditional Chinese methods with those of the West. It is important, however, to note that the astronomy advocated and practiced by the Jesuits, even though a decided advance upon that of the Chinese, was found to be inadequate in some particulars, for the Jesuits hesitated to disclose all the astronomical findings of Europe at that time. Obviously due to religious pressure--the Church order forbidding the dissemination of the idea of the "liquidity of the Heavens," together with its condemnation of Galileo's Law of Terrestrial Motion⁴⁹--one finds that both the astronomical instruments constructed and scientific treatises published by the Jesuits during late Ming and early Ch'ing on the whole adhered to the Ptolemaic theory, with only a few exceptions (such as Sabbatinus de Ursis's Chien-p'ing i-shuo 簡平儀說 (On the Planisphere: 1611),⁵⁰ Emmanuel Diaz's T'ien-wên lüeh

(徐懋德, 1690-1743), Augustinus von Hallerstein (劉松齡, 1703-1774), Antonius Gogeisl (鮑友管, 1701-1771), Phillippus Maria Grimaldi (閔明我, 1639-1712), Thomas Pereira (徐日昇, 1615-1709), Antonius Thomas (林安多, 1644-1709), Dominicus Parrenin (巴多明, 1665-1714) and Michel Benoist (蔣友仁, d. 1744).

⁴⁹Henri Bernard, "Galilee et les Jesuites de la mission d'Orient," Revue des questions scientifique (1937), p. 362.

⁵⁰Ssu-k'ü ch'üan-shu tsung-mu, chüan 106, p. 5a; Pfister, No. 30, p. 105. The Chien-p'ing i-shuo may be found in the Shou-shan ko-ts'ung-shu 守山閣叢書, chüan 92.

天問略 (Summary of Astronomy: 1615)⁵¹ and Michel Benoist's K'un-yü ch'uan-t'u-shuo 坤輿全圖說 (Explanation of the Terrestrial Map of the World)⁵²), which contained some information on Nicholas Copernicus' Heliocentric Theory.⁵³ Under these peculiar circumstances, the Jesuits appeared to have had a dual method of procedure: within the palace they taught the Copernican system, but in their work, they relied on the old Ptolemaic theory.

Of scientific treatises devoted to the explanation of Western astronomy, or rather the Almagest of Ptolemy (third century A.D.), there were many. The first significant one was Ricci's Ts'e-liang fa-i 測量法義 (Principle of Survey: 1617),⁵⁴ an explanation of the theory of astronomical measurements by means of the right-angled triangle. Later, with the arrival of Joannes Adam Schall von Bell, more works to further understanding of Western astronomy were published. Chief among Schall's works were the Li-fa hsi-ch'uan 曆法西傳 (History of Astronomy in the West: 1670) and

⁵¹ Ssu-k'u ch'üan-shu tsung-mu, chüan 106, p. 5a.

⁵² "Biography on Michel Benoist," CJC, chüan 46, pp. 6a-19a; Pfister, No. 377, p. 820.

⁵³ It was not until 1865 that the discoveries of Galileo and John Kepler were officially used in the Catholic missions in China.

⁵⁴ Pfister, No. 9, p. 38. This work may be found in the Hai-shan hsien-kuan ts'ung-shu 海山仙館叢書, chüan 107 and the Ts'ung-shu chi-ch'eng 叢書集成, chüan 1301.

the Hsin-fa li-shu 新法曆書 (Astronomical Encyclopaedia According to the New Method: 1670), two general studies which, while using the Ch'ung-cheng li-shu 崇禎曆書 as the primary source and still emphasizing the Ptolemaic system, traced the development of astronomy of the West from Ptolemy to Galileo;⁵⁵ and the Hsin-fa piao-i 新法表異 (Differences between the Old Calendars and the New: 1656), an essay in which Schall listed forty-two points to indicate the inaccuracies of the Chinese method.⁵⁶ Here, in view of its similar content, perhaps a word may be added regarding Verbiest's K'ang-hsi yung-nien li-fa 康熙永年曆法 (Perpetual Astronomy of the K'ang-hsi Emperor: 1686);⁵⁷ this work, being an abstraction of the astronomical treatises written by Schall, became one of the chief references for the Imperial Astronomical Board throughout the Ch'ing dynasty. As to works with a specialized nature directed to the Chinese, there were the Yüeh-li li-chih 月離曆指 (Theory of the Moon: 1632) and the Yüeh-li li-piao 月離曆表 (Tables Concerning the Calculation of the Moon: 1632) by Tacobus Rho; the Chiao-shih li-chih

⁵⁵ Pfister, No. 49, p. 108. In the section on Copernicus, Schall did not mention the former's Heliocentric theory; instead, he retained the stationary position of the earth in relation to the sun while discussing this particular astronomer. CJC, chüan 47, p. 7b.

⁵⁶ "Biography of Joannes Adam Schall von Bell," ibid., chüan 45, pp. 1a-11b.

⁵⁷ Pfister, No. 124, p. 354.

交食曆表 (Theories of Eclipses of the Sun and the Moon: 1632) and the Chiao-shih li-piao 交食曆表 (Tables of the Eclipses of the Sun and the Moon: 1632) by Schall von Bell; and the Ch'ih-tao nan-pei hsing-t'u 赤道南北星圖 (Map of the Stars to the North and South of the Equator: 1672) by Verbiest.⁵⁸ With regard to astronomical instruments, the Jesuits, utilizing the knowledge obtained from Europe, were able to construct with greater care much larger terrestrial globes, celestial spheres, planispheres, sun dials and the like, and thus to collect more accurate data on the obliquity of the ecliptic, the movements of the planets, the harmony of the spheres, the precession of the equinoxes, the length of the year, and the eccentricity of the solar orbit.⁵⁹ Descriptions of these instruments may be found in works such as the following: Sabbatinus de Ursis' Chien-p'ing-i-shuo 簡平儀說 (On the Planisphere: 1611);⁶⁰ the I-hsiang-t'u 儀像圖 (Diagrams showing the Instruments: 1674),⁶¹ the Hsin-chih ling-t'ai i-hsiang-chih 新制靈台儀象志 (Description of the Instruments newly Constructed at the Imperial Observatory: 1674)⁶² and the Yü-lan chien-p'ing-i hsin-shih

⁵⁸ Ming-shih, chüan 31.

⁵⁹ Ibid., chüan 25, p. 17a; Ming-shih-kao, Wang Hung-hsu 王緒鴻 comp., chüan 6, p. 11b.

⁶⁰ Pfister, No. 30, p. 105.

⁶¹ Ibid., No. 124, p. 354.

⁶² Ibid.

yang-fa 御覽簡平儀新式用法 (Practice of New Methods for the Use of the Emperor: 1682)⁶³ by Verbiest;⁶⁴ and the I-hsiang k'ao-ch'eng 儀象考成 (Investigation of Instruments: 1745), with the cooperation of Ignatius Kögler (戴進賢, d. 1746),⁶⁵ Augustinus von Hallerstein (劉松齡, d. 1774)⁶⁶ and Antonius Gogeisl (飽友管, d. 1771).⁶⁷

(2) Mathematics. In mathematics the Jesuits, unhampered by theological restrictions, as in the case of astronomy and calendar-making, with the collaboration of native converts like Hsü Kuang-ch'ü and Li Chih-tsao, not only managed to open a new chapter of Western knowledge to the Chinese on geometry, arithmetic, trigonometry, the use of logarithms, algebra, elucidation of the circle, and the like; but also their continuous efforts, skeptically received by a fraction of native scholars, led to a renaissance of Chinese knowledge in this field. During the period of late Ming and early Ch'ing, those who taught the Western method

⁶³Ibid.

⁶⁴"Biography on Verbiest," CJC, chüan 45, pp. 13b-20b; Ch'ing wên-hsien t'ung-k'ao 清文獻通考, chüan 256, p. 7161; Ch'ing-chao t'ung-chih 清朝通志, chüan 23, pp. 675-676; H. Bosmans, "Ferdinand Verbiest, Directeur de l'Observatoire de Peking (1623-1688)," Revue des questions scientifiques, 3^e série, Vol. XXI, pp. 195-273 and pp. 325-464; Wylie, p. 108.

⁶⁵Pfister, No. 297, pp. 643-647.

⁶⁶Ibid., No. 351, pp. 753-757.

⁶⁷Ibid., No. 350, pp. 751-752.

of calculation of writing down the progress and results of reasoning step by step included names such as Ricci, Tacobus Rho, Julius Aleni, Joan Nicolas Smogulecki (穆尼閣, 1611-1656),⁶⁸ and Pierre Jartoux (杜德美, 1668-1720).⁶⁹

The earliest work containing Western mathematics was Ricci's Kan-k'ian-t'i-1 乾坤體義 (Explanation of the Material Sky and the Earth: 1603) which, in the latter half, contained some information on geometry.⁷⁰ Perhaps more well-known was Ricci and Hsü Kuang-ch'i's translation of the first six chapters of Euclid's geometry into Chinese--a translation made three times in an attempt to achieve perfection--under the title of Chi-ho yüan-pên 幾何原本 (Elements of Geometry: 1607) which consisted of thirty-six definitions, four postulates and twenty axioms, along with an explanation of the important relationship between geometry and other branches of science.⁷¹ Of equal importance were

⁶⁸ Ibid., No. 91, pp. 262-264; CJC, chüan 45, pp. 21b-22a.

⁶⁹ Ibid., chüan 46, pp. 4a-6b; Pfister, No. 260, pp. 584-585.

⁷⁰ Ibid., No. 9, p. 40; CJC, chüan 44, pp. 1a-7b; Ssu-k'u ch'üan-shu tsung-mu, chüan 106, pp. 4a-4b.

⁷¹ Ibid., chüan 107, p. 6a; Pfister, No. 9, p. 37. The Chi-ho yüan-pên may be found in Li Chih-tsao's T'ien-hsüeh ch'u-han and also in the Hai-shan hsien-kuan ts'ung-shu, chüan 98-101. Li Yen, in his Chung-kuo suan-hsüeh-shih, p. 194, suggests that Ricci's translation was based on Clavius's (1539-1612) Euclidis elementorum libri, XV, 1589--a work by Ricci's eminent teacher--and not on the original by Euclid. Aside from the Chinese translation,

the Kuo-ku-i 勾股義 (Development of the Theory of the Right-Angled Triangle: 1607),⁷² contributed by Ricci and Li Chih-tsao, and the Chi-ho yao-fa 幾何要法 (Principles of Geometry: 1631), a joint-effort of Aleni and Ch'u T'ai-su 瞿式穀.⁷³ Of arithmetic, the Jesuits added little to what the Chinese already possessed. The T'ung-wên-suan-chih 同文算指 (Rules of Mathematics: 1614), a treatise communicated to Li Chih-tsao by Ricci, contained the rules for Notation, Addition, Subtraction, Multiplication, Division, the various operations of Fractional Computation, Extraction of Roots, and Trigonometrical Calculations.⁷⁴ Of trigonometry, both plane and spherical, there were the Ko-yüan pa-hsien-piao 割圓八線表 (Trigonometry: 1631) and the Ta-ts'e 大測 (Trigonometry: 1631) by Terrentius.⁷⁵ As to the use

Ricci's work was rendered twice into Manchu: in 1685 and in 1758. Also, in 1865, Tseng Kuo-fan, as governor-general at Nanking, ordered the reprint of the Elements of Geometry in connection with the "Self-strengthening" movement.

⁷²Pfister, No. 9, p. 31; this work may be located in the Hai-shan hsien-kuan ts'ung-shu, chüan 107.

⁷³Wylie, pp. 109-110.

⁷⁴Ssu-k'u ch'üan-shu tsung-mu, chüan 107, pp. 5b-6a; Wylie, pp. 118-119. Again in the Chung-kuo suan-hsüeh-shih, pp. 200-221, Li Yen Points out that this particular work was presumably a translation by Ricci of Clavius' Epitome arithmeticae practicae, 1583. For this work, see Hai-shan hsien-kuan ts'ung-shu, chüan 103-106, and the Ts'ung-shu chi-ch'eng, chüan 1281-1282.

⁷⁵Yao Pao-yü 姚寶猷, "Chi-tu-chiao chiao-shih shu-ju Hsi-yang wên-hua k'ao" 基督教教士輸入西洋文化考 ("The Introduction of Western Civilization into China: a Study of the

of logarithms, this was described and explained in Joan Nicolas Smogulecki's T'ien-pu chên-yuan 天步真原 (1644?), particularly in the section entitled Pi-li tui-shu piao 比例對數表 (Table of Logarithms) (in 10 chüan).⁷⁶ With regard to algebra--a subject which the Jesuits introduced into China during the seventeenth century, under the title A-êrh-je-pa-ta 阿爾熱八達 (or A-êrh-je-pa-la 阿爾熱巴拉), commonly known to the Chinese as Tung-lai-fa 東來法 (Method from the East) or Chih-ken fang-fa 借根方法 --even though there was no formal book on this subject, the main ideas were expressed in the Shu-li chung-yun 數理精蘊 (chüan 31-36), a compendium on mathematics, both Western and Chinese, compiled with the collaboration of the Jesuits under Imperial auspices between 1723 and 1756, which will be discussed later.⁷⁷ Finally, on the elucidation of a circle, the most significant was Tacobus Rho's Ts'e-liang chuan-i

Activities of the Christian Missionaries), Shih-hsüeh chuan-k'ian 史學彙刊, 1:2 (February, 1936), p. 21; and Chang Yin-lin 張蔭麟, "Ming-Ch'ing chih-chi Hsi-hsüeh shu-ju Chung-kuo k'ao-lüeh" 明清之際西學輸入中國考略 ("A Brief Study of the Introduction of Western Knowledge to China during the Late Ming and Early Ch'ing"), Ch'ing-hua hsüeh-pao 清華學報, 1:1 (June, 1924), p. 54.

⁷⁶ Li Yen, pp. 214-217; Pfister, No. 92, pp. 264-265; Ssu-k'ü ch'üan-shu tsung-mu, chüan 106, p. 9b. Smogulecki's work was later (1648) translated into Chinese by his disciple Hsieh Fêng-hsiang 薛鳳祥 (d. 1680) under the title T'ien-hsüeh hui-t'ung 天學會通. This particular work may be found in the Shou-shan ko ts'ung-shu, chüan 103-104.

⁷⁷ Ssu-k'ü ch'üan-shu tsung-mu, chüan 107, pp. 6a-6b; Sarton, Vol. 2, pp. 627-628; Mikami, op. cit., pp. 79-84.

測量全義 (The Complete Meaning of Survey: 1631), a work which, aside from containing a translation of two of Archimedes' treatises (namely, "The Measurement of the Circle" and the "Sphere and the Cylinder,") also gave a formula for computing the circumference of a circle to twenty-one points ($\pi = 3.14159265358979323846$).⁷⁸

(3) Technology. As skillful craftsmen and artisans in the advancing field of technology, the Jesuits, best portrayed by Nicolaus Longobardi, Emmanuel Diaz, Julius Aleni, Tacobus Rho, Ferdinandus Verbiest, Jean de Rocha (羅如望, 1566-1623),⁷⁹ Franciscus Sambiasi (畢方濟, 1582-1649)⁸⁰ and Joannes Rodrigués (陸若漢, 1559-1633),⁸¹ were likewise competent: their work ranged from the design and manufacture of cannons for military purposes to making mechanical toys for palace amusement. Realizing the fascination and curiosity of the Chinese, the early Jesuits, on their arrival in China, presented to the court, as well as to high-ranking officials, such items as alarm-clocks, telescopes and eyeglasses.⁸² Concurrently, they offered their services, as a partial fulfillment of their

⁷⁸Chang Yin-lin, op. cit., p. 54; Pfister, No. 56, p. 190.

⁷⁹Ibid., No. 18, pp. 67-69.

⁸⁰Ibid., No. 40, pp. 136-142.

⁸¹Ibid., No. 71, pp. 214-215.

⁸²Ming-shih, chüan 326, pp. 12b-15a.

conciliatory-persuasive policy, in the manufacturing of Western armaments.⁸³ Thus, through the exhibition of Western technology by the Jesuits, a limited movement of Westernization centered on firearms and other Western articles was taking shape.

To demonstrate the Jesuits' contributions in the field of technology, a few words concerning their scientific treatises seems to be in order. Within the period under consideration, important works primarily for the further understanding of Western armaments and machines, either composed independently by the foreign priests or with the cooperation of the native converts, consisted of the following: Sabbatinus de Ursis' T'ai-Hsi shui-fa 泰西水法 (Western Hydraulics: 1612), an extensive treatment of different aspects of agriculture practiced in the West which was later included in the famous Nung-chêng ch'uan-shu 農政全書 (A Complete Treatise on Agricultural Science: 1639) compiled by Hsü Kuang-ch'i;⁸⁴ a treatise on the telescope by Joannes

⁸³ Cheng Shih-hsü 鄭師許, "Ming-Ch'ing liang-tai ti chün-ch'i pien-ko chi ch'i ying-hsiang," 明清兩代的軍器變革及其影響 ("Changes in Military Equipment during the Ming and Ch'ing dynasties and Their Effects") Hsin-chung-hua 新中華, 2:6 (1944), pp. 59-70; Fang Hao 方豪, "Ming-mo Hsi-yang huo-ch'i liu-ju wo-kuo chih shih-liao" 明末西洋火器流入我國之史料 ("Historical Materials concerning the Introduction of Western Arms into China in the Late Ming"), Tung-fang tsa-chih, 40:1 (January, 1944), pp. 49-54.

⁸⁴ Ssu-k'u ch'uan-shu ts'ung-mu, chüan 102, pp. 2b-3a; Pfister, No. 30, p. 105; Louis Maverville, "Hsü Kuang-ch'i, a Chinese Authority on Agriculture," Agricultural History, XIV (October, 1940), pp. 143-160.

Adam Schall von Bell, entitled the Yüan-ching shuo 遠鏡說 (The Telescope: 1627);⁸⁵ the Yüan-Hsi ch'i-ch'i t'u-shuo lu-tsui 遠西奇器圖書錄要 (European Works on Mechanical Principles with Illustrations: 1627), commonly known as Ch'i-ch'i t'u-shuo, contributed by Terrenz and Wang Chêng (1571-1644),⁸⁶ which contained a translation of Western works on mechanical principles and instruments, along with fifty plates describing the use of Western machinery;⁸⁷ and above all, the Huo-kung ch'ieh-yao 火攻挈要 (A Compendium of Firearms Used for Attack: 1643), a study by Schall and Chiao Hsi 焦勛 (date unknown) which included, in addition to description and explanation devoted to the manufacturing of weapons, dynamite and shells, essentials of Western strategy.⁸⁸

(4) Geography. Finally, in the field of geography, such Jesuits as Ricci, Aleni, Verbiest and Benoist distinguished themselves as cartographers. As part of their conciliatory-persuasive policy, the Jesuits prepared detailed maps of the world, and presented them to the court

⁸⁵This work may be found in the Ts'ung-shu chi-ch'eng, chüan 1308.

⁸⁶Hummel, op. cit., pp. 807-809.

⁸⁷Pfister, No. 46, pp. 156-157; this work may be found in the Shou-shan-ko ts'ung-shu, chüan 107-109.

⁸⁸The Huo-kung ch'ieh-yao may be found in the Shou-shan-ko ts'ung-shu, chüan 35, and in the Ts'ung-shu chi-ch'eng, chüan 1491.

and influential officials as gifts, with an aim to create sensationalism throughout China and to satisfy Chinese curiosity. The first were the numerous maps of the world prepared by Ricci.⁸⁹ Making intelligent use of Chinese materials at hand and adding to them his own knowledge, Ricci described in these maps and in the accompanying texts the Ptolemaic theory, the sphericity of the earth, the functions and computation of the Meridians, the application of longitude and latitude to measure the width and length of the earth, the division of the earth into five zones, and the most recent discoveries in Western geography during the fifteenth and sixteenth centuries.⁹⁰ In addition, there

⁸⁹In an article entitled "K'ai Li Ma-tou ti shih-chiai ti-t'u" 考利瑪竇的世界地圖 ("On the World Map of Matteo Ricci") Yü-kung, 5:3-4 (April, 1936), p. 28, William Hung suggests that, within the period from 1584 to 1608, there were probably eight different editions made of Ricci's Map of the World: two appeared as Shan-hai yü ti-t'u 山海輿地圖 (1584 and 1595), two as Shan-hai yü-ti ch'uan-t'u 山海輿地全圖 (1600 and 1604), one as Yü-ti ch'uan-t'u 輿地全圖 (1601) and three as K'un-yü wan-kuo ch'uan-tu 坤輿萬國全圖 (1602, 1604 and 1608).

In making these different editions, Ricci depended largely on the Mercator Map of 1569 and the Ortelius Map of 1570 and, for his later editions, on the Plancius Map of 1592. Kenneth Ch'ên, "The Early Expansion of Chinese Geographical Knowledge," T'ien-hsia Monthly, X:1 (August-September, 1940), p. 60.

⁹⁰For an account of Ricci's Map, see Henri Bernard, "Les Etapes de la cartographie scientifique pour la Chine et les pays voisins (depuis le XVI^e jusqu'à la fin de XVIII^e siècle)," Monumenta Serica (1935-1936), pp. 428-477; J. F. Baddeley, "Father Ricci's Chinese World Maps, 1584-1608," Geographical Journal, L:4 (October, 1917), pp. 254-270; E. Heawood, "The Relationship of the Ricci's Maps," ibid., pp. 271-276; and Li Yen, pp. 96-126.

were, for example, Julius Aleni's Wan-kuo ch'uan-t'u 萬國全圖 (World Map: 1623) and the K'un-yü ch'uan-t'u 坤輿全圖 (The Map of the World: ?) by Ferdinandus Verbiest and Michel Benoist;⁹¹ however, they added little to those of Ricci. Here attention should be paid to Martin Martini's (衛匡國, d. 1661)⁹² Novus Atlas Sinensis, 1655, which included seventeen maps and one hundred and seventy-one pages of text, describing in detail each province and each prefecture.⁹³ Although the purpose of this work was to increase Europe's knowledge of Chinese geography, it was the first truly scientific atlas of China.

Supplementary to the maps, the Jesuits composed numerous works on geography to further expound the above-mentioned points, of which the outstanding ones were: the Chih-fang wai-chi 職方外紀 (Description of the Globe: 1623), a concise geography of the world started by Pantoja and later completed by Julius Aleni which has, in addition to the enclosure of a map of the world, five ch'uan devoted to

With regard to the discussion of the accompanying texts, see Kenneth Ch'ên, "Matteo Ricci's Contribution to and Influence on Geographical Knowledge in China," Journal of the American Oriental Society, 59:3 (September, 1939), pp. 327-337; and Lionel Giles, "Translations of the Chinese World Map of Father Ricci," Geographical Journal, LII:6 (December, 1918), pp. 367-385.

⁹¹Pfister, No. 124, p. 355.

⁹²Ibid., No. 90, pp. 256-259.

⁹³Arnold H. Rowbothan, Missionary and Mandarin: The Jesuits at the Court of China (Berkeley: University of California Press, 1942), p. 266.

the description of the physical location, products, political system, religions, education, and customs of the five continents;⁹⁴ Ferdinandus Verbiest's K'un-yü t'u-shuo 坤輿圖說 (Explanation of the Terrestrial Map of the World: 1672), a work, while somewhat similar to that of Aleni's, contained further information on some points, such as the different kinds of birds, animals and architecture found and seen in different parts of the world;⁹⁵ and the Hsi-fang yao-chi 西方要紀 (A Compendium of Europe: ?), a brief account on the transportation, education, commerce, military systems, manufactured goods, religions, legal systems, political institutions and the like of different European countries, with contributions by Louis Buglio, P. Gabriel Magalhaens (安文思, d. 1677)⁹⁶ and Ferdinandus Verbiest.⁹⁷

The Jesuit contribution in the sphere of geography would be incomplete without mention of their activities as geographical surveyors during early Ch'ing. Aware that

⁹⁴Wyllie, p. 58; Pfister, No. 39, p. 135. This work may be found in the Shou-shan-ko ts'ung-shu, chüan 61.

⁹⁵Wyllie, pp. 58-59; Pfister, No. 124, pp. 355-356; Ch'ing-wen-hsien t'ung-k'ao, chüan 224, p. 6868. This work may be found in the Chih-hai ts'ung-shu 指海叢書, chüan 91-92. In addition, an abstract of Verbiest's work, entitled the K'un-yü wei-chi 坤輿外紀 has frequently been published; however, the principle part of the geographical matter is omitted.

⁹⁶Pfister, No. 88, pp. 251-254.

⁹⁷Ibid., No. 81, p. 242; this work may be located in the Chao-tai ts'ung-shu 昭代叢書, chüan 27.

K'ang-hsi was often concerned about his huge domain and the vast territories in the north, the Jesuits, particularly Verbiest and Parennin, persuaded the emperor to undertake a general cartographical survey of the whole empire. Finally, the period from 1707 to 1717, a systematic cartographic survey of the whole empire commenced, in which nine priests participated, together with a large number of trained Chinese assistants. On July 4, 1708, the task of surveying the northern empire was assigned to Joachim Bouvet (白普, d. 1730),⁹⁸ Jean Baptiste Régis (雷考思, d. 1738)⁹⁹ and Pierre Jartoux (杜德美, d. 1720)¹⁰⁰ who, utilizing the most scientific method of the time (triangulation and verification of the long distances by the study of the eclipses), began a survey of the Great Wall and adjacent territory.¹⁰¹ In the following year, under the supervision of Régis, Jartoux and Xavier-Ehrenbert Fridelli (費隱, d. 1743),¹⁰² they mapped Manchuria, the ancestral home of the reigning dynasty, covering a territory as far north as the fourth degree of

⁹⁸ Pfister, No. 171, pp. 433-437.

⁹⁹ Ibid., No. 236, pp. 529-533.

¹⁰⁰ Ibid., No. 260, pp. 548-585; CJC, chüan 46, pp. 4a-6b.

¹⁰¹ Weng Wen-hao 翁文灏, "Ch'ing-ch'u ts'e-hui ti-t'u k'ao" 清初測繪地圖考, Ti-hsüeh tsa-chi, 111 (September, 1930), pp. 411-412.

¹⁰² Pfister, No. 274, pp. 607-609.

latitude and as far south as the borders of Korea.¹⁰³

Having completed the surveying of the great northern empire, the Jesuits, in accordance with imperial orders, were split into several groups to survey China proper: Régis and Jean-Francois Cardoso (麥大成, d. 1723)¹⁰⁴ surveyed the vicinity of Shangtung; Jartoux and Fridelli went north to map the country of the Khalkha region (in Outer Mongolia); another group, including Cardoso and de Tarte (塔脫爾), surveyed Shansi, Shensi, Kiangsu, Kwangsi and Kwangtung; Régis, Moyriac de Mailla (馮秉正, d. 1748)¹⁰⁵ and Romain Hinderer (德瑪諾, d. 1744)¹⁰⁶ were responsible for Honan, Kiangnan, Kiangsu, Chekiang and Fukien; and later, Fridelli and Régis made maps of Szechuan, Yunan and Kweichow. In 1718, with all the data of various surveys at hand, a general map of the Chinese empire, prepared by Jartoux and Régis, was presented to the throne.¹⁰⁷

Information incorporated into these maps was not confined to China proper, but included north-central Asia and northeastern Asia as far as the Arctic Ocean. Perhaps due to Ch'ien-lung's anxiety over the menace arising from

¹⁰³Weng Wen-hao, op. cit., p. 412.

¹⁰⁴Pfister, No. 284, p. 623.

¹⁰⁵Ibid., No. 269, pp. 596-599.

¹⁰⁶Ibid., No. 277, pp. 611-616.

¹⁰⁷Weng Wen-hao, op. cit., pp. 412-413.

nations on his borders and his fear of an alliance of the Mohammedan peoples against him, Antoine Gaubil (宋君榮, d. 1759)¹⁰⁸ was ordered to make a map of the frontier lands of Turkey, Persia and India, and another priest, Father Benoit, was ordered to make a new atlas of Central Asia, a total of 104 plates.¹⁰⁹

Nevertheless, there were certain territories which the Jesuits were not allowed to penetrate. For example, they were not allowed to go as far north as the Russian frontier or eastward from there to the sea; nor were they allowed to enter Korea or Sinkiang. As an alternative, Chinese or Manchu officials were despatched to these regions to bring back data later collected by the foreign priests.¹¹⁰ It should be pointed out that the result of the concerted effort of the Jesuits to map the Chinese empire remains definitive; indeed, it has been the basis of all subsequent geographical study of and in China.

(C) The Chinese Reactions toward the Jesuits' Activities in China

It remains to be seen what immediate influence the Catholic missionaries, chiefly through their attempt to

¹⁰⁸ Pfister, No. 314, pp. 667-676.

¹⁰⁹ Wang Yung, op. cit., pp. 264-269.

¹¹⁰ Rowbothan, op. cit., pp. 264-269.

synthesize Christianity with Confucianism, and through the novelty of their Western science, had on the Chinese. Significantly, within the period under consideration, both the Wan-li and Ch'ung-cheng emperors of late Ming and the Shun-ch'ih and K'ang-hsi emperors of early Ch'ing, largely due to the accurate demonstrations based on Western Scientific knowledge, utilized the services of the Jesuits as state astronomers, chief of whom were Diego de Pantoja, Sabbatinus de Ursis, Joannes Terrenz, Emmanuel Diaz, Johann Adam Schall von Bell, Ferdinandus Verbiest and Ignatius Kögler in the readjustment of the calendar and the improvement of astronomy, when the traditional calendars (the Ta-t'ung li and the Hui-hui-li) proved to be no longer accurate.¹¹¹ Along these lines, Imperial astronomical and translation bureaus for the revision of the Calendar, and for the manufacturing of Western astronomical apparatus were established, under the supervision of the Jesuits (and sometimes missionaries of other denominations), to translate and compile important scientific works

¹¹¹ Ming-shih, chüan 31, p. 13b; Ku Ying-t'ai 谷應泰 (comp.) Ming-shih ch'i-shih pên-mo 明史紀事本末 (A Complete Record of the History of Ming) in the Chi-fu ts'ung-shu 欽定四庫全書, chüan 73, pp. 1a-2a and pp. 3b-15a; Ch'en Shou-yi, "The Religious Influence of Early Jesuits on Emperor Ch'ung-cheng of the Ming Dynasty," T'ien-hsia Monthly, 8:5 (May, 1939), pp. 397-419 and 9:1 (August, 1939), pp. 35-47; Elsie Talcott Hibbert, Jesuit Adventure in China: During the Reign of K'ang-hsi (New York: E. P. Dutton and Company, 1941); and George H. Dunne, "The Jesuits in China in the Last Days of the Ming Dynasty," a Ph.D. dissertation at the University of Chicago, 1944.

such as the Ch'ung-cheng li-shu 崇禎曆書 (Astronomy of the Ch'ung-cheng Reign: 1634),¹¹² a late Ming collection of European astronomy, with contributions by Nicholas Longobardi, Joannes Terrenz, Tacobus Rho, Johann Adam Schall von Bell, Hsü Kuang-ch'i, Li Chih-tsao and Li T'ien-ching; and the Lü-li yuan-yuan 律曆淵源 (Compendium on the Astronomy, Music and Mathematics), compiled with the collaboration of the Jesuits under Imperial auspices between 1723 and 1756, including three main works: the Li-hsiang k'ao-ch'eng 曆象考成 (42 chüan)¹¹³ on the astronomy; the Shu-li ching-yun 數理精蘊 (53 chüan)¹¹⁴ on mathematics; and the Lü-lü cheng-i

¹¹²It has also been published with the title Hsi-yang li-fa hsin-shu 西洋曆法新書 (New Works on Western Astronomy). Preceded by various memorials and edicts on astronomy, this work is divided into eleven parts, primarily based on the Ptolemaic system: (1) the elements of the system; (2) standard numbers; (3) calculations; (4) instruments; (5) general operations; (6) sun's course; (7) fixed stars; (8) moon's path; (9) nodes and conjunctions of the five planets. Also there is an appendix by Schall von Bell in two parts: (1) the biographies of Western astronomers from Ptolemy to Galileo; (2) an elucidation of the differences between the Chinese and Western astronomy. Wylie, pp. 108-109; Ssu-k'u ch'uan-shu ts'ung-mu, chüan 106, p. 5b.

¹¹³The Li-hsiang k'ao-ch'eng, divided into three main sections, embodies both Chinese and Western information of astronomy. The first is theoretical, the next practical and the last consists of tables. On the whole, although this work is more advanced than the Ch'ung-cheng li-shu, the Ptolemaic theory is still maintained. Wylie, pp. 110-111; Ch'ing-wên-hsien t'ung-k'ao, chüan 256, pp. 7159-7160; Ssu-k'u ch'uan-shu ts'ung-mu, chüan 106, pp. 7a-7b.

¹¹⁴This work is also divided into three parts. The first traces the origin of Chinese mathematics, together with a commentary on the Chou-pei suan-ching; the second deals with geometry and arithmetic; and the third contains

律呂義 (5 chüan)¹¹⁵ on music. Also, as a measure to hinder the threats from outside during late Ming and to further strengthen the military power during early Ch'ing, the assistance of the Jesuits in the manufacturing of cannon and other armaments on the Western model was welcomed. Furthermore, in the general cartographical survey of the empire (1707-1717) as well as in the surveying of the newly conquered area in Turkestan and Ili (1755-1759), teams of Jesuit fathers with trained Chinese students were despatched. On a more sophisticated level, the Jesuits' numerous new, well-composed treatises on various branches of learning, their detailed maps of the world, their religious paintings utilizing the Renaissance perspective, and their critical evaluation of the Chinese traditional classics in light of Catholicism but in agreement with earlier Confucianism, opened new horizons to some brilliant minds of China at that time. At the same time, these innovations caught the nation as a whole intellectually unprepared to undertake a movement away from traditionalism and from Neo-Confucianism in particular.¹¹⁶

essentials of European algebra, trigonometry and the use of logarithms. Wylie, p. 120; Ssu-k'ü ch'üan-shu tsung-mu, chüan 107, pp. 6a-6b.

¹¹⁵See footnote 37.

¹¹⁶Ming-shih, chüan 326, pp. 12a-15a; Ch'ên Teng-yüan 陳登元, "Hsi-hsüeh tai-Hua shih kuo-jen chih wu-tuan t'ai-tu," 西學來華時國人之武斷態度 ("The Chinese Dogmatic Attitude toward Western Knowledge when It Was First Introduced into China," Tung-fang tsa-chih, 27:8 (April, 1930), pp. 61-67.

Some of the eminent late Ming and early Ch'ing scholars, such as Hsü Kuang-ch'i, Li Chih-tsao, Yang T'ing-yün and Wang Cheng and others, revolted against the general trend of the intellectual expressions of the age, held rendezvous with the Catholic priests in spite of criticism from their colleagues, quenched their thirst for new scientific knowledge, and in general sought intellectual refuge within the Western camp. Under both the religious and scientific influences of the missionaries, these officials, aside from composing religious essays with more or less the same themes and for the same purpose as their Western collaborators, contributed important scientific works which altogether increased the understanding of science in China.¹¹⁷ For them, the acceptance of Christianity would overcome the shortcomings of Confucianism and replace Buddhism. But there were far more, such as Fang I-chih, Chou Tzu-yü 周子愚, Huang Tsung-hsi 黃宗羲 and Mei Wên-t'ing 梅文鼎 who, foreshadowing the concept of "Chinese learning for the fundamental principles, Western learning for practical application" (中學為體, 西學為用), a famous slogan used in the nineteenth century in connection with the whole issue of Westernization, held with Chinese traditionalism on the whole, and only took Western

¹¹⁷ T'ang P'ai-huang 唐肇黃, "Ming-chi ch'ing-ch'u Hsi-lai t'ien-suan tui-yü Ch'ing-tai hsüeh-shu ti ying-hsiang" 明季清初西來天算對於清代學術的影響 ("The Effects of Late Ming and Early Ch'ing Western Astronomy and Mathematics on Ch'ing Scholarship"), Chung-kuo wen-hua chiao-yü-kuan chi-k'an 中國文化教育館季刊, 3:2 (April, 1939), pp. 447-460.

scientific knowledge into consideration when the re-examination of Chinese astronomy and mathematics became a necessity.¹¹⁸ In this connection, it may be added, as pointed out by Hu Shih, Liang Ch'ih-ch'ao, Henri Bernard and others, that the Jesuits' critical interpretation of the traditional Chinese texts, together with the new scientific methodology in mathematics and astronomy, had some influence on early anti-Ch'ing thinkers who, among other things, specialized in textual criticism based on more scientific inquiry, aimed at the revival of the native sciences, especially mathematics and astronomy, and tried to break away from Neo-Confucianism and other aspects of traditionalism.¹¹⁹

Nevertheless, despite their efforts to introduce Western religious ideas and scientific knowledge into China during the period of late Ming and early Ch'ing, and despite the friendly reception of certain scholars and members of the imperial family,¹²⁰ several scores of whom were said to have

¹¹⁸Ch'ên Tung-yüan, op. cit., pp. 65-74.

¹¹⁹Hu Shih, "The Chinese Renaissance," in the Chinese Year Book (1924), pp. 633-651; Liang Ch'ih-ch'ao, Ch'ing-tai hsüeh-shu kai-lun 清代學術概論 (A General Discussion of the Academic Learning of the Ch'ing Dynasty), pp. 173-175; Henri Bernard, "Whence the Philosophic Movement at the Close of the Ming (1580-1640)?" Bulletin of the Catholic University of Peking, No. 8 (December, 1931), pp. 67-73; T'ang P'ai-huang, op. cit., pp. 453-457.

¹²⁰For example, see Ch'ên Yüan 陳垣, "Yung-ch'ien chien feng T'ien-chu-chiao chih tsung-shih" 雍乾間奉天主教之宗室 ("Members of the Imperial Family who Worshipped Catholicism during the Periods of Yung-cheng and Ch'ien-lung"), Fu-jen

been converted by 1640, the Jesuits as well as priests of other denominations were, however, subject to the mercy of the court, and as the result of court politics, they found themselves caught on the horns of a dilemma, alternating between imperial patronage and disfavor. In other words, as long as their services were deemed desirable and proved to be advantageous to the court, they were allowed to remain in the capital and to carry on religious activities, as demonstrated particularly in the reign of K'ang-hsi (1662-1723); otherwise they were restricted by regulations applied to all foreigners. Showing the decline of the important role played by the Jesuits in China, a contemporary author writes:

"Under the Ming the Jesuits had been advisers; under K'ang-hsi they were honourable scholar-guests; under Ch'ien-lung they were merely servants of the Crown."¹²¹ Moreover, their activities in China were further hindered by the half-a-century-old rites controversy between the Jesuits and their competing orders, particularly the Franciscans and the Dominicans; this controversy involved such issues as whether Chinese traditional terms, like t'ien and shang-ti, should be used by the missionaries and given Christian connotations,

hsüeh-chih, 3:2 (July, 1932), pp. 1-36; Ch'ên Shou-yi, "The Religious Influences of Early Jesuit on Emperor Ch'ung-cheng of the Ming Dynasty," T'ien-hsia Monthly, 8:5 (May, 1939), pp. 397-419; ibid., 9:1 (August, 1939), pp. 35-47.

¹²¹Rowbothan, op. cit., p. 226.

and whether the native converts should be permitted to engage in ceremonies honoring Confucius and their ancestors; it was complicated by the position taken by Emperor K'ang-hsi in favor of the Jesuits and by the Papacy's support of other denominations in these matters.¹²² The result was the famous episode of 1724: the expulsion of all missionaries from China, save a few who were retained for scientific work. Worse still, during the Yung-cheng (1723-1736), the Ch'ien-lung (1736-1796) and the Chia-ch'ing (1796-1821) administrations, although the Jesuit scholars were still employed at court, Christianity was classed as one of the "uncannonical doctrines," a menace to the state and subversive of Chinese institutions. The former Emperor expressed his disapproval to several of the Catholic missionaries:

You say that your law is not a false law. I believe it. If I thought it were false what would prevent me from destroying your churches and driving you from them? What would you say if I sent a troop of Bonzes and Lamas into your country to preach their doctrines? You want all Chinese to become Christians. Your Law demands it, I know. But in that case what will become of Us? Shall we become subjects of your king? The converts you make recognize only you in time of trouble. They will listen to no other voice but yours. I know that at the present time there is nothing to fear, but when your ships come by the thousands then there will probably be great disorder The emperor, my father, lost a great deal of his reputation among scholars by the condescension with which he let you establish yourselves here. The laws of our ancient sages will permit no change and I will not allow my reign to be laid open to such a

¹²²Ibid., pp. 119-192; Hibbert, op. cit., pp. 241-260.

charge.¹²³

As expected, during the period under consideration, with the exception of a segment of the officialdom who embraced Catholicism and admired Western sciences for reasons briefly described above, opposition to both Western religious ideas and Western sciences sprang up everywhere, on all levels. Arguments were advanced as measures of cultural defense mechanism, to safeguard Chinese traditional heritage and at the same time to resist Western infiltration of any sort. It is not an exaggeration to say that the majority of the native scholars, entrenched in the ethnocentric cultural tradition, were not seriously affected by the new elements of Western thought, of which the opposition to Western religion and science will be the main concern of the following two chapters.

¹²³ Joseph de Moyriac de Mailla, S.J., Historie générale de la Chine ou Annales de cet Empire trad. de Tong-kien-Kang-mou (Paris, 1777-1785), Vol. XI, p. 392, note, quoted in Rowbothan, op. cit., p. 178. For further information about the persecution of Catholicism, see Yazawa Toshihiko 矢澤利彦 "Chia-ch'ing shih-nien ch'a-chin T'ien-chu-chiao shih-mo" 嘉慶十年查禁天主教始末 ("A Complete Account of the Prohibition of Catholicism in the Tenth Year of Chia-ch'ing"), translated by Ching Hua 程華, Chung-ko yüeh-k'an 中和月刊, 111:4 (April, 1942), pp. 54-74.

CHAPTER IV
OPPOSITION TO WESTERN RELIGION:
THE ANTI-CHRISTIAN MOVEMENT

This section examines the way in which the Jesuits were caught in the intellectual battle of the age. It was primarily due to their concept of Confucianism which they utilized as a convenient way to propagate Christianity; this concept became involved in the revival of the New and Old Textual controversy. The Jesuits favored pre-Han Confucianism; hence they came into opposition with Buddhism, Taoism, Neo-Confucianism, and the Syncretistic Creed (Taoism, Buddhism and Confucianism). Accordingly, with the exception of Taoism, the attack on Western religion came from each of the above-mentioned schools, even though the tempo of attack and the arguments used varied sometimes from one to another. The Jesuits' desire to conciliate or supplement Confucianism on the one hand, and to reprimand or replace Buddhism on the other prompted the Buddhists, particularly those associated with Confucianism, to conduct a crusade to eliminate this heterodoxy; this crusade finally led to a demonstration of anti-foreignism and anti-Catholicism. For the traditional Confucianists, particularly the scholar-officials following

Neo-Confucianism, the application of the Jesuits' conception of Confucianism, would not only mean the obstruction of the long-term conceptions of traditionalism, particularly those of Neo-Confucianism, but would also imply, among other things, "the usage of barbarian ways to change the Chinese." In view of this, they joined forces with the Buddhists in the anti-Christian movement. As will be seen later, of the arguments advanced in opposition to Western religion, the ones most commonly shared by both the Buddhists and Confucianists, during the period from late Ming to early Ch'ing, were: the completeness of Chinese thought which rendered superfluous any supplementation with alien ideas; the application of Lao Tzu's theory on the Sinization of barbarians by indicating that Christianity was nothing but a by-product of Chinese thought; the acknowledgment of the fundamental good of man who had the power to reach his best state of development, free from sin and crime, without assistance from God; and the usage of ideas behind Neo-Confucian and Buddhist theories to argue that all things were of the same substance. Taken altogether, they were the means by which the scholar-officials sought to safeguard Chinese traditionalism from Western infiltration and to maintain the status quo within Chinese traditional thought.

(A) Buddhist Criticism of Christianity

Ricci, supported by his contemporaries and successors, both native and foreign, harshly criticized Buddhism. He particularly attacked the theory of Reincarnation (輪迴), the Prohibition of Taking Lives (戒殺生), the Equality of All Things, the "Emptiness" and "Nonexistent" nature of the Buddhist doctrine, together with image-idol worshiping on the one hand. Combined with this attack, his ideas on cosmogony, the only Incarnation of God on Earth, the Intercession of Christ as necessary for salvation, the Coming of God in Final Judgment, and the exploitation of nature and sentient beings to accommodate man's needs bound by the very law and mechanism of existence, inevitably gave grounds for strong Buddhist counterattacks. The T'ien-chu shih-i (The True Meaning of Lord of Heaven: 1599), which first appeared as the T'ien-hsüeh shih-i (The True Meaning of Catholicism), was a religious treatise intended by Ricci to challenge the entire body of Chinese thought and at the same time "to supplement Confucianism and to replace Buddhism" with Christianity; this work became the center of Buddhist attack.¹ Another of Ricci's works, the Chi-jen shih-p'ien 畸人十篇 (Ten Essays on Extraordinary Man: 1608, colored by anthropocentrism, was also in many ways contrary to the Buddhist

¹Consult particularly chüan 2, section 5, pp. 1-16, and section 7, pp. 51-55, for Ricci's attack on Buddhism.

doctrine.² Also subject to bitter scrutiny were Michel Ruggieri's T'ien-chu sheng-chiao shih-lu 天主聖教實錄 (A True Record of the Sacred Teaching of the Lord of Heaven: 1584), a work which explained the Creation and the Creator, the Immortal Soul, the Judgment and the Ten Commandments; the Wan-mu chên-yüan 萬物真原 (The True Principle for All Things: 1628), a symposium which expounded that all things were created by God, with contributions by Jules Aleni, Nicolas Longobardi, F. Furtado and R. de Fgueredo; and Ferdinand Verbiest's Chiao-yao hsi-lun 教要序論 (An Introduction to Religious Doctrines: 1670), a religious treatise written in an easy-to-understand language designated to convert more natives to Catholicism. Similar were religious works written by native converts, such as Hsü Kuang-ch'i's P'i-shih-shih chu-wang 闡釋氏諸妄 (Exposing the Various Fallacies of Buddhism) and Yang T'ing-yün's Tai-i-pien 代疑篇 (1621), which altogether focused on the condemnation of Buddhism in almost the same tones and measures used by Ricci and associates.

To begin with, it is significant that primarily due to the scarcity of available Buddhist material, a satisfactory narration of the Buddhist's opposition to Christianity during the period of Late Ming and Early Ch'ing becomes

²This work by Ricci is available in Li Chih-tsao's T'ien-hsüeh ch'u-pan, section 5.

extremely difficult. Fortunately, fragments of critical treatises, altogether fourteen pieces, written by Buddhist monks or firm believers, within the period from the end of the sixteenth century to the middle of the seventeenth century can be located in the Sheng-chiao p'o-hsieh chi 聖朝破邪集 (Collected Works of the Sacred Dynasty Exposing Heterodoxy) compiled by Hsü Ch'ang-chih 徐昌治 in 1855--a work which contains mostly essays hostile to Western religion and sciences, written not only by Buddhists, but also by different schools of thought; this is one of the indispensable works for the study of Sino-European cultural exchange during the period of Late Ming and Early Ch'ing, and particularly for the study of Chinese traditional opposition to Western religion and science. The narration which follows is based exclusively on this work.

Prior to the death of Ricci in 1610, the first echo of anti-Catholicism came from the province of Chekiang. This was the center of Buddhism at that time, the birthplace of outstanding Chinese scholar-officials who had accepted Christianity, men such as Hsü Kuang-ch'i, Yang T'ing-yün and Li Chih-tsao, and the Jesuit propagation center. Aiming to hinder the Jesuits' attempt to synthesize Christianity with Confucianism and their concurrent effort to replace Buddhism with the teaching of the Lord of Heaven; the Buddhists of this vicinity, although handicapped by the lack of a dynamic

ideological weapon with which to combat this so-called heresy, argued that their foreign opponents misunderstood the fundamentals of Buddhism, or else they would have refrained from such unfounded criticism; and that Chinese thought as a whole was complete and did not need to be supplemented by other foreign ideas. In particular, to defend the "nonbeing" and "emptiness" of the Buddhist doctrine, they attacked their Western opponents' misconception of cosmogony centered upon God the Creator by applying the theory that everything was "without beginning or end"--one of the fundamentals of traditional Chinese thought and the teaching of the One Vehicle (一乘) of Buddhism.³ In other words, unlike Christianity which is all definite, and projected in time, with a beginning and an end; Buddhism puts little emphasis on God the Creator, and its world is, so to speak, without beginning and without end, and its time and space are conceived in terms of infinity.

Concurrently, speaking not only as Buddhists, but as defenders of Chinese traditionalism, they condemned the native collaborators for accepting "the barbarian ways to change the Chinese" and warned the whole nation, with the following remark, to be intellectually alert:

The barbarian Ricci uses the teaching of the Lord of Heaven to deceive the world by saying that at the time of Creation, God created heaven and earth and

³See Chapter II (A).

arranged everything as an artisan constructs a pavilion! [He] then created a male Adam and a female Eve to be the ancestors of mankind. Accordingly, He ordered people not to respect their parents, but to respect their Great Father of the Lord of Heaven; not to honor their kings, but to honor the Great King of the Lord of Heaven. . . . Those who worship the Lord of Heaven, even though they are mean and unfilial, will ascend to heaven; whereas those who do not worship the Lord of Heaven, even though they are kings and sages, will descend to hell. Once the teaching of the Lord of Heaven is established, then the t'ai-chi 太極 [Supreme Ultimate] of Confucianism, the tz'u-peí 慈悲 [Compassion] of Buddhism, and the ch'ing-ching 清靜 [quiescence] of Taoism, will all be without kings. ⁴

Specifically, Yü Shun-hsi 虞淳熙, a native of Hang-chou (杭州) and a firm believer in Buddhism, advised Ricci in one of his many letters that before the latter attacked Buddhism freely, he should familiarize himself with Buddhism.⁵ Also Buddhism, according to him, possessed a more comprehensive metaphysical structure and was thus hard to communicate to the uninitiated like Ricci. Another well-known illustration occurred in 1615, five years after the death of Ricci, when the prominent monk from the same area, Chu-hung 株宏, as a formal criticism of Christianity, particularly Ricci's T'ien-chu shih-i published his "Chu-ch'uang san-pi" 竹窗三筆 ("Three Essays from the Bamboo-Window"), along with his four

⁴ Yü Shun-hsi, "Ming-t'ien-t'í í p'ò Lí-í chien-t'ien wang-shih" 明天體以破利夷偕天罔世 ("Comprehending the Heavenly Order to Destroy the Barbarian Ricci's Blasphemy on Heaven to Deceive the World") in Sheng-chiao p'ò-hsieh chi, chüan 5, pp. 15b-16a. Hereafter abbreviated: SCPHC.

⁵ Chang Kuang-t'ien 張廣濟, "Cheng-wang chi" 證妄記 ("On Confirmation of Fallacy") in SCPHC, chüan 7, p. 31b. Cf. ibid., chüan 5, pp. 12a-14b.

essays "On T'ien" ("On Heaven"), in which he argued that since Confucianism contained sufficient teachings on t'ien, it was unnecessary to supplement these with Christian teachings; and that the Jesuits' arbitrary criticism of the Buddhists' doctrines, such as the Prohibition of Taking Lives and the Theory of Reincarnation, were further evidences of their entire misunderstanding of Buddhism. Like Yü Shun-hsi, he added that if the Catholic priests took Buddhism into consideration seriously, they would not come out with these criticisms.⁶ Not only that, he undermined Ricci's two religious works, the T'ien-chu shih-i and the Chi-jen shih-p'ien as pieces whose "language is unskillful and unpolished" and whose ideas contained therein "are indeed simple and laughable."⁷

Meanwhile, particularly as a means of countering the Buddhists' attack, a controversial work entitled Pien-hsüeh i-tu 辯學遺稿 (Collected Documents on Dialectics) was published by the Jesuits which was said to contain a critique by Ricci on Chu-hung's exposition on t'ien, along with a reply from Ricci to Yü Shun-hsi.⁸ More important was the insertion of

⁶ Ibid., chüan 7, pp. 1a-4b; and p. 32a.

⁷ Chu-hung to Yü Shun-hsi, quoted in Chang Wei-hua 張維華, "Ming-Ch'ing chien fo-yeh chih cheng-pien" 明清間佛耶之爭辯 ("Argument between Buddhists and Christians during the Late Ming and Early Ch'ing"), Hsüeh-ssu 學思, 1:2 (January, 1942), p. 13.

⁸ The Pien-hsüeh i-tu may be found in Li Chih-tsao's T'ien-hsüeh ch'ü-han, section 3. In his reply to Yü Shun-hsi,

an episode pertaining to the confessed dying statement of Chu-hung that "I [Chu-hung] have taken the wrong road and have led many people astray."⁹ The issue of such a statement undoubtedly multiplied the Buddhists' resentment. Since Chu-hung was considered to be the most prominent monk within the Buddhist circles, this statement, if it contained any truth, not only would indicate, in the final analysis, the acceptance of the "barbarian ways to change the Chinese," an argument used by both the Buddhists and Confucianists to condemn the native converts, but also it would mean, in the larger sense, the self-destruction and denunciation of Buddhism as an influential factor in Chinese thought, an admission naturally welcomed by the Jesuits.

With Buddhism caught on the horns of a dilemma, Chang Kuang-t'ien 張慶活, another long trusted follower of Chu-hung, came to the rescue. By securing the understanding and cooperation from another monk, Ta-hsien 大賢, Chang questioned the genuineness of Ricci's critique and the

Ricci asserted that "since [my] arrival in China, and [since I] slightly know the [Chinese] language, it is always [the teachings of] Yao 堯, Shun 舜, the Duke of Chou 周 and Confucius, but not Buddhism. Up to now, my mind remains unchanged." Such a statement by Ricci may be found in Ch'ên Shou-yi, "San-pai nien ch'ien ti chien-li Kung-chiao lun" 三百年前的建立孔教論 ("An Early Sixteenth-Century Treatise Championing the Cause of Confucianism as China's State Religion"), Li-shih yü-yen yen-chiu-so chi-k'an 歷史語言研究所集刊 (Bulletin of the Institute of History and Philosophy, Academia Sinica), VI, 2 (1936), p. 158.

⁹ Chang Kuang-t'ien, "Cheng-wang chi" in SCPHC, chüan 7, p. 31a.

trustfulness of Chu-hung's final statement. In his "Cheng-wang chi" 證妄記 ("On Confirmation of Fallacy"), Chang revealed these as plots and conspiracies created by the foreign opponents to deceive the Chinese people; he pointed out that Chu-hung's four essays on t'ien were issued five years after the death of Ricci; hence a critique coming from the latter's hand was not only questionable but impossible; and that he, being of a close association with Chu-hung, was at the latter's deathbed where there was no utterance of any confession.¹⁰ By proving this, he managed to free Buddhism from the imputation of guilt and to reaffirm its status quo in Chinese thought, to place the Jesuits and their religion in a delicate position, and to caution the nation at large that foreigners were untrustworthy and that their intentions were unfathomable.

With Buddhism now out in the clear and reasserted, another monk, P'u-jun 普潤 composed an article entitled the "Chu tso-chi yüan-ch'i" 誅左集緣起 ("Starting from the Eradication of the Heresy"), as a response to Chang Kuang-huo's accusation. Fired by the zeal of righteousness, he passed judgment upon the mysterious force of Christianity in light of Chinese traditional social values thus:

Those who believe in the Lord of Heaven purposely forged books . . . saying that everything is created by the Lord of Heaven. . . . Consequently, those who

¹⁰ Ibid., pp. 31 ff. and pp. 39a-b.

join their religion will destroy the ancestral sacrifices to worship the only Lord of Heaven; will set fire to all sacred images to bring only offerings to the criminal wooden cross; and will abolish the three-years' mourning to their parents to keep only the practice of the monstrous Sabbath. 11

The immediate net result was the Nanking Religious Incident (南京教難), 1616-1622, a semi-nationalist movement which expressed itself in the expulsion of foreigners from Chinese soil and the punishment of leading Chinese converts who were looked upon as "betrayers" to Chinese traditionalism.¹² The underlying factor of this movement, however, was the total repulsion of Western religion and science. Thus the attack was now expanding from the intellectual disputes over the so-called heterodoxy to more a political issue. Needless to say this shift of emphasis was to the advantage of the Buddhists. Without going into detail, the chief personality behind this movement was the arch-traditionalist, Chên Ts'ui 沈淮, a native of Nanking and the Vice-President of the Board of Rites, who at the same time was one of the leading spokesmen of obstructionism to Western religion and science. Realizing that the time had ripened for political

¹¹ Ibid., chüan 8, pp. 21b-22a.

¹² The Nan-kung shu-tu 南京書牘 (Record from the Nanking Magistrate), an important work which consists primarily of findings and complaints of foreign missionaries and native converts in connection with the Nanking Religious Incident, is not available in this country; however, a preface to such work may be found in SCPHC, chüan 1, pp. 1a-4a. For a short summary about this incident, see Ming-shih, chüan 326, pp. 12a-15a.

action, he, together with other conservatives, such as Fang Ts'ung-che 方從哲, Wei Chin-chung 魏進忠, Liu Chao 劉朝, Yen Wên-hui 晏文輝 and Hsü Ju-k'o 徐如珂, submitted a series of three memorials to the throne in 1616, declaring that foreign missionaries were "great thieves of Confucianism" and that Hsü Kuang-ch'i, Yang T'ing-yün and Li Chih-tsao and the rest were leaders of the heterodoxy. In order to "keep the barbarians from entering into the capital to debilitate obscurely the kingly ways," he asked for Imperial action that "henceforth no people of this kind shall be allowed entry, and those who violate [this regulation] shall be punished according to the great statutes of Ming." Also, by making Hsü Kuang-ch'i and his associates the scapegoats of Westernization, he requested Imperial sanction that "those people who usually engage in the theory of astronomy should not be allowed to establish bureaus to translate with the barbarians."¹³ Consequently, Imperial edicts were issued, ordering the local authorities along the coastal areas to keep a close watch over every movement of the foreign missionaries and the Chinese converts. At the same time, the Catholic priests, having been convicted of spreading heterodoxy, were ordered to return to Macao; this order included Alphonso Vagerani, Emmanuel Díaz, Diego de Pantoja and Sabbatinus de Ursis, men

¹³ SCPHC, chüan 1, pp. 5a-10a.

who had contributed to Chinese sciences.¹⁴ Under these circumstances, Hsü Kuang-ch'i wrote a memorial requesting the repeal of this restriction, but in vain. As a further measure to prevent Hsü and his associates from appealing on behalf of their Western colleagues, another joint-memorial of the same political nature was submitted by Yü Mou-hsiang 余懋享 and Hsü Ju-k'o in 1621, impeaching Hsü Kuang-ch'i, Yang T'ing-yün, and Li Chih-tsao as "traitors" of Chinese traditional sciences. This demonstration of anti-foreignism, utilized to safeguard the Chinese cultural heritage, did not cool off until after the death of Chên Ts'ui in 1622.

Following this initial expression of anti-Catholicism and anti-foreignism, the Buddhists, realizing that the situation was to their advantage, sought occasions to initiate debates with their Western opponents, as further measures to embarrass the latter. As expected, opportunities of this nature did not come; this was fully recorded in the three essays entitled "the Debates on T'ien" 辯天說, written by the monk Yüan-wu 圓悟 in 1636. In this articles, not only did the author accuse his adversaries of their unwillingness to carry on debates (for he said that he despatched his followers to the Catholic missions for such purpose), but

¹⁴For some of the findings of the native converts and the Catholic priests, such as Alphonso Vagerani, consult the first chüan of SCPHC; Chang En-lung, op. cit., p. 454, pp. 457-458 and p. 460.

also for their noncooperation in exchanging critical notes on different religious matters.¹⁵ Having failed to achieve his goal, he then showed inclination, obviously with ulterior motive, to purchase recent religious publications from the Catholic priests, but he was refused by the latter on the ground that "our religious works are not for sale; only those who truly believe in Our Lord of Heaven might have one or two; otherwise even if one wishes to obtain them, they are unobtainable."¹⁶ Met by this refusal, he sneered:

The words of the saints and sages which fill the streets are not the way for oneself; [rather they are] the mutual ways for the world to follow. Consequently, the Six Classics and Confucianism are not only for their own homes, and the five thousand and forty-eight sects of Buddhism are not only to benefit their own disciples; they are scattered among cities and capitals. ¹⁷

In the rest of the period, the Buddhists followed suit by concentrating mostly on the composition of more critical essays as further measures to attack the heresy and at the same time to defend their own positions, particularly in the defense of concepts such as Reincarnation and Prohibition of Taking Lives. This time, combining the theories of the Taoists and Confucianists which signified the equality of all things and the origin of everything from the same substance--two of the ultimates of Chinese traditionalism--they attacked

¹⁵SCPHC, chüan 7, pp. 12a-30b.

¹⁶Ibid., 14a.

¹⁷Ibid., pp. 16b-17a.

their Western opponents' paradoxes on the superiority of man over all other sentient beings.¹⁸ In this connection, it is significant to point out that on the surface both religions contain the idea of charity and the essence of retribution; but underneath, there are fundamental differences. Suffice it to say that unlike the Christian idea of charity which centered upon the world of men and his daily behavior and which looked upon the exploitation of nature and other sentient beings to accommodate man's needs as a matter of course and not as an evil; the Buddhists carried this fundamental to a more logical and comprehensive conclusion that one must, to the best of his ability, refrain from harming not only other men but other living things, including animals and insects as well--a fundamental which eventually leads to the emancipation of oneself from biological and emotional commitments for the development of Buddhahood, the idea of Prohibition of Taking Lives, and the Buddhist Compassion toward all sentient beings which are still blindly whirling around the wheel of Birth and Death. Similarly are the differences in their concept of retribution.

Consequently, in the form of Equalitarianism versus Anthropocentrism, they attacked strongly the existence of the three different kinds of animi among all worldly things

¹⁸Cf. Chapter II (A).

defined by Ricci in his T'ien-chu shih-i.¹⁹ This was aimed, however, at defending the Buddhist theory of Prohibition of Taking Lives; such a view was expressed by the monk Chi-chi 寂基, in the following words:

These barbarians do not apprehend that everything is of the same substance; consequently [they] falsely claim that the Lord of Heaven created all things, that the nature of the Lord of Heaven is different from that of men, and that the nature of men is different from that of animals. [They] say the nature of animals is originally stupid and unintelligent. However, their instinct to search for food when hungry and to look for water when thirsty . . . are no different from those who have intelligence. There must be a Supreme Being who has secretly instructed them before they can do so. Those who have eyes would not be deceived by such obscure sayings. Let us examine how tremendous are the number of animals on earth which search for food when hungry and look for water when thirsty! . . . If everyone has to go through this secret instruction, I am afraid that this Supreme Being, even though he possesses all-power and all-talent, still would not look after them all.
 . . . 20

¹⁹In the T'ien-chu shih-i, Ricci said: "The world has three types of animi [or spirits]. The inferior is called the shang-hun 生魂 [life-principle] which is the spirit of grass and trees. This spirit assists the trees and grass to grow. When the trees and grass wither, this spirit also vanishes. The medium is called the chiao-hun 覺魂 [senses] which is the spirit of animals. This spirit helps the animals to develop, causing them to see and hear with ears and eyes, to taste and smell with mouth and nose and to sense things with the limbs of the body; however, they cannot infer reasoning. When they die, their spirit also disappears. The superior is called the ling-hun 靈魂 [soul] which is the spirit of men. While consisting of both the life-principle and senses, this human-soul aids men to grow, to sense things, to infer reasoning and to comprehend principles. Even when men die, their souls will not become extinct but will exist for ever."

²⁰Quoted in Chang Wei-hua, op. cit., pp. 15-16.

This attack was shared by another monk, T'ung-jung 通容. In his "Yüan-tao p'i-hsieh shuo" 原道關邪說 ("Exposing the Heterodoxy in accordance with the Way"), he commented in the same tune:

But Ricci did not understand the teaching of the sages, for he said that a person has san-hun 三魂: the life-principle, the sense and the soul. He said that the life-principle and the senses will die within a hundred years; but the soul will exist for ever. Since there are some which are destructible and some non-destructible, then things cannot be of one substance; this is in contrary to the Heaven-conferred nature. ²¹

From the criticism of the Christian outlook centered upon anthropolithicism, the Buddhists, as a measure to defend their concept of Reincarnation, moved on to challenge the Western religious ideas of retribution and a future world. In brief, they objected strongly to the Western notion of man's prerogative in this system of rewards and punishments, from which other sentient beings were excluded. A portion of the "T'ien-hsüeh ch'u-p'i" 天學初階 ("The First Exposition of Catholicism") written by the monk Ju-shun 如純 will shed some light on this argument:

Nature is indeed the center. If [one] seeks it in the past or future, life or death, illusion or enlightenment, sages or commoners, it cannot be found. But in the midst of a pure mind free from defilement which does not extend to the external spheres, suddenly it occurs--this is called delusion. Using delusion as the cause, [one] undertakes all sorts of karma. Since karma varies from good to evil, and from light to heavy, therefore rewards also differ from happy to sad, and from promotion to degradation. Without karma, reward cannot be brought

²¹ SCPHC, chüan 8, pp. 16a-b.

about, and without illusion, karma cannot arise. Illusion, karma and suffering--these three things--they are all interrelated, just as the wheel of a well becomes self-revolved. If effect is not interrelated with karma, then [everything] is from the hands of the Lord of Heaven. No matter if they are as low as fowl and beasts, as minute as larvae, even wealth and honor, poor or mean, life and death, failure and success among the human race, they are like sky and sea many times apart. Then where is the perfect Equality of the Lord of Heaven? But the principle of Reincarnation is like this. 22

(B) Confucianists' Opposition to Christianity

As manifested in their religious writings, the Jesuits attacked the nonreligious attitudes and cosmological-metaphysical theories of Neo-Confucianism--particularly Chou Tun-yi's Diagram of the Supreme Ultimate, Chang Tsai's theory on cosmology in reference to the condensation and dispersion of ch'i (氣), Ch'eng Yi's explanations concerning ti (帝),

²²SCPHC, chüan 8. According to Buddhism, the total inheritance of man on the unenlightened biological and human level is Karma: whatever an individual thinks, speaks, and does, is part of his karma. Buddhism assumes the transmigration of souls from one form of life to another, so that karma does not terminate with the dissolution of the body. Rather, man inherits the karma of his past lives: it conditions his present life, and the merits or demerits of his present life will further condition the welfare of his soul in future existences. The idea of karma is sometimes given a more worldly interpretation, so that it smacks of the notion of retribution; if a man is living a happy life, it is on account of the accumulated merit of his past lives. In the strict Buddhist scheme, however, good and bad, fortune and misfortune, are irrelevant: the man who is not enlightened is still on the Samsara, the Wheel of Birth and Death, and is not free from the burden of karma. An individual soul may go through transmigration after transmigration, accumulating his karma, and still remains on the rack of samsara. The only hope of escape from karma lies in replacing Ignorance, Avidya, with Enlightenment, Bodhi.

t'ien (天) and the hexagram ch'ien (乾), and Chu Hsi's Principle and the Supreme Ultimate.²³ The Jesuits also criticized Confucianism for its Buddhist and Taoist influences and tendencies. Furthermore, they used the Chinese classical term, shang-ti (上帝), referred in the Book of Changes and the Book of Poetry, and colored it with Christian connotations. They embraced pre-Han Confucianism which was at variance with later Confucianism; and they advocated Christianity as a supplementary means through which Confucianism would achieve its perfection. These actions of the Jesuits caused most of the Confucianists of both Late Ming and Early Ch'ing to join forces to initiate an anti-Christian movement, aiming to maintain and solidify Traditionalism and concurrently to combat "heterodoxy." Specifically, the T'ien-chu shih-ti, a religious treatise in which Ricci expounded, among other things, his arguments that the growth of creatures could not be by li and that men could not reach his best state of development, free from sin and crime, without the assistance of Christ, was the center of attack from the Confucians as it had been from the Buddhists.²⁴ Likewise condemned was Jules Aleni's San-shan lun-hsüeh 三山論學 (Discussing Learning on the San-shan: 1625), a critical evaluation of Neo-Confucianism, which argued that

²³See Chapter II (A).

²⁴T'ien-chu shih-ti, chüan 1, pp. 20-21, pp. 37-38.

the Supreme Ultimate, without feeling and senses, was nothing but a principle, and consequently "could not be the Creator of all things."²⁵ Also under strong criticism were Francois Noël's Jen-tsui chih-chung 人罪至重 (The Heaviest of Man's Sins: 1698), a treatment which compared the religious similarities between early Confucianism and Catholicism and discredited the "so-called Principle, Way or Heaven," the Neo-Confucianism source of all things, for being "empty" and "abstract";²⁶ and the Chu-chih ch'un-cheng 主制羣徵 (Of Divine Providence as Proven by Various Reasons: 1629), a work composed by Johann Adam Schall von Bell, in which the author distinguished the differences between God and Heaven, particularly the Chinese t'ien.²⁷ Among all the works under criticism, perhaps the most controversial was the T'ien-hsüeh chuan-kai 天學傳槩 (Pamphlet on the Teaching of Heaven: 1663), written by Li Tsu-po 李祖白 (d. 1665), a non-Confucian demagogue of seventeenth century China. Li proceeded far beyond Hsü Kuang-chi and others who had accepted Christianity on intellectual grounds, and he transcended Ricci and his associates who only drew upon the similarities between Christianity and early Confucianism as a persuasive basis of acceptance. Li, apparently fascinated and influenced by the

²⁵ San-shan lun-hsüeh, pp. 6-7.

²⁶ Jen-tsui chih-chung, pp. 23-24.

²⁷ Chu-chih ch'un-cheng, p. 11.

Old Testament, pronounced, in contrast to all Chinese traditional beliefs, that man had originated in Judea, that the Chinese were "actually the descendants of Israel," that a branch of the human family had migrated to China under a leader whom he identified as Fu Hsi²⁸ 伏羲, that the Lord of Heaven had been worshiped in ancient China under the names, t'ien and shang-ti, that this worship, known as the T'ien-hsüeh 天學 had been lost in Chou period and had now been revived by Ricci and others, and that Confucianism, including the whole Chinese concept of t'ien, was a product of the West.²⁹

Before we attempt to give an account of the Confucianists' intellectual battle with the Jesuits and other denominations, it is significant to re-emphasize that Chinese

²⁸One of the mythical emperors of China's antiquity who was said to be a potential mathematical genius. For our special concern, Hsü Kuang-chi, throughout his scientific writings, often referred him to Matteo Ricci.

²⁹Ch'ên Shou-yi, "Ming-mo Ch'ing-chu Yen-su-hui Ju-chiao-kuan chi ch'i fan-ying" 明末清初耶穌會士的儒教觀及其反應 ("The Jesuits' Conception of Confucianism in the Late Ming and Early Ch'ing and Its Repercussion in China"), Kuo-hsüeh chi-k'an 國學季刊, 5:2 (1939), p. 48. Cf. John Webb, a seventeenth-century Englishman who surprisingly enough in his An Historical Essay, Endeavoring a Probability that the Empire of China Is the Primitive Language (London: Nath. Brook, 1669) said that the Chinese are the descendants of Adam and Eve; that the Chinese language is the beginning of all languages; and that Early Confucianism is the Earlier Hebrew religion. For further information, see Ch'ên Shou-yi, "John Webb: A Forgotten Page in the Early History of Sinology in Europe," Chinese Social and Political Science Review, XIX:3 (October, 1935), pp. 295-330.

thought, down to the period of Late Ming and Early Ch'ing (largely due to the rationalization of the Neo-Confucianists who in this followed Confucius himself) kept aloof from spiritual beings and emphasized cosmological-metaphysical problems rather than religious issues and interpretations. Thus a hidden movement of divorcing religion from philosophy was taking place.

Consequently, it was not at all surprising that when the Jesuits tried to fill the religious vacuum of sixteenth and seventeenth-century China by attempting to synthesize Christianity with Confucianism, they were met by strong opposition from the Confucianists. To the latter, the acceptance of any of their Western opponents' religious propositions would mean doing away with the spirit of Neo-Confucianism whose emphasis was in the sphere of metaphysics rather than religion; it would mean a return to the ancient religious characteristics of the pre-Han period, from which many eminent scholars and philosophers throughout Chinese history, specifically those in the Sung time, tried hard to free themselves; and particularly it would be acceptance of "barbarian ways to change the Chinese." To make the matter worse, the missionaries of other denominations forbade the native converts to practice ancestral worship, required total acceptance of the teaching of the Lord of Heaven, and criticized the entire body of Chinese thought, including

Confucianism, for its idol-image worshiping and heresy. This ideological onslaught lashed the Confucianists into an intellectual fury.

In the anti-Christian movement, the Confucianists, in addition to participation in the political semi-nationalistic movement (viz., the Nanking Religious Incident, 1612-1622, which has been dealt with in the previous section) focused their criticism on Christianity, within our period of specification, upon the following points: assigning Christian connotations to Confucian conception such as shang-ti; the Christian idea of reward and punishment; the intercession of Christ as necessary for salvation; the soul, as a prerogative of man and not of other sentient beings, bestowed by God; and above all, the Christian ideas of cosmogony centered upon God the Creator. As to the arguments used to counter Christianity and to defend Confucianism, the most common formula applied in this connection, aside from the condemnation of Christianity as a heresy, were the contention that the completeness of Confucianism as a philosophy rendered superfluous any supplementation with alien ideas; the application of Lao Tzu's theory on the Sinization of barbarians by indicating that Christianity was nothing but a by-product of Chinese thought; the acknowledgment of the fundamental good of man who thus had the power to reach his best state of development, free from sin and crime, without

assistance from God; and the usage of cosmological ideas behind Neo-Confucian theories to argue that the growth of creatures was by li and that all things were of the same substance. With regard to the means utilized to safeguard the Chinese cultural heritage, the most significant was the advocacy of Confucianism as the state religion to combat Christianity, even though an advocacy was contrary to the spirit and beliefs of that time. As will be demonstrated in the following pages, these arguments, together with the means, although not always valid and sometimes arbitrary, all led to the maintenance and solidification of traditionalism, particularly Confucianism.

Against this background, one may attempt to narrate the Confucianists' criticism of Christianity. Like the Buddhists' attacks on their Western opponents, the first Confucian countermeasure to free Chinese thought from outside infiltration and to defend Chinese traditionalism, was a defense of the completeness of Chinese thought on the one hand and an exposition of Christianity as a heresy and as a by-product of Confucianism on the other. Yen Wên-hui 晏文輝, an associate of Chên Tsai, the arch-traditionalists who was responsible for the Nanking Religious Incident, wrote:

. . . Since the creation of Heaven and Earth, Chinese teaching, from Fu Hsi to the Duke of Chou and Confucius, has manifested itself--in mind, tao and the Heaven-man relationship--so fully as to allow no space to be infiltrated with alien ideas. Hereafter came forth Lao Tzu, Yang Tzu and Mo Tzu: those who adored curiosity followed

them. Nevertheless, they merely stole the remnants of our Confucianism in order to advocate their partial views. At that time, those who safeguarded the tao vigorously hindered these views from being spread. Now the teaching of the Lord of Heaven is promulgated. . . . Although the title seems to be close to Confucianism, actually the teaching is far from being correct. . . . In the T'ien-chu-chiao yac-lüeh 天主教要略 [An Introduction to Catholicism], it says: "The Lord of Heaven, whose name was Jesus . . . was born at the time of Han Ai-ti 漢哀帝." It also says that he was "crucified to death on the cross by a sinful official." Is it proper to reckon this condemned-to-death Western ghost as the Lord of Heaven? To say that there is a Chinese t'ien and there is also a Western t'ien? To say there is no Lord of Heaven before the Han and only one after the Han? 30

Corresponding to and in line with Confucian criticism of Buddhism in previous dynasties, this attack must have had some psychological effectiveness in this sixteenth and seventeenth-century Confucian anti-Christian movement. In launching his criticism, the author must have in mind that no Chinese, imbued with Confucianism would, under any circumstances, depart unquestionably from traditionalism to embrace non-Confucian ideas, particularly those advanced by a "condemned-to-death Western ghost."

From the exposition of the "heresy" and the glorification of the completeness of Chinese thought, the Confucianists of both late Ming and early Ch'ing advanced to attack the Jesuits' miscomprehension and misapplication of the two Confucian concepts, shang-ti and t'ien. In his refusal to accept Ricci's attempt to establish the Chinese shang-ti as

³⁰ SCPHC, chüan 1, pp. 21b-23b.

the Western Lord of Heaven, Chiang Tê-ching 蔣德璟, in his preface to the Collected Works of the Sacred Dynasty Exposing Heterodoxy, distinguished the differences of the two terms:

[I] have often associated with Western scholars . . . but do not know there is any teaching of the Lord of Heaven. Having read their works, I began to realize that they steal our Confucian concept of serving the Heaven by saying that [their] Lord of Heaven is our shang-ti. . . . When we build temples for ancestral worship, the Western scholars view this as wrong and say to me: "It is [only] the master of the household, but, do you know, Sir, there is a greater Lord?" I laugh and say: "The Greater Lord is the shang-ti: in our China only the Son of Heaven [i.e., the Emperor] can worship the shang-ti, the rest do not care to. In our Confucian teaching concerning life, there is fear of the t'ien, there is respect for the t'ien and realization that everything concerns the t'ien; but where are the idols and images? If there are any, I am afraid they belong to those who have deep eyes, high noses and heavy beard." The Western scholars become dumbfounded. 31

Such a view was shared by Chang Ch'ao 張潮, one of the compilers of the Chao-tai ts'ung-shu 昭代叢書 (1833-1849). In his short preface to Ferdinand Verbiest and others' Hsi-fang chi-yao 西方紀要 (An Account of the West), he came out with an interesting comparison between Confucianism and Christianity, particularly the difference between the Chinese notion of an impersonal God and the Western concept of an anthropomorphic and personal God. He said:

The teaching [Christianity] of the Occidental is indeed superior to other religions; unfortunately, owing to the usage of the expression, Lord of Heaven, it is unpolished and unrefined and tends to be absurd which makes it something of which court-officials and teachers cannot speak. If it [the term, Lord of Heaven] is put

³¹Ibid., chüan 3, pp. 1a-1b.

aside and not talked about, then [the teaching] would not be far from our Confucianism. Our Confucianists when they discuss t'ien, note that in the Book of History it says: "The august Shang-ti has conferred upon the populace a moral sense" (惟皇上帝降衷于下民); that in the Book of Poetry it says: "O Most Great and Supreme shang-ti" (皇天后帝); that Confucius says: "He who offendeth against the Heaven has none to whom he can pray" (獲罪于天無所禱也) (Confucian Analects 3, 13, Legge, p. 159); that Mencius says: "Heaven Giveth the Kingdom to the worthiest . . . Heaven giveth it to the son [of the preceding Sovereign]" (天與賢天與子) (Meng-tzu 5a, 6, Legge, p. 358). Thus our Confucianists talk about t'ien, not in emptiness and abstraction, but seemingly according to a spirit which masters them all; however, from the very beginning, there was no mention of mother and form, nor of events before birth and after death. Are these the differences between our Confucianism and their religion. 32

The commitment to a personal God in the form of the Creator, the Father, and the Lord of Hosts puzzled the Confucianists whose conception of the Godhead was impersonal: Heaven or the tao.³³ In further denouncing the Christian concept of a personal Deity, the following criticism, composed by Li Sui-ch'iu 黎遂球 shed some light on the picture:

With the teaching about the Lord of Heaven nowadays, there are those who do not understand and who say it is

³² Chang Ch'ao, compiled, Chao-tai ts'ung-shu, chia-chi (甲集), chüan 27, p. 1b.

³³ In China, there is no cult of the personality. Buddhism advocates the negative of personality: it is only through emancipation from personal craving and desires that one wins liberation. Taoism, similarly, advocates a way of life in harmony with nature, a way that transcends mere human desires and ambitions. The Confucianists similarly equate "manhood" with precise fulfillment of and subordination to the duties inherent in one's basic human relations. All three tend to discourage the aggrandisement of personality, and the dominance of the will and instincts at the expense of a certain harmonious development of reason and feeling.

near to our Confucianism; actually it is a great error which still has to be corrected. If one calculates from the calendar and judges from human relationships and natural phenomena, one knows there are definite differences between what our Confucianists call t'ien [and the Lord of Heaven]. Where has it been said that there is one person, such as the so-called Lord of Heaven, to master the Heaven? In the ancient times, there were indeed many who were born sages and saints but not gods; such were the Five Emperors [T'ai Hao 太皞, Yen-ti 炎帝, Huang-ti 黃帝, Shao Hao 少昊, and Chuan Hsu 顓頊] who were all humans. . . . However, no one can, in the final analysis, be called the Lord of Heaven. . . . Those who already understand what our Confucianists call t'ien should correct the so-called Lord of Heaven of Western learning. If not, then they will set forth false accusations, saying that our ideas of worshiping the Heaven is misleading. . . . then how can Heaven be moved, and how can the respect of the Heaven bring forth prosperity? 34

Following this, the Confucianists rebuffed the Jesuits' unwillingness and reluctance to accept the Chinese term t'ien as shang-ti--two Chinese concepts, even though different in terminology, actually containing the same meaning and ideas, as seen in the seasonal order and the Mandate of Heaven in Chinese thought. In criticizing his Western opponents for their miscomprehension, Chou Wei-lien 鄒維連, another Confucianist, wrote:

From the nation in the extreme West across the seas, there is a barbarian called Ricci who . . . fallaciously use the Lord of Heaven to designate the shang-ti referred in the Confucian classics. Since he knows that shang-ti appears frequently in the Six Classics, and that the ceremonial of the sacrifice to Heaven and Earth is the worship of the shang-ti, it is obvious that [he knows]

34 Li Sui-ch'iu, Lien-hsū ko-chi, 蓮翬閣集 chüan 2, quoted in Ch'en Shou-yi, "The Jesuits' Conception of Confucianism in the Late Ming and Early Ch'ing and Its Repercussions in China" (in Chinese), p. 58.

that the most supreme is the shang-ti. In the past, the great sages signified ti [the emperor] as the Master of Heaven; since ti is t'ien and t'ien is ti, the honoring of t'ien is consequently the honoring of ti. How can he say that t'ien is not the highest and how can he conceal the title of shang-ti and change it to that of the Lord of Heaven? First he says that the Lord of Heaven is li [principle]; then he says that the Lord of Heaven is the God; and finally he bestows upon the unscrupulous Jesus of Han times the title, Lord of Heaven, so as to establish the religion. . . . Not only does he laugh at Buddhism and scorn Taoism, but also he tried to place [the Lord of Heaven] above the Five Emperors, the Three Kings, the Duke of Chou and Confucius. There has never been any big changes which can be compared to this! 35

Still within the framework of a Chinese shang-ti or t'ien versus a Christian God, some of the eminent Confucian scholars of our period, relying particularly on the Neo-Confucian concept of the Supreme Ultimate and similar ideas contained in the I-ching, began to attack different aspects of Christianity. First came the denial that soul, somewhat comparable to hsin 性 (mind or conscience) of Confucianism, together with the intercession of Christ was necessary for Salvation. Instead, the Confucianists believed that every human being, without assistance from God, had the power and free will to reach his best state of development and to be free from sin and crime.³⁶ In denying that hsin, or rather,

³⁵ SCPHC, chüan 6, p. 8a. The Six Classics are associated with the name of Confucius: Poetry, History, Music, Li, I-ching, and the Ch'un-ch'iu. One of these, the Book of Music, was lost.

³⁶ According to Confucianism, if a man acts neither beyond nor short of his hsin, his whole being is in harmonious state, and his example is not only good for himself, but infectious for the family and society of which he is a

soul, was bestowed by God, Wang Chên 王貞, in one of his letters to Yen Mou-yu 顏茂猷 requesting the latter to take part in the exposition of Catholicism, attacked the Christian misconception thus:

Now their religion only designates [the one who] creates Heaven and Earth, human and sentient beings as the Lord of Heaven, saying that He is everywhere, comprehends all things and can do everything. It says that the Lord of Heaven bestows upon men a soul which is called hsin; but this does not mean that hsin is t'ien or that t'ien is hsin. It also says that Heaven and Earth are like palaces and the sun and moon are like lanterns; but this does not mean that Heaven and Earth constitute the Lord of Heaven. [According to their religion], Heaven and Earth, the Lord of Heaven, and man are three things which cannot be combined together into one substance. They claim that our theory that all things are of one substance and that Heaven, Earth, and everything are derived from liang-chih 良知 [intuitive knowledge] as advocated by Wang Yang-ming 王陽明, is wrong. Such is the [basis] whereby they destroy the everlasting schools of thought of the world. 37

With regard to the denunciation of the intercession of Christ as necessary for Salvation, the following argument expressed by Chung Shih-sheng 鍾始聲 serves as a good

member. The emphasis, however, is on the humanly natural, and not, as in Christian asceticism, on a willful mortification of desire or on any notion that the good life is impossible for humanity in general. It is the Confucian, thus also the traditional, belief that hsin, quiescent and good by itself, manifests itself only through feeling, desire and will, and that, moreover, it is only when feelings and desires receive proper expression that hsin remains good. Asceticism and indulgence are both bad, because if a man either represses or gratifies one aspect of his nature to an undue degree, his hsin becomes perverted, and this results in evil.

³⁷ SCPHC, chüan 3, pp. 8a-11b.

example.³⁸ Sharing the views of his contemporaries who claimed that human nature is a whole, which, with proper education of the will, emotion, and feeling, results as a matter of course in morally and aesthetically beautiful behavior, Chung wrote:

Among the spirits in Heaven and the men on Earth, if there are those who can adequately perceive, within a thing or event, the completeness of the Supreme Ultimate and the principles in the I-ching, those who are in Heaven will be the shang-ti; those among spirits will be the shen-ming 神明 [spirituals]; and those among men will be the sages; the power to rule and to transform by teaching belongs to them. If, prior to the creation, there were already those who were supremely intelligent and sagacious, such as the Lord of Heaven, then there should have been peace without turmoil, good without evil; why should this condition have to be abrogated supplemented by saints and sages? 39

The above statement, pragmatic and elementary as it was, reveals the doubts concerning the existence of a superhuman God as well as the over-all nonreligious mentality of the

³⁸ Confucius, unlike Jesus, made few demands on human nature. Jesus drew a distinction between the "regenerate" and the "unregenerate," and the notion that, short of intervention by the love of God, human nature is a poor thing has played a prominent role in Christian teaching. For Confucius, the difference between the world of ordinary affairs and ordinary people and the ideal world and ideal people was a difference in degree, not in kind. Concretely, it is a difference in degree of aesthetic and emotional purity and maturity. The personal struggle between doubt and faith, which figures so prominently in Christian teaching, has no place in Confucianism.

³⁹ Quoted in Chang Wei-hua 張維華, "Ming-Ch'ing chien Chung-Hsi ssu-hsiang chih ch'ung-t'u yü ying-hsiang" 明清間中西思想之衝突與影響 ("The Ideological Conflict between China and the West during the Late Ming and Early Ch'ing and Its Effects"), Hsüeh-ssu, 1:1 (January, 1942), p. 23.

Chinese at that time; because of that, they were unable to see that if God were "supremely intelligent and sagacious," why there was, then, no paradise on earth, a teaching advanced by most Chinese saints and sages.

Next was the rebuttal of the Christian ideas on cosmogony, together with the anthropomorphic-superhuman concept of Christ, in terms of the conventional metaphysical beliefs and the rational spirit of seventeenth-century China. The outstanding spokesman in this connection was the early anti-Ch'ing political philosopher-mathematician-historiographer, Huang Tsung-hsi 黃宗羲 (1610-1695), the founder of the so-called Eastern Chekiang School 浙東學院 which, among other things, emphasized objectivity both in history and philosophy; and the author of many significant works of scholarship, such as the I-hsüeh hsiang-shu lun 易學象數論 (1661), the Ming-i tai-fang lu 明夷待訪錄 (1663), and the Ming-Ju hsüeh-an 明儒學案 (1676).⁴⁰ In his essay entitled "Shang-ti pien" 上帝篇 ("On Shang-ti") contained in the Nan-lu wên-yüeh 南雷文約, he, closely following the ideas set forth by his predecessor, Chang Tsai 張載, applied primarily the theory that all things, including Heaven, Earth, men and the myriad creatures, were made by the endless

⁴⁰ Hummel, op. cit., Vol. 1, pp. 351-354; Hsiao Kung-chuan, op. cit., pp. 256-264; Hou wai-lu, op. cit., pp. 104-152.

condensation and dispersion of ch'i 氣 (ether),⁴¹ to attack the misconception of Christianity in the following words:

The troubles of fallacies always come slowly. Nothing is more supreme than t'ien; consequently only those who have the kingdom can worship it, the princes and others do not dare to do so. The Book of Poetry says: "Fear the Majesty of Heaven and thereby preserve it." (畏天之威, 于時保之) (Karlgren, p. 241) Again it says: "Shang-ti on high looks down upon you; do not be unfaithful in your hearts." (上帝臨汝, 無貳爾心) (ibid., p. 188) Such is the severity of the t'ien. There is only one t'ien, and the differences of the four seasons --Spring, Summer, Autumn, Winter--is determined by the up and down [or condensation and dispersion] of the ch'i; the master is the ch'i who is [in turn] the shang-ti of the great t'ien. The Chou-li 周禮, owing to the different times for sacrifices, called it Wu-ti 五帝 [the five planetary Gods] whose ideas have now been lost. The Wei-shu 緯書 (Apocryphal Books) initiated the titles of the Wu-ti [青帝, 赤帝, 黃帝, 白帝, 黑帝]. Cheng K'ang-ch'eng 鄭康成 [more commonly known as Cheng Hsüan 玄] entered them in the commentary, as if they were the five t'ien. More reckless still are the Buddhists who say: "In the Heaven above and the Earth beneath I alone am the honored one" (天上地下, 唯我獨尊). Based on this, they establish the theory of many t'ien with Buddha sitting in the middle and the various t'ien stand beside him. . . . Is this not a great fallacy? With regard to the teaching of the Lord of Heaven, it is only the restraint of Buddhism to respect the t'ien. Accordingly, they [the Christians] erect the statue of a human-ghost, as the Lord of Heaven, record his ideas, and obliterate the shang-ti! Such heterodoxy, although now given up by the men of virtue, originates, nonetheless, from the Confucianists. 42

The above statement, aside from supplying further evidence of the nonreligious attitudes of the late Ming and early

⁴¹ For further information of this theory, see Feng Yu-lan, op. cit., Vol. 11, pp. 478-482; Needham, Vol. 11, p. 471.

⁴² Nan-lu wên-yüeh, chüan 3, "shang-ti"; the same source may be found in P'ao-hsieh lun 破邪論 in Chao-tai ts'ung-shu 昭代叢書, Vol. 12, chüan 15, pp. 3b-4b.

Ch'ing scholars, shows the over-all tendency, based on the satisfactory metaphysical explanation of the mysteries of the creation, not only to refuse to accept the almighty Christian God as the ruling Deity of mankind, but also to attempt to depart from both the ancient religious beliefs and Buddhist influences, of which Christianity was regarded as a mere remnant.

As the Confucianists' criticism of Christianity was gaining momentum, there appeared in 1664 another politico-ideological movement of anti-Catholicism and anti-foreignism. Like the Nanking Religious Incident, 1616-1622, planned by Chên Tsai, it was a movement of both anti-Christian and more broadly, of anti-Westernization (the latter will come under discussion in the next section). This time, the chief personality behind the movement was the Neo-Confucian scholar, Yang Kuang-hsien 楊光先 (1597-1669), a determined defender of Chinese culture and science, and a skillful campaigner against Western missionaries. Yang's anti-Western ideas, both religious and scientific, may be located in a collection entitled Pu-te-i 不得已 (I Could Not Do Otherwise).⁴³ Briefly, it may be said that the paramount cause of this movement was the immediate reaction to Li Tsu-po's controversial and non-Confucian ideas expressed in his T'ien-hsüeh

⁴³Hummel, op. cit., Vol. 11, pp. 889-892; CJC, chüan 36, "Biography on Yang Kuang-hsien," pp. 2a-4b; Ibid., chüan 45, "Biography of Johann Adam Schall von Bell," pp. 1a-13a.

chuan-kai, as well as the employing of foreign missionaries in the Imperial astronomical and translation bureaus, in place of the Chinese. To place the Jesuits and other orders in a delicate and embarrassing position, Yang submitted on September 15, 1664, a document to the Board of Ceremonies in which he used Li Tsu-po as a scapegoat of the "heresy," charged the Western astronomers, particularly Adam Schall von Bell, with errors in astronomical calculations, and accused the rest of plotting against the state and indoctrinating the natives with false ideas, and submitted as evidence religious articles used by converts, such as the Cross, religious tracts, identification cards and the like. Moreover, he charged Schall with deliberately fixing an inauspicious day in 1658 for a burial of an infant prince, in order to cast spells on Emperor Shih-tsu and Empress Hsiao-hsien. The result was the trial of the foreign priests, with Yang acting as the chief prosecutor. As a result, all churches throughout the empire were closed, and the Catholic priests were ordered to return to Macao; but four--Ferdinand Verbiest, Louis Buglio, Gabriel de Magalhaens and Schall, who were then living in Peking--were permitted to remain.⁴⁴

In view of this affair, Yang Kuang-hsien's position as a politician was unethical and questionable; however, for

⁴⁴THL, K'ang-hsi chao, pp. 5b-6a; Wang Chih-ch'un, Huang-chao jou-yuan chi 國朝柔遠記, chuan 5, p. 5a and p. 6b.

the traditionalists, whose chief motive was the preservation of Chinese cultural heritage, he was a spokesman. As a critic, Yang expounded ideas in criticizing Christianity which were similar to those mentioned above but were deeper both in content and in thought.

First, similar to Chiang Tê-ching, Chang Ch'ao and Chou Wei-lien, Yang attacked Ricci and his associates in attempting to use the Chinese classics to show that shang-ti was the Western Lord of Heaven and whereby giving the Chinese concept a Western religious connotation. Yang also denounced Ricci's acceptance of shang-ti as the almighty God and concurrent rejection of t'ien as the highest Deity. Yang wrote:

With the aim of honoring Jesus Christ as the Lord of Heaven and placing him above all sages among nations, Matteo Ricci often makes references to the shang-ti referred in the Chinese Six Classics and arbitrarily seeks to prove that [shang-ti] is the Lord of Heaven by saying: "The Lord of Heaven is the shang-ti referred to in the ancient Confucian classics; our Lord of Heaven is the Chinese-acknowledged shang-ti. The blue Heaven is used by the shang-ti which is without direction, without head or body, without hands or legs; hence Heaven is not fit to be honored; moreover, the earth which is stepped on by all human-beings and which receives all the waste, how can it be honored?" Thus [according to Ricci] both Heaven and Earth are not fit to be respected. To establish a thecry in such a way is not the sayings of the talented but of beasts! ⁴⁵

Also, to prove that t'ien was shang-ti, Yang, like Huang Tsung-hsi in particular, while keeping aloof from religious and spiritual interpretations, referred to the

⁴⁵Pu-te-i, "P'o-hsieh lun" 破邪論, chüan 2, p. 1.

I-ching and its commentaries (particularly on the hexagram of ch'ien 乾, the Creative force which symbolizes the character of Heaven in all its perfection) for evidence to show that t'ien was li 理 (principle), the universal principle from which all things came into existence, in contrast to the Christian notion that all things were created by a personalized God. He rationalized in the following words:

Heaven is the great origin of all events, things and li (Principles). When li is established, then ch'i 氣 (Ether) exists; when ch'i is in existence, then shu 數 (Numbers) is created; when shu is created, then hsiang 象 (Images) begins to take shape. T'ien is li with shape, and li is t'ien without shape. When shapes come to the utmost, then li appears therein: this is how li is t'ien. The I-ching is a work which discusses li and from which li, ch'i, shu and hsiang are therein being provided. The hexagram of ch'ien 乾 [symbolizes]: "The Creative works sublime success, furthering through perseverance." (乾元亨利貞) (Wilhelm, 1, p. 2) Its Judgment 彖 says: "Great indeed is the generating [or originating] power of the Creative [ch'ien]; all beings [or things] owe their beginning to it. This power permeates all Heaven." (大哉乾元萬物資始乃統天) (Ibid., p. 2) Ch'eng Tzu says: "Ch'ien, the Creative, is t'ien. When speaking in terms as a whole, it is the tao 道 (Way); whereas when speaking in terms as parts, its shape is called t'ien, its master is called ti 帝, its function is called demons and spirits, its subtle application is called spiritual, and its nature and human-feeling is called ch'ien." (乾天也尊言之則道也分言之以形體謂之天以主宰謂之帝以功用謂之鬼神以妙用謂之神以性情謂之乾) This is a theory of the whole and of the parts; it never emphasizes only the parts and does not talk only about the whole. When the teaching of the Lord of Heaven talks about theories and actions, these are purely functional, which, according to Ch'eng Tzu, was characteristic of demons and spirits; how can such be called the Creator? Chu Hsi says: "The Ch'ien, like the soul of man, is the nature of t'ien; how can man by himself be man, and spirit by itself be spirit?" (乾元是天之性如人之精神豈可謂人自是人精神自是精神耶) Based on this, then t'ien cannot by itself be called t'ien, and king

cannot by himself be called king. What all things respect is t'ien and what men honor is king. When man raises his head, he sees the t'ien; accordingly, he calls it shang-ti. It is not that there is another king in Heaven. ⁴⁶

In addition, like his contemporaries, Wang Chên and Chung Shih-sheng, Yang, besides indicating that Catholicism was nothing but a by-product of Buddhism, opposed the Christian ideas of the intercession of Christ as necessary for Salvation and denied that the human soul was bestowed by God. With regard to this, he said:

Heaven and Hell are religious means used by Buddhists to establish their religion so as to persuade and frighten the common men and women; actually there is no Heaven and Hell. "To reward good deeds [Heaven] will bestow hundreds of blessings; to punish bad deeds [Heaven] will confer hundreds of calamities." Hundreds of blessings and calamities are the Heaven and Hell of this world. However, their [Christians'] religion says there is actually a Heaven above and a Hell below; those who believe in it will ascend into Heaven and those who do not believe in it will descend into Hell. If so, then the Lord of Heaven is a mean man who courts popularity and flattery; how can He be the Master of Heaven and Earth? If all believers are good people and all nonbelievers are bad people, there is something that might be said. On the contrary, if all believers are bad people and all nonbelievers are good people, how can they allow right and wrong to be upset and not show any sympathy. The Confession of Buddhism, like Yen Hui's 顏回 [a disciple of Confucius] never repeat a wrong in learning, never say that sins will be entirely eliminated; nevertheless, in their religion [they say that] by praying to Jesus and his mother, sins will be forgiven and those who pray will ascend into Heaven; thus thieves and hypocrites are heavenly people and Heaven is indeed a huge refuge for criminals! Picking the fragments of Buddhism and at the same time saying that Buddha will descend into Hell everlastingly, this is nothing more than using jealousy to cover the mouth of another jealous

⁴⁶ Ibid., chüan 2.

woman! If they are truly thinking of this world, then they should establish the most upright theories . . . why do they have to expose the faults of Buddhism in order to plant their own roots of heterodoxy? 47

Before we end this section on the sixteenth and seventeenth-century movement to exterminate "heterodoxy," a few words should be said about the advocacy of Confucianism as a state religion to counter Christianity. Such promulgation was advocated by the scholar-philosopher Wang Ch'i-yüan 王啟元 (date unknown) in his Ch'ing-ch'ü ching-tan 清署經談 (1623), a rare religious treatise which, among other things, aimed at the recreation of all the essence and religious aspects of Confucianism, with the hope of disarming all of the Jesuits' attempts to synthesize Christianity with early Confucianism.⁴⁸ Curiously enough, he, like Ricci, searched through China's millennium for the long-lost religious atmosphere. He rediscovered that "originally Confucius alone is the Most Divine" and that "the Confucian canon from the beginning is already complete." (孔子原自至神; 聖經原自大備) He emphasized pre-Han Confucianism as the pillar of all Chinese thought and disapproved of Neo-Confucianism for its "outwardly Confucianism and inwardly Buddhism" (陽儒陰佛)

⁴⁷ Ibid., chüan 1.

⁴⁸ For further information about this work, see Ch'ên Shou-yi, "An Early Sixteenth-Century Treatise Championing the Cause of Confucianism as China's State Religion" (in Chinese), Academia Sinica Bulletin of the Institute of History and Philology, VI:2 (1936), pp. 133-162.

tendency. He further criticized the syncreticism of Confucianism, Taoism and Buddhism as non-Confucian. Realizing that neither the political demonstration of anti-foreignism nor the composition of treatises condemning the "heterodoxy" were effective and sufficient, Wang, on the whole contrary to the ideas of his contemporaries but foreshadowing K'ang Yu-wei and others, held that the best means of defending the Chinese cultural heritage and at the same time of combating Christianity was to champion the cause of Confucianism as China's state religion,⁴⁹ with Confucius acting as the counterpart of Christ and the Confucian canon taking the place of the Bible. Also, foreseeing the dangers of the Jesuits' attempts to synthesize Christianity with Confucianism, he cautioned in the tone of a true traditionalist:

To begin with, the religion of the Lord of Heaven exposes Buddhism. . . . Thence they [the Christians] expose Taoism and Later Confucianism. However, they have not come to Confucius yet, for they want to use the scholar-gentry as a means to spread their religion in China; consequently, their intention was purposely hidden and not revealed. My humble opinion is that Buddhism is easy to comprehend, but that the teaching of the Lord of Heaven is unfathomable. Any learned scholars should be aware of this. 50

On another occasion, he compared the evil of the two alien ideas, Buddhism and Christianity, thus:

⁴⁹Cf. K'ang Yu-wei 康有為, K'ung-tzu kai-chih k'ao 孔子改制考 (Confucius as a Reformer), ch. 10.

⁵⁰Ch'ên Shou-yi, "An Early Sixteenth-Century Treatise Championing the Cause of Confucianism as China's State Religion," p. 160.

Although Buddhism proclaims that it is superior to the ideas of the shang-ti, yet the shang-ti and Buddha can be distinguished by people. But the Lord of Heaven announces that he is one with the shang-ti of China. Should the people then worship the original shang-ti of China, or the Lord of Heaven? When [the states] of Wu 吳 and Yüeh 越 usurped the throne, the Ch'un-ch'iu 春秋 (Spring and Autumn) still knew how to correct the situation; how much more so when the term shang-ti is confused. 51

Finally, as a total basis of nonacceptance of Christianity, he gave the following six reasons in the section dealing with the "T'ien-ch'u kung-lun-pien" 天主公論篇 . They were: (1) Christ should not be born four thousand years after the Creation; (2) prior to the birth of Christ, Heaven and Earth should not be without a master; (3) if there was a Lord of Heaven before the birth of Christ and one after, then Heaven and Earth should not have two Lords of Heaven; (4) if God loved all his people on earth, then he should not be born in Israel only; (5) the shang-ti is the most supreme; only the emperor had the right to serve the Heaven and not the common people; and (6) China has enough teaching on t'ien, it should not be necessary to seek it from Western religion. 52

⁵¹Ibid., p. 159.

⁵²Ibid.

CHAPTER V
DISPUTES OVER WESTERN SCIENCE: THE
MOVEMENT OF ANTI-WESTERNIZATION

Parallel to the Buddhist-Confucianist opposition to Christianity was the hostility, expressed by some Chinese scholar-officials, both in late Ming and early Ch'ing, to the various Western scientific ideas and techniques introduced by the Jesuits. This hostility produced a struggle between Chinese "traditional" science based primarily on ancient authorities, on the one hand, and Western "modern" science based essentially on scientific observation and knowledge, on the other. It is this struggle which is examined in this section. To begin with, it may be said that there appeared on the surface a partial acceptance of Western science and techniques; this was due partly to the frequent inaccuracies in astronomical calculations based on traditional observations, namely, those recorded in the Ta-t'ung-li (Ming Calendar) and the Hui-hui-li (Muslim Calendar), partly to the need of modern arms to counter the threats from outside during late Ming and to strengthen the military power during early Ch'ing, partly to the special interest of a segment of native scholars who were dissatisfied with the limitations

of current Chinese scientific thought, and partly to the fascination and curiosity aroused by Western mechanical instruments. This temporary acceptance, resulted in the employment of Jesuits in the Imperial Astronomical Bureau to readjust and improve the traditional calendar and astronomy; the manufacture of horological, mathematical and astronomical instruments, as well as armaments, on Western models; the translation and publication of numerous scientific treatises; the reproduction of Ricci's Map of the World, and the utilization of the Jesuits in geographical surveys. Correspondingly, as a response and reaction to the Jesuit scientific activities in China, there was a semi-popular movement of re-examining and re-evaluating Chinese science, which resulted particularly in a revival of Chinese mathematics and astronomy. However, despite the imperial patronage and despite the conciliatory-persuasive policy under which Western science was introduced by the Jesuits into China, there was, due to professional jealousy, condemnation of Christianity as a heresy, skepticism and xenophobic suspicion, a movement of anti-Westernization, both political and ideological, which aimed to isolate traditional Chinese science from Western scientific influences and to negate the Jesuits' use of their scientific knowledge as a tool to reach their religious objectives. Involved in this movement was a denial of the superiority of various aspects of Western science over

those of the Chinese, particularly in the fields of astronomy and calendar-making, mathematics, technology and geography--fields in which China had a glorious past.

As will be demonstrated in the following pages, in this resistance to Western science (aside from the political aspects of anti-foreignism), the classical argument used by the traditionalists to depopularize and minimize the Jesuits' scientific contributions was the contention that all Western scientific ideas and techniques introduced by the Jesuits had originated in China. This theory of the Chinese origin of Western science had some psychological effectiveness. On the one hand, it provided a reason for total nonacceptance of Western science by some, on the ground that since its ideas had already been fully recorded and explained in Chinese texts, a supplement from the Jesuits was unnecessary. On the other hand, it supplied the opportunity for some to make an apology for the underdevelopment of Chinese science, thus making a partial acceptance of some aspects of Western science permissible within the context of traditionalism. Also, there were some who attempted to show diversity and contradiction within Western science by using one "barbarian" idea to defeat another "barbarian" theory on the same subject --a means precedent to nineteenth-century policies of using "the barbarians to fight against the barbarians" and of using "the Western arms to fight against the West." Furthermore,

there were others who, embracing the spirit of the age, argued that the cultivation of one's mind was far more important than the comprehension of a few Western technical skills; they thus sought to remove the danger of possible complete Western technological domination of Chinese society. These arguments, on the whole, though arbitrary and unscientific, showed the scholar-officials' reluctance to accept "the barbarian ways to change the Chinese," and their profound reverence for traditionalism and antiquity.

(A) Opposition to Western Astronomy and the Calendar

The first all-out Chinese traditional opposition to the Western scientific knowledge introduced into China by the Jesuits during the periods of late Ming and early Ch'ing was in the spheres of astronomy and the calendar. Indeed, it marked the first academic battle between the Chinese and the West, in the form of the "new" versus the "old," or rather, the traditional Chinese versus the Western, just as the Opium War, 1840-1842, was the first political battle in modern times. This opposition was a hostile reaction to the Jesuits' criticism of the inaccuracies in traditional astronomy and calendar-making, to the complete acceptance of the Western methods by some eminent scholars and native converts, and to the Imperial patronage of the Western missionaries in the Imperial Astronomical Board; it manifested itself in

three forms: (1) a current of anti-Westernization closely related to a political movement of anti-foreignism; (2) the advocacy of the Chinese origin of Western science as a device to minimize the importance of Jesuit scientific contributions; and (3) a Confucian attempt to syncretize as a last resort to avoid the total acceptance of the Western astronomy and calendar.

Accordingly, as soon as Chou Tzu-yü and his associates, in light of the inaccurate solar eclipse prediction of the Ta-t'ung-li and the Hui-hui-li, recommended Emmanuel Diaz, Sabattinus de Ursis, Diego de Pantoja and Nicolas Longobardi to the Imperial Astronomical Board to undertake the readjustment and improvement of the traditional Chinese astronomy and calendar,¹ the astronomical controversy between the Chinese traditionalists and the Jesuits commenced. The story concerning this astronomical controversy is well known. Suffice it to say that the opposition gained strength when the devoted Catholic, Hsü Kuang-ch'ü (rejecting the traditional theory that Western science was originated in China), acknowledged Matteo Ricci as another Ptolemy,² and also compared Ricci to Hsi Ho 羲和, legendary astronomical genius

¹Ming-shih, chüan 31, pp. 15a-16b.

²"Biography of Matteo Ricci," CHC, chüan 44, p. 7b; Huang-Ch'ing ching-chiai, chüan 1065, p. 6a. Cf. Henri Bernard, Matteo Ricci's Scientific Contributions on China, p. 48.

of Emperor Yao's time; and when Li Chih-tsao, another native convert, in a memorial to the throne in 1613 requested the total acceptance of the Western astronomy and calendar. Li embraced the superiority of Western techniques which, according to him, were such that not even Kuo Shou-ching, "the sage among astronomers" who lived in Yüan times, could either match or live up to them.³ The danger of accepting "the barbarian ways to change the Chinese" paved the way for the controversialists to combine the movement of anti-Westernization with the Nanking Religious Incident, 1616-1622, resulting in the expulsion of foreigners from Chinese soil and the nonapplication of Western astronomy and calendar-making for a period of six years.⁴ In a way, it was a partial triumph for the traditionalists, and the rethronement of Chinese traditional science.

However, this movement of anti-Westernization, without any genuine attempt to reform the Chinese traditional techniques, was unable to challenge Western astronomy and calendar-making effectively in the long run. Only a few years later, the 1629 inaccurate solar-eclipse prediction based on traditional calendars again offered an opportunity

³Ku Ying-t'ai 谷應泰, Ming-shih chi shih pên-mo 明史紀事本末 (A Complete Record of the History of Ming) in the Chi-fu ts'ung-shu 欽定四庫全書, chüan 73, pp. 13a-15b.

⁴Cf. pp. 103 ff. in the section on "The Buddhists' Criticisms of Christianity."

for Hsü Kuang-ch'1, Li Chih-tsao and Li T'ien-ching to prepare measures for a Chinese astronomical reform, which resulted in the further employment of Jean Terenz, Jchann Adam Schall von Bell and Giacoma Rho in new scientific undertakings, such as the compilation of the Ch'ung-cheng li-shu (Astronomy of the Ch'ung-cheng Reign: 1634), the manufacturing of Western astronomical instruments, the selection of students to study the Western astronomy and calendar, and particularly the establishment of a European Astronomical Bureau (西洋曆局).⁵ As expected, the revival of imperial patronage of the Jesuits during the reign of Ch'ung-cheng (1628-1644) renewed the astronomical controversy. This time the leader of the anti-Western-science movement was Wei Wên-k'uei 魏文魁, another well-known obstructionist of Western religion and science. Aiming to reaffirm the validity of the Chinese traditional astronomy and calendar, he, besides condemning Hsü Kuang-ch'1 and his associates as "traitors" of Chinese science, obtained imperial approval to establish the Eastern Astronomical Bureau (東局), as an addition to the Ta-t'ung-li and the Hui-hui-li and a counterpart of the European Astronomical Bureau.⁶ Since Wei's method was exclusively traditional, an addition to the Imperial Astronomical

⁵ Ming-shih, chüan 31, pp. 21a-25b; Ku Ying-t'ai, op. cit.; chüan 73, pp. 15a-17b.

⁶ Ming-shih, chüan 31, pp. 21a-25b; "Biography of Wei Wên-k'uei," CJC, chüan 31, pp. 16a-19b.

Board did not help to improve the situation. In the prediction of the 1643 lunar eclipse, all three of the Chinese methods proved to be wrong.⁷ There was talk of abolishing the traditional Chinese astronomy and calendar in favor of the Western; only the threat from the Manchus prevented this from becoming a reality.

With the Manchus ascended the Chinese throne, the Jesuits, owing to their accurate astronomical demonstrations, together with their adequate knowledge in other fields of science, won special favor and recognition from the court; this was seen, as far as astronomy and calendar are concerned, in the adoption of the Western astronomy (known as the Shih-hsien-li 時憲曆), and the nomination of Johann Adam Schall von Bell to be in charge of the Imperial Astronomical Board.⁸ It was not long before another politico-ideological movement of anti-foreignism, planned by the arch-traditionalist, Yang Kuang-hsien, to defeat both Western religion and science, was on its way. Particularly to attack the Western astronomy and calendar, Yang composed the Hsi-fa shih-miu 西法時繆 and the Hsüan-che-i 選擇議 charging the Western astronomers, particularly Adam Schall von Bell, with errors in astronomical

⁷ Ming-shih, chüan 31, pp. 26a-33b.

⁸ Huang-chao wên-hsien t'ung-k'ao 皇朝文獻通考, chüan 256, pp. 7157-7158.

calculations.⁹ Realizing this was not sufficient, he further accused the Jesuits of indoctrinating the natives with false ideas and charged Schall with deliberately fixing an inauspicious day in 1658 for a burial of an infant prince, in order to cast spells on Emperor Shih-tsu and Empress Hsiao-hsien.¹⁰ As on previous occasions, although the anti-Jesuit conspiracy fulfilled Yang's objectives--the ordering of the Catholic priests to return to Macao and the placing of himself at the head of the Imperial Astronomical Board, with Wu Ming-hsuan 吳明煊 as his assistant, in lieu of Schall--Yang's lack of scientific knowledge, commonly shared by his contemporaries, could not preserve the traditional astronomy and calendar much longer, thus again leaving the field open for Western scientific ideas. After a short interval, Yang left his post, giving ill-health as the reason. Indirectly, this indicated the first defeat of the traditionalists in their encounter with Western science.

In 1667, when the K'ang-hsi emperor was considering the service of Ferdinand Verbiest, Yang Kuang-hsien, still prompted by the desire to preserve the Chinese astronomy and calendar, warned:

⁹THL (K'ang-hsi chao), chüan 5, pp. 5b-6a; LCSL, chüan 14, pp. 27a-29a; "Biography on Johann Adam Schall von Bell," CJC, chüan 45, p. 2b; Huang-Ch'ing ching-chia1, chüan 1066, p. 1b.

¹⁰Cf. pp. 117-119 in Section on "Confucianists' Opposition to Christianity."

It is better to have no good astronomy than to have Westerners in China. If there is no good astronomy, this is no worse than the Han situation when astronomers did not know the principle of apposition between the sun and the moon and consequently claimed that the solar eclipses often appeared on the last day of the month; still the Han dynasty enjoyed dignity and prosperity for four hundred years. With Westerners in China, I am afraid that they would use money to win the hearts of our people; it is like the setting of fire to a bundle of firewood, and the troubles will not be too far off. . . . These non-tributary people from thousands of li away, when they come, we do not ask why they come, and when they go, we did not investigate where they will go from here. . . . The geographical locations of our thirteen provinces, our military strength and our revenue have all been recorded in their works. Still there are no restrictions! Is there any such amusing policy of treating foreigners in the past and at the present? ¹¹

On another occasion, as the result of Wu Ming-hsuan's failure to compete with Ferdinand Verbiest in an astronomical demonstration in 1669, Yang, realizing the battle was now lost, petitioned:

Your minister humbly thinks that the astronomy of the Imperial Astronomical Board is the hereditary method of Yao and Shun. Since the throne Your Majesty holds is the throne inherited from Yao and Shun, and since the authority Your Majesty enjoys is the authority handed down from Yao and Shun, then the astronomy promulgated by Your Majesty should be the astronomy of Yao and Shun. Everything that Your Majesty decrees is in accordance with Yao and Shun, how can it be that only astronomy is not? With regard to Ferdinand Verbiest, he destroys the hereditary astronomical instruments of Yao and Shun, replacing them with European instruments. ¹²

¹¹"Biography of Yang Kuang-hsien," CJC, chüan 36, p. 3b.

¹²Quoted in Inaba Iwakichi 稻葉君山, Ch'ing-chao ch'uan-shih 清朝全史 (A Complete History of the Ch'ing Dynasty) translated by Tan Tao 但素, chüan 2, pp. 166-167.

Despite his unsuccessful attempts in resisting the West, Yang's request for a restricted foreign policy and his appeal to China's antiquity for the preservation of Chinese traditional science and for endorsements and justification of changes, were two basic formulae utilized by the traditionalists throughout the Manchu dynasty to hinder the infiltration of Western ideas and science.

Meanwhile, the failure to combat Western astronomy and calendar by political means brought forth another type of cultural defense mechanism, a passive type of resistance. Motivated by the desire to minimize the Jesuits' important contributions in astronomy and calendar-making, and currently to whitewash the underdevelopment and inaccuracy of Chinese traditional science, some of the traditionalists expounded the Chinese origin of these two branches of science as a device to oppose further Western science; this was done by citing some vague references from the Chinese classics, particularly from the chapter "Yao-t'ien" 堯典 in the Book of History. As a powerful spokesman of this type of argument, Mei ku-ch'eng 梅穀成 (1687-1763),¹³ another mathematical genius of early Ch'ing, dramatized:

[People from] distant countries who can discuss astronomy are mostly from the Hsi-yü. This is because [the legendary emperor] Yao 堯 ordered Hsi Chung 羲仲 to dwell at Yü-i 嵎夷, which is equivalent to a place

¹³For biography, see CJC, chüan 39, pp. 1a-8a; CSLC, chüan 17, pp. 52-7a; Hummel, op. cit., p. 569.

near the T'eng-lai peninsula 登萊 today. [Then he ordered] Hsi Shu 羲叔 to settle at Nan-fang 南方, which is the kingdom of Indo-China today. But [these two places] are limited on the east and south by vast oceans. [He further ordered] Ho Shu 和叔 to settle at Shuo-fang 朔方 which is the Ngo-terh-tuo-sau 鄂爾多斯 of today. Again this region is limited by the extreme cold and cannot expand further north. Only Ho Chung 和仲 [was ordered] to settle in the West; however, aside from the order "to settle in the West," there was no territorial limitation. This region has no hindrance from great oceans, has climate similar to the interior, and has no extreme cold threatening from the far north. Thus the fame of Yao and Shun 舜 spread throughout [this Western region]. In undertaking this expedition, Ho Chung received an order from Emperor [Yao], that if he would go further north, he would penetrate further north. The distant people [of the West], looking up to him with admiration, came to follow him. Among them there were some, because of their possession of a portion of his teaching and his remaining records, who were able to open the road of knowledge. However, there were also among them some versatile and clever ones who began to question [his teaching and records]; as a result it is natural to have changes. ¹⁴

From the above, it is obvious that Mei was attempting to label the Western astronomy and calendar as by-products of Chinese traditional science, to raise Ho Chung above Ptolemy, to ease any forthcoming attacks of "accepting the barbarian ways to change the Chinese," and to pave the way for a partial acceptance of Western science, if the situation so demanded. As Huang Tsung-hsi said, it was like "a pearl lost in an abyss, and somehow a water monster got hold of it."¹⁵

¹⁴ Mei's passage may be found in Ling Yang-tsao 凌楊藻, Li-shao pien 彙編, "On Western Astronomy" in the Ts'ung-shu chi-ch'eng 叢書集成, ch'uan 31, pp. 509-510. Here Hsi-yü, the familiar "Western Region" in Chinese literature, is used to designate Europe.

¹⁵ Huang Tsung-hsi, Wu-hui chi 吾悔集 (On My Confession) in the Ssu-pu ts'ung-k'an 四部叢刊, ch'uan 3, p. 146.

Mei K'o-ch'eng was by no means alone in this amazing argumentation. Li Kuang-ti 李光地 (1642-1718)¹⁶ a famous astronomer of K'ang-hsi times, had received an astronomical baptism from the Jesuits, but he was still bound to tradition, for he said that "the Yao-t'ien [in the Book of History] is the basis of astronomy for all ages."¹⁷ More significant was the K'ang-hsi cheng-yao 康熙政要 (Important Political Documents concerning the K'ang-hsi Administration), a work which, although it contained material favorable to the Jesuits and on the K'ang-hsi emperor's decision to adopt Western astronomy, contained the same line of argument. It stated:

People always distinguish the differences between the ancient and the recent methods: [this is because] fundamentally they do not know of the origin of astronomy. It was originated in China and spread to the extreme West. The Westerners preserved it safely and had it put under constant observation and yearly modification. It is because of this that they obtained minute exactness, not because they had any other method. ¹⁸

In imperial China, the words of an emperor, generally unchallenged by scholars, were final divine wisdom. It is no wonder that in the Ming-shih, the official history of the Ming dynasty compiled in the early Ch'ien-lung period, the same theory of the Chinese origin of the Western astronomy

¹⁶ For biography, see CJC, chüan 40, pp. 1a-5a; Hummel, pp. 473-475.

¹⁷ "Biography of Li Kuang-o'o," CJC, chüan 40, p. 6b; Huang-Ch'ing ching-chia, chüan 1062, p. 4a.

¹⁸ K'ang-hsi cheng-pao, chüan 18, p. 27a.

and calendar was expounded. In the section dealing with astronomy, it said:

People from the Western Oceans who come to China all call themselves Europeans. Their astronomy is similar to the Hui-hui-li but is more exact. Constant references to previous dynasties reveal that most people from distant countries who were familiar with the methods of astronomy were from the Hsi-yü; but no mention was made of those who were from the East, South and North. This is because the [legendary emperor] despatched Hsi Ho and Chung Shu to all corners of the earth, but restricted Hsi Chung, Hsi Shu and Ho Shu to Yü-i, Nan-fang and Shuo-fang, respectively. Only Ho Chung was ordered "to settle in the West," with no territorial limitations. Is it not at this time that the fame of our teaching spread westward? By the end of the Chou dynasty, the disciples of the mathematicians were scattered everywhere. Since the countries of the Hsi-yü and T'ien-fang 天方 are on the Western borders--unlike those countries on the east and south which are separated by vast oceans and those of the utmost north threatened by extreme cold--there was provided indeed a convenient way for them to gather their books and instruments and to invade the West. ¹⁹

Finally, unable to find any powerful instrument to counter Western astronomy and calendar effectively, the traditionalists made a Confucian attempt in syncretism, as a last resort in their efforts to preserve the Chinese cultural heritage and to reject the total acceptance of Western science. In supplying Chang Chih-tung with precedence and endorsement for his "Chinese learning for the fundamental principles, Western learning for practical applications"--a famous slogan in the nineteenth century in connection with the whole issue of Westernization--Kuo Cheng-chung 郭正中 ,

¹⁹ Ming-shih, chüan 31, p. 33b.

an eclectic of early Ch'ing, formulated:

Chinese astronomy should not be entirely abolished and Western astronomy should not be exclusively used. The four kinds of astronomies [the Ta-t'ung-li, the Hui-hui-li, the astronomy of Wei Wên-k'uei and the Western astronomy], each of them has its weaknesses and good points. It should be a combination of different schools, including that of the Western method. 20

This attempt in syncretism was expressed more explicitly in Wang Hsi-ch'ang's 王錫蘭 (1628-1682)²¹ Hsiao-an hsin-fa 曉庵新法. In determining that the Western astronomy and calendar should be used only for practical purposes, and Chinese methods should be preserved for theorizing purposes, he asserted:

During the last years of the Wan-li reign, the Westerner Ricci, who was quite well versed in astronomy and mathematics, came to China. At the beginning of Ch'ung-cheng reign, Hsü Kuang-ch'i, an official from the Board of Rites, was ordered to translate his [Ricci's] works . . . this was completed within a few years. Almost everyone who discusses astronomy worships it. I venture to say that Western astronomy is adequate; however, it can only be applied to predict good omens, but it cannot be used to comprehend fully astronomical theories. 22

Sharing this attempt in syncretism, Mei Wên-ting 梅文鼎 (1633-1721),²³ the greatest mathematician of the

²⁰ Ibid., chüan 31, pp. 32a-32b.

²¹ For biography, see CJC, chüan 34, pp. 1a-18 and chüan 35, pp. 1a-7a; CSLC, chüan 68, p. 14a.

²² "Biography of Wang Hsi-ch'ang," CJC, chüan 34, pp. 2a-b; Huang-Ch'ing ching-chiai, chüan 1059, p. 1a.

²³ For biography, see CJC, chüan 37, pp. 1a-19b, and chüan 38, pp. 1a-15a; CSLC, chüan 68, pp. 10a-13b; Hummel, op. cit., pp. 570-571.

K'ang-hsi period, reflected Wang's ideas in his Li-hsüeh i-wên 曆學疑問 in the form of a question and answer:

Question: The comprehension of the celestial order is a matter of time; and the completeness of astronomy is by modification. Now with the introduction of the [Western] method, we abolish all the traditional way of following [astronomy]. Is it that all the experiences of the past are not fit to be used?

Answer: Nowadays, the application of the new astronomy is to use its methods to supplement the incompleteness of the old; however, it is not the complete abolition of the old method in order to follow the new. ²⁴

(B) Opposition to Western Mathematics

Next, we consider, as subservient factors to the whole movement of anti-Westernization, the methods by which the Chinese scholar-officials, primarily relying on traditional mathematical classics, attempted to belittle and disparage the Jesuits' important mathematical contributions²⁵ (in arithmetic, geometry, trigonometry, use of logarithms, algebra, elucidation of the dissection of the circle and the like) on the one hand, and to exonerate the slow progress of native mathematics on the other. The arguments utilized against Western mathematics were somewhat similar to the repudiation of foreign astronomy and the calendar, even though manifested on a more limited scale. Particularly

²⁴"Biography of Mei Wên-ting," CJC, chüan 38, pp. 1a-1b; Huang-Ch'ing ching-chiai, chüan 106I, p. 4a.

²⁵For the Jesuits' important mathematical contributions during late Ming and early Ch'ing, see Chapter III.

similar was the theme centering upon the glorification of the Chinese origin of Western mathematics, a theme which aimed, among other things, at the revival of Chinese mathematics.

In the re-examination of native sciences taking place during early Ch'ing, particular attention was given to the Chou-pi suan-ching 周髀算經 (The Arithmetical Classic of the Gnomon and the Circular Pathus) and the Chiu-chang suan-shu 九章算術 (Nine Chapters on the Mathematical Arts)²⁶--two Han works embraced by the traditionalists as the keys to all mathematics. Speaking of the excellence of the Chou-pi suan-ching, Wang Yüan-ch'ü 王元啟 (1714-1786),²⁷ one of the mathematical giants who devoted his lifetime to the revival of the Chinese traditional mathematics, cautioned his countrymen against falling into the same pitfall as Hsü Kuang-ch'ü and others who neglected the merits of the ancient native works. With regard to this, he said:

Scholars should be reminded that the Chou-pi [suan-ching] is one of the classics which covers everything on mathematics. Only later scholars' neglect [of this work] hindered it from being fully developed. Consequently, this permits the Western method to spring up and to have its triumph [over the Chinese]. Actually the Western method is also based on the Chou-pi [suan-ching]. . . .²⁸

²⁶See Appendix I.

²⁷For biography, see CJC, chüan 41, pp. 20b-24b.

²⁸Ibid., p. 22a.

Even in the Shu-li ching-yun 數理精編, a compendium on mathematics, both Western and Chinese, compiled with the collaboration of the Jesuits under Imperial auspices between 1723 and 1756, the assertion of this view is clear. In one of the introductory chapters there appeared, besides the tributes paid to Ricci, Schall, Verbiest and others for services towards the perfection of the numerical science, the following confirmation:

During the reign of Wan-li of Ming, people from Western Oceans began to come to China. Among them there were one or two, like Matteo Ricci and Motel Jacques, who had some knowledge of mathematics. Since the founding of our dynasty, an increasing number of people who [knew mathematics] came to China; among them were Johann Adam von Bell, Ferdinand Verbiest and Antonio de Silva. . . . However, when requested where they obtained their mathematical knowledge, they all replied that it came from China. On inquiry into the ancient sages, one finds that, owing to the esteem of Yao, and the profundity of Shun . . . the subject of mathematics began at this time. Then came the prosperity of the Three Dynasties [Hsiao 夏, Shang 商 and Chou 周] in which the fame of our teachings spread everywhere . . . and books which circulated abroad were not limited to only one. At the end of the Chou dynasty, the disciples of mathematicians were scattered everywhere. As the result of the burning of books in the Ch'in dynasty (221-207 B.C.), most of the classics in China were lost. But the branches abroad still preserved the originals. It is from this that Western learning has its origin. 29

From the above, it is clear that the traditionalists hoped, with the help of the unsubstantiated Jesuit admittance that Western mathematics "came from China," together with the belief that Europe was the sole depository of Chinese

²⁹Shu-li ching-yun, chüan 1; Ssu-k'u-ch'üan-shu tsung-mu t'i-yao, chüan 107, pp. 6a-b.

mathematical classics, to lessen the attack of "accepting the barbarian ways to change the Chinese," and above all, to rescue Chinese mathematics from the threat of Jesuit monopolization.

Specifically, within the concept of the Chinese origin of Western science, one finds, amidst the various elements of Western mathematics, the advocacy of full comprehension of algebra and of the formula for computing the circumference of a circle. These two methods, revived by the Arabs in the tenth century and introduced into China by the Jesuits during the seventeenth and early eighteenth century, were most familiar to the Chinese long before the arrival of the Jesuits in China. Through their search into the past, the Chinese claimed that algebra, a subject introduced by the Jesuits as A-êrh-je-pa-ta 阿爾熱八達 (or A-êrh-je-pa-la 阿爾熱巴拉) which could be converted into Chinese as Tung-lai-fa 東來法 or "Method from the East," was in fact the method of Li Yeh 李冶 (1192-1279), commonly known as T'ien-yüan-i 天元一 in the Yüan dynasty (1260-1368). In the Ch'ih-shui-i-chên 赤水遺珍, Mei K'o-ch'eng, one of the compilers of the Shu-li ching-yun, reported the rediscovery thus:

Lately I served at the Imperial Court, receiving from His Majesty the Emperor, K'ang-hsi, [a work] on the method of Chih-ken-fang 借根方 [algebra], together with an Imperial Edict, saying that "the people from the Western Oceans name this method as A-êrh-je-pa-ta which can be translated [into Chinese] as Tung-lai-fa [Method from the East]." Respectfully I read it and found its

method extraordinary, capable of serving as a guide to mathematics. However, realizing its method to be very similar to that of T'ien-yüan-i, I re-examined the Shou-shih-suan-ts'ao 授時算草 . . . and found out that although the terminology is different, actually [the two systems] are the same. During the Yüan dynasty, scholars, whether they were composing books [on mathematics], or whether they were regulating mathematics, were all dealing with this subject [algebra]. Somehow, for reasons unknown, its trace has been lost. Fortunately, from the distant people [the Jesuits], we have rediscovered the old subjects. Still, they have not forgotten³⁰ where the term Tung-lai-fa [from the East] comes from.

Another example is found in the Ssu-k'u ch'üan-shu tsung-mu t'i-yao 四庫全書總目提要 (An Annotated Bibliography of the Books in the Ssu-k'u-ch'üan-shu Encyclopaedia), a work compiled by Chi Yun and others between 1773 and 1782 under the patronage of Emperor Ch'ien-lung 乾隆. When commenting on Li Yeh's Ts'e-yüan hai-ching 測圓海鏡³¹ the same idea of the Chinese origin of algebra prevailed:

It was at the time when our nation's transforming influence attracted ships from afar that Europeans first presented the method of Chih-ken-fang [algebra] to the Court. His Majesty, K'ang-hsi the Emperor, ordered various officials from the Mêng-Yang-chai 蒙養齋 to study it. It was Mei Ku-ch'eng who apprehended that it was the ancient method of T'ien-yüan-i which is fully recorded in his Ch'ih-shui-i-chên. He also says that the Western term A-êrh-je-pa-la is equal to the Tung-lai-fa in Chinese. From this we know that Li Yeh's collected

³⁰"Biography of Mei Ku-ch'eng," CJC, chüan 39, pp. 2a-b; the Ch'ih-shui i-chên may be found in the Mei-shih ts'ung-shu tsi-yao 梅氏叢書輯要, compiled by Mei Wên-ting and Mei Ku-ch'eng, chüan 61.

³¹For details of this work, see Li Yen, "Ts'e-yüan hai-ching yen-chiu li-ch'eng hsiü" 測圓海鏡研究歷程序 ("A Historical Inquiry into the Ts'e-yüan hai-ching"), Hsüeh-i tsa-chih 學藝雜誌, 11:2, 6, 8, 9, 10 (1931) and ibid., 12:1-4 (1932). Cf. Sarton, Vol. 2, pp. 627-628.

work [the Ts'e-yüan hai-ching], once circulated to the Hsi-yü, made its re-entrance into China. 32

The information contained in the above two paragraphs seem confusing. Owing to the similarity in transliteration between A-êrh-je-pa-la and the Arabic Al-jabr meaning algebra, there is a temptation to assume that the Chinese term Tung-lai-fa, or "Method from the East," used by the Jesuits in connection with algebra, referred to that of the Arabs instead of the Chinese. Apparently mistaken, the Chinese took the term "Method from the East" as referring to the method of Li Yeh. Nevertheless, despite the unsolved problem of whether Europe ever received algebraical knowledge from China, the quotations help to show, so far as our special study on "the opposition to Western science" is concerned, the use of "Chinese ways to change the barbarians."

Likewise, the traditionalists claimed that the Yüan-chou-shuo 圓周率, the formula for computing the circumference of a circle known to the Greeks after Archimedes (287-212 B.C.), had been figured out and handed down by Tzu Ch'ung-chih 祖冲之 (429-500). Accordingly, with an aim to discredit the formula ($\pi = 3.1415926535897323846$) given by the Jesuits in the Ts'e-liang ch'üan-i 測量全義 (The Complete Meaning of Survey: 1631) and other similar works, they frequently cited the following passage from the Sui-shu 隋書 (History of the

³² Ssu-k'u ch'üan-shu tsung-mu t'i-yao, chüan 107, p. 4b.

Sui Dynasty), as evidence that such a finding was available to the Chinese even in the fifth century and that it was not the only product of the West:

At the end of the [Liu] Sung dynasty (420-479), Tsu Ch'ung-chih, a subordinate officer from the south of Hsü-chou 徐州, opened again another secret. Using one million as one, [he gave] 3.1415927 as the greater number of the circumference of a circle, and 3.1415926 as its lesser number. The right number [according to him] was between the greater number and the lesser number. In the case of the "accurate value" (密率), the diameter of the circle was 113 and the circumference of the circle was 355. With regard to the "approximate value" (約率), the diameter of the circle was 7, and the circumference of the circle was 22. 33

Due, however, to the distrust and skepticism towards foreigners, there were some, like Ku Ch'uang-fa 顧長發 who, instead of preserving or improving such ancient practices, said that $\pi = 3.125$.³⁴ More obvious was Ch'ien T'ang 錢塘,³⁵ an eighteenth-century mathematician, who advanced a different

³³Sui-shu, "Lü-lü chi," 律曆志, chüan 11. Cf. CJC, chüan 8, p. 19a. For clarification, the above quotation may be rendered in mathematical form thus:

$$3.1415926 < \pi < 3.1415927$$

$$\pi = 3.14159265$$

$$\pi = \frac{355}{113}$$

$$\pi = \frac{22}{7}$$

³⁴Ssu-k'ü-ch'üan-shu ts'ung-mu t'i-yao, chüan 107, p. 12b; CJC, chüan 41, pp. 9a-b.

³⁵For biography, see CJC, chüan 42, pp. 23a-26a. CSCL, chüan 68, pp. 42a-44a; Hummel, op. cit., p. 156.

(and incorrect) finding ($\pi = 3.16$). Juan Yüan 阮元 (1764-1849),³⁶ one of the spokesmen of the anti-Western-science school, expressed his full approval of this formula with the following words:

Since the time of Liu Hui 劉徽 and Tzu Ch'ung-chih, the formulae for computing the circumference of a circle, even though there are slight differences, all tend to be 3.14. Only K'ai-t'ing 溉亭 [literary name of Ch'ien T'ang] claims it to be 3.16, which is different from other schools of thought. Upon examining Ch'in Chiu-shao's 秦九韶 Shu-hsüeh chiu-chang 數學九章 [Nine Chapters on Mathematics: Sung], I therein find out that he also used 3.16 as the circumference of a circle, which is identical to the system of K'ai-t'ing. Incidentally, this exactness is in agreement with those of the ancient people. 37

Juan Yüan's judgment was a classic example of the traditionalists' profound reverence of antiquity and traditional science, even at the expense of scientific accuracy. This spirit of opposition to Western science, generated by the primary desire to preserve the Chinese cultural heritage from foreign infiltration, continued into the nineteenth century, until Sino-European relations underwent drastic changes. Like many of Juan Yüan's contemporaries, his attitude towards the total acceptance of Western mathematics by people like Hsü Kuang-ch'i and others, was one of hostility

³⁶ For biography and his work, see CSLC, chüan 36, pp. 18b-26b; Hummel, op. cit., pp. 399-402; Wolfgang Franke, "Juan Yüan (1764-1849)," Monumenta Serica, 9 (1944), pp. 53-80; and P. L. Van Hée, "The Chou-jen chüan of Yüan Yüan," Isis, VIII (1926), pp. 103-118.

³⁷ CJC, chüan 42, pp. 25b-26a.

and skepticism. In the following criticism, which acted as a kind of manifesto for the revival of Chinese traditional mathematics, Juan Yüan said:

In every Chinese dynasty, people who master and investigate mathematics have not been lacking. In late Ming, however, owing to the emphasis on abstract discussions on human nature instead of on practical knowledge, this subject began to become weak. . . . Consequently, Western [mathematics] came to take its place. . . . Although it is permissible to say that Ming mathematicians were not like the Westerners, it cannot be said that ancient people were all unlike the Westerners [regarding mathematics]. . . . If scholars would only examine systematically one by one the works on mathematics handed down through the last two thousand years, then they would come to realize the refinement and skill of the Chinese methods which, in comparison, are superior to those of the Westerners. They do not read ancient texts and hence erroneously say that the Western methods are superior to those of the Chinese. Accordingly, they only know of the Western ways; how would they know of the so-called ancient [Chinese] methods? 38

(C) Opposition to Western Technology:

Third, we examine the decisive factors whereby some of the late Ming and early Ch'ing scholar-officials, primarily out of their desire to defend Chinese traditionalism and to preserve her cultural heritage, opposed adopting Western armament and machinery. As indicated above, within the period under consideration, there seemed to be on the surface (due to military necessity and fascination with certain Western things, such as alarm clocks, harpsichords,

³⁸"Biography of Matteo Ricci," ibid., chüan 44, pp. 7b-8b.

telescopes and eyeglasses), a movement of Westernization which led to the manufacturing of firearms and other articles on Western models; yet there was simultaneously a hidden movement which aimed to free Chinese society from any possibility of complete Western technological domination. In this anti-Westernization movement, there appeared, in addition to the advocacy of the Chinese origin of Western armament and technology, an argument which took the form of existing Chinese ideological systems versus Western technology, or rather, the Chinese hsin 心 (mind) versus the Western 1 藝 (skill).

As if aware of the forthcoming many-faced dangers which an overrated technology would present to a society, particularly to an "oriental" society whose basic structure was agricultural and not potentially industrial, and whose value judgment was weighted by a kind of Confucian moral scale and not by materialistic standards, some of the traditionalists, with Hsü Ta-shou 許大受, the late Ming obstructionist of Western science, as their spokesman, signaled the nation at large to be intellectually alert. In his article entitled Shang-ch'ao tso-p'1 聖朝佐闢 (Assisting the Sacred Dynasty to Expose Heterodoxy), Hsü launched a criticism in the form of the Chinese "mind" versus the Western "skill":

Someone asks: Although their [the Jesuits'] 11 理 [principles] are not always subtle and the people are not always virtuous, yet their machines are skillful

and are used for the good of the people; why should you then always rebuke them?

I answer: Have you not heard of the offense of Kung Shu-pan 公輸般 [a noted mechanical inventor] and the defense of Mo-tzu 墨子? Kung Shu-pan was skillful, but in nine battles he was repulsed nine times, because Mo-tzu was likewise skillful. When did we ever yield our skillfulness to the barbarians? Even though [their machines] are skillful, what good will they do to one's mind? Now take the case of the self-alarm clock; it is nothing more than a clepsydra which requires more than ten gold pieces to manufacture it; what big advantages will it bring? The manufacture of the pulley is said to save human-power; since it is so extremely hard to make and so easily out of order, is it not a waste of money? With regard to machines such as cannon, they will set on fire the gunners before annihilating the enemy; would this also be to one's advantage? 39

Speaking as a true Confucianist, Hsü Ta-shou's economic-ideological denunciation of Western technological skill of the existing system mirrored the spirit of the age, namely, the Neo-Confucian concept of the mind.

Hsü's view was shared by his contemporary, Li Ts'an 李燾 who, in his essay P'i-hsieh-shuo 辟邪說 (On the Extermination of Heterodoxy), not only attacked the evils of Western technology but also asserted the theory of the Chinese origin of Western astronomical instruments, for he said:

Again recently [Ricci] aimed to use one or two of his clever [gadgets], such as the astronomical instruments, saying that they have not been heard of in China, in order to interpolate their adoption. . . . But he is unaware that such mechanical skillfulness originated from our Confucian classics. . . . The highest goal of government and teaching is aimed at one's mind and not

39 SCPHC, chüan 4, pp. 36a-b.

directed towards these things [machinery]. Accordingly, although the Hundred Schools occasionally touched upon [the subject] of human nature, yet their unorthodox teachings and confused scholarship forbade them to come within the walls of our Confucianism. How much worse are the barbarians who, with their petty skills, plan secretly to confuse our orthodox teachings, to take away from our Confucianists the importance of human nature, and to cause us to turn our heads to listen to their commands. Are these not bearers of extreme omens of misfortune who should be punished by the Imperial axes and halberds? 40

To give more evidence on the theory of the Chinese origin of Western technology, we borrow another example from Juan Yüan, the uncompromising critic of Western science. In his essay on the "Self-Alarm Clock," the author gave indication that this mechanical instrument, along with the principle of mechanics, was derived from the Chinese clepsydra, and was not a new invention of the West:

Although the self-alarm clock comes from the Western Oceans, its principle is derived from our ancient clepsydra. . . . The ancient clepsydra is filled with water; due to its drippings, the volume of water gradually begins to reduce from high to low, thus causing the wheel to rotate. Like this is the self-alarm clock, which has an iron spring placed in a metal case. To increase its tension, the spring is tightened. Once tightened, the tension also slowly tends to reduce from heavy to light. . . . To sum up, the theory of reducing tension from heavy to light, which they called mechanics, is the principle of our ancient clepsydra and not the sole invention of the people from the Western Oceans. 41

⁴⁰ Ibid., chüan 5, pp. 23a-27b.

⁴¹ Juan Yüan, Tzu-ming-chung shuo 自鳴鐘說 (On Self-Alarm Clock) in Yen-ching shih san-chi 研經室三集, chüan 5.

(D) Opposition to Western Maps and Geography

Finally, we examine how the Chinese, in terms of their traditional beliefs and native speculations (or understanding),⁴² discredited and minimized the Jesuits' important contributions in the fields of map-making and geography to repudiate these two branches of Western science. In particular they criticized Ricci's Map of the World, the Ptolemaic and Heliocentric theories, the Sphericity of the Earth, the application of longitude and latitude to measure the width and length of the earth, the division of the earth into five zones, and the new geographical knowledge contained in works such as Julius Aleni's Chih-fang wai-chi (Description of the Globe: 1623) and Ferdinand Verbiest's K'un-yü t'u-shou (Explanation of the Terrestrial Map of the World: 1672).

Needless to say, among all things geographical, the focus of attack was Ricci's Map of the World, a map which, owing to its unfamiliar and detailed content, had immediately created a sensation in China.⁴³ However, despite the initial popularity of this map, both prior to and after the death of

⁴²Consult Chapter II (B).

⁴³See J. F. Baddeley, "Father Ricci's Chinese World Maps, 1584-1608," Geographical Journal, L:4 (October, 1917, pp. 254-270; E. Heawood, "The Relationship of Ricci's Maps," ibid., pp. 271-276; Lionel Giles, "Translations of the Chinese World Map of Father Ricci," ibid., LII:6 (December, 1918), pp. 367-385; and particularly William Hung, "On the World Map of Matteo Ricci," Yü-kung, 5:3-4 (April, 1936), pp. 1-50.

Ricci, some Chinese scholars, conditioned by the traditional beliefs that China was the central and largest area in the world, objected both to the small size and to the slightly northwestern position of China in Ricci's map. Expressing this attitude, Wei Chün^{魏濬}, in an article entitled "Li shou huang-t'ang hou-shih pien"^{利說荒唐惑世篇} ("On Ricci's Fallacies to Deceive the World"), wrote:

Lately Matteo Ricci utilized some false teachings to fool people, and scholars unanimously believed him. . . . The Map of the World which he made contains elements of the fabulous and mysterious, and is a downright attempt to deceive people on things which they personally cannot go to verify for themselves. It is really like the trick of a painter who draws ghosts in his picture. We need not discuss other points, but just take for example the position of China on the map. He puts it not in the center but slightly to the West and inclined to the north. This is altogether far from the truth, for China should be in the center of the world, which we can prove by the single fact that we can see the North Star resting at the zenith of the heaven at midnight. How can China be treated like a small unimportant country, and placed slightly to the north as in this map? This really shows how dogmatic his ideas are. Those who trust him say that the people in his country are fond of traveling afar, but such an error as this would certainly not be made by a widely-traveled man. ⁴⁴

There were others who, in their unwillingness to accept the superiority of Western maps and geography over those of the Chinese, and in their refusal to accept Ricci as another Ptolemy, came out with the usual argument that the

⁴⁴ SCPHC, chüan 3, pp. 37a-b. A partial translation of this article may be found in Kenneth Ch'ên, "Matteo Ricci's Contribution to and Influence on Geographical Knowledge in China," Journal of the American Oriental Society, 59:3 (September, 1939), p. 348.

new theories the Jesuits discussed in their geographical works, the new scientific methods applied in map making and geographical survey and the scientific instruments used in these related fields had all originated in China. This time, the Tseng Tzu shih-pien 曾子十篇 (The Ten Chapters of Tseng Tzu) and the Chou-pi suan-ching (The Arithmetical Classic of the Gnomon and the Circular Paths of Heaven: Han) were regarded as the gospels from which various Western ideas had been derived; this included the Sphericity of the Earth, the Ptolemaic theory, the Heliocentric system, the application of longitude and latitude to measure the width and length of the earth and the like.⁴⁵

The unique spokesman who presented this kind of argument was again the mathematical genius, Juan Yüan. In announcing that the sphericity of the earth, together with the Ptolemaic theory, originated in China and were not ideas initiated in Ricci's various works, he said: "Originally, the [Ten Chapters] of Tseng Tzu and the Chou-pi said that the earth is a sphere. But, owing to the scatter of the disciples of the mathematicians among the barbarians at the end of the Chou Dynasty, the old method began to become dimmed."⁴⁶

⁴⁵ Ming-shih, chüan 31, p. 24a.

⁴⁶ Juan Yüan, Tseng Tzu shih-pien in Wên-hsuan-lou ts'ung-shu 文選樓叢書, Vol. 12, chüan 4, p. 6b. Cf. Ming-shih, chüan 31, pp. 23b-24a.

On another occasion, in his biography of "Johann Adam Schall von Bell" contained in his Ch'ou-jen-chüan, Juan Yüan criticized the latter's Li-fa hsi-chuan (History of Astronomy in the West: 1656), a work which emphasized the Ptolemaic theory, thus:

By listing forty-two points to indicate the differences between Chinese and Western methods, Johann Adam Schall von Bell goes on to prove the inaccuracy of the Chinese ways. Accordingly, those who study the Western theories say that the teachings of the Westerners are superior to those of the Chinese. However, the frequent reference to [Chinese] histories and gazettes and the systematic study of works by [Chinese] astronomers and mathematicians make me realize that the Western methods are the symposium of significant ideas, both ancient and recent, and not independent creations made by the Westerners. For example, the Sphericity of the Earth has already been explained in the Tseng Tzu shih-pien. . . . How can they know that things like this have not originated in China? 47

Following this, Juan Yüan went on to prove that the comprehension of the theory of the sphericity of the earth, along with the application of longitude and latitude to measure the width and length of the earth, were known to the Chinese long before the arrival of the Jesuits in China; they were not, according to him, exclusively ideas of the West. In his commentary on the Celestial Sphere in the Ten Chapters of Tseng Tzu, he quoted as evidence from the section on astronomy in the Yüan-shih 元史 (History of the Yüan Dynasty):

⁴⁷"Biography of Johann Adam Schall von Bell," CJC, chüan 45, pp. 12a-12b; Huang-Ch'ing ching-chia, chüan 1066, pp. 8a-8b.

During the Yüan dynasty, a certain Cha-ma-lu-ting [Jamal al-Din] from Hsi-yü constructed a Hsi-yü instrument. . . . On the wooden sphere he constructed, he covered seven parts green as water and colored three parts white as land. He drew rivers, lakes and seas on it. Also he drew small squares [longitude and latitude] to measure the width and length of a country. This is the origin of Western theory on the sphericity of the earth since the times of Yüan and Ming. 48

The central ideas of Nicholas Copernicus' Heliocentric Theory were contained in Jesuit works such as Sabbatinus de Ursis' Chien-p'ing i-shuo (On the Planisphere: 1611), Emmanuel Diaz's T'ien-wên lüeh (Summary of Astronomy: 1615) and particularly Michel Benoist's K'un-yü ch'üan-t'u-shuo (Explanation of the Terrestrial Map of the World). With regard to this, Juan Yüan on one hand upheld the Ptolemaic theory and opposed the new solar central system in which "Heaven and Earth alternate their positions and motion and motionless inverse their operation";⁴⁹ on the other hand he claimed the Heliocentric theory to be a Chinese idea, for he said:

Occidentals are yet skillful in mathematics, a subject which they constantly change and modify in order to make it perfect. Also the obscurity of the Chinese methods provides the situation for them suddenly to appear remarkable. People who adore curiosity and are pleased with the new all join together to give their approval. But they do not know that [Emmanuel Diaz's] chiu-chung 九重 [contained in his T'ien-wên-lüeh] is based on the T'ien-wên 天問 [in the Ch'u-tz'u 楚辭]; and that the Chieh-ken-fang 借方根 [Algebra] is from the

⁴⁸ Juan Yüan, Tseng Tzu shih-pien, chüan 4, pp. 6b-7a.

⁴⁹ "Biography of Michel Benoist," CJC, chüan 46, pp. 1.8b-1.9a; Huang-Ch'ing ching-chiai, chüan 1067, p. 14b.

T'ien-yüan 天元 ; thus Westerners are not free from secretly inherited theories and methods established by the Chinese, for which they have only altered the names and titles. I often think of the earthquake instrument of Chang P'ing-tzu 張平子 which is now nonexistent. The old theory says that this instrument can record earthquakes; this is not true. Instead, my opinion is that it is an instrument which demonstrates the rotation of the earth and the motionlessness of heaven [Heliocentric theory]. Perhaps Chiang Yu-jen's 蔣友仁 [Michel Benoist] theory of the rotating of the earth is based on this!
 . . . 50

From this context, it appears that Juan Yüan, as an outstanding spokesman of anti-Westernization, attempted to create diversity on the Western ideas, thus making them to look self-defeated and self-contradictory. Accordingly, he, taking advantage of the different Western views expressed among the Jesuits concerning the universe, namely, the Ptolemaic system and the Heliocentric theory, tried to use one "barbarian" theory to defeat another "barbarian" idea. In this attempt, he used Johann Adam Schall von Bell, representing the Ptolemaic theory, and Michel Benoist, representing the Heliocentric theory, as scapegoats. In his biography of "Nicholas Copernicus," Juan passed judgment on them thus: "Michel Benoist, in accordance with Copernicus, says that the sun is motionless and the earth rotates . . . a theory which is different from what is discussed in Johann Adam Schall von Bell's Li-fa-hsi-ch'uan [History of Astronomy in the West]. . . . How can they, being of the same Western race, have

⁵⁰Juan Yüan's Preface to Hsü Ch'ou-jen chüan 續騷人傳 .

theories contradicting each other in such a way."⁵¹

There were still others who, because of their suspicion and skepticism regarding foreigners, showed little inclination to believe or consult the new geographical knowledge about the world contained in the numerous Jesuit works which were now made available. Accordingly, they disregarded the Western works; this does not mean, however, that they did not know of the existence of Western works on geography. As later instances will show, this nonacceptance revealed itself more fully when they discussed European countries either in private travelogues or in imperial collections composed in the seventeenth and eighteenth centuries. Although errors were inevitable, and information contained in Chinese works was far from being correct, the works at least helped to show the skeptical mind and distrustful attitude of late Ming and early Ch'ing scholars towards the Jesuits, factors which hindered their acceptance of new Western geographical knowledge.

First let us examine the imperial collections, notably, the Ming-shih, the Huang-ch'ao wên-hsien t'ung-k'ao 皇朝文獻通考 and the Ta-Ch'ing i-t'ung-chih 大清一統志, all compiled during the early part of the Ch'ing dynasty, to see what differences from the Jesuit works were contained therein.

⁵¹"Biography of Nicholas Copernicus," CJC, chüan 43, p. 7b; Huang-Ch'ing ching-chiai, chüan 1064, pp. 5b-6a.

Since most of the imperial editions under consideration were the products of Hanlin scholars, we may say they represented the consensus of opinion of the best educated stratum of society.

The Ming-shih, the official history of the Ming dynasty, compiled in the early Ch'ien-lung period, devoted the last thirteen chüan to the description of foreign countries.⁵² In comparison with over thirty countries mentioned in Ricci and other's works, only brief and inaccurate treatment of Portugal, Spain, Holland and Italy was included, the rest of Europe being left out. Even in the description of these four countries, the authors' distrust and reluctance to use the accessible Western works caused them to make many errors. Consequently, one finds, in the section concerning Spain, that Spain and the Philippines were regarded as one country located somewhere in the Indian Ocean and that the Philippines were occupied by the Portuguese instead of by the Spaniards.⁵³ Similarly, in the discussion of Portugal, Han-hsi-la 干系蠟 (Castille), a province in Spain, was

⁵²For a detailed account of the description of European countries in the Ming-shih, see Chang Wei-hua 張維華, Ming-shih Fu-lang-chi, Lu-sung, Ho-lan, I-ta-li ya ssu-ch'uan chu-shih 明史佛郎机呂宋和蘭意大利四傳注釋, (A Commentary of the Four Chapters on Portugal, Spain, Holland and Italy in the History of Ming Dynasty), Yenching Journal of Chinese Studies, Monograph Series No. 7, 1934, 256 pp.

⁵³Ming-shih, chüan 323, pp. 8a-10b.

confused with Portugal which was presented as near Malacca. In addition, the Ming-shih stated that the Portuguese were formerly Buddhists, later converted to Catholicism.⁵⁴ As to Holland, the Ming-shih compilers doubted its existence, for they said that during the Yung-lo 永樂 and Hsuan-tê 宣德 period, Cheng Ho 鄭和 sailed the Western Seas seven times, but nowhere did he find any Holland.⁵⁵ With regard to Italy, they said it was near the Ta-hsi-yang 大西洋, the Great Western (Atlantic) Ocean; however, they added that the imperial records did not mention any Ta-hsi-yang, and so the veracity could not be substantiated.⁵⁶

Another work which treated Western geographical knowledge with similar suspicion was the Ta-Ch'ing i-t'ung-chih, a comprehensive topographical record of the whole empire. The compilers of this voluminous work not only regarded Fan-lan-hsi 法蘭西 (France) and Fu-lang-chi 佛郎機⁵⁷ (Portugal) as one country,⁵⁸ but they also declared Portugal

⁵⁴ Ibid., chüan 325, pp. 13a-17a.

⁵⁵ Ibid., chüan 325, p. 17a.

⁵⁶ Ibid., chüan 326, pp. 12b-15a.

⁵⁷ As early as 1514 or 1515, the Portuguese appeared in Chinese waters. They were first called Fu-lang-chi after the word "Frank," a term which the Chinese used to designate all Europeans at that time. Chang Hsing-lang 張星烺, Chung-Hsi chiao-t'ung shih-liao hui-pien 中西交通史料彙編 (A Miscellaneous Collection of Historical Materials on Contact between China and the West) (Peking: Fu-jen University Press, 1928), Vol. 1, pp. 145-148.

⁵⁸ Ta-Ch'ing i-t'ung-chih, chüan 424/20, p. 1a.

and Holland as well as Sumatra and Java, to be in the South-western Ocean.⁵⁹

A similar work was the Huang-ch'ao wên-hsien t'ung-k'ao, which described every phrase of Chinese civilization. Particularly in the section entitled Ssu-i-k'ao 四裔攷 (chüan 293 to 300), a severe indictment of Ricci's world and China could be found. Here it was noted:

As to the statement made by the Italian [Ricci] that the world consists of five continents, this is no more than a repetition of what Chou Yen 鄭衍, who lived during the period of the Warring Kingdoms, said in his theory of the small oceans. He [Ricci] however dared to say that the Middle Kingdom was one of the five continents, and was named Asia. According to his account, the fifth continent was Megallanica, a new land beyond the straits extending over 1,000 li suddenly discovered by Magellan during his voyage around the world and named after him for being the first one to reach that region. On the other hand he designated as a continent a land extending for only 1,000 or so li, while on the other hand a huge country like China extending over several tens of thousands of li is also called a continent. Such a statement is so full of contradictions that its prodigious falsehood is exposed without being attacked. Although the statement made by him that the customs, traditions, products, religion, and government of his country are superior to those of China is empty, vague and exaggerated, still it is likely that what he said about the uniqueness of the country and the simplicity of the people is true. However, his description of the five continents is nothing more than a wild fabulous story, and his other statements of similar nature are probably copied from some other sources without proper acknowledgment. 60

⁵⁹ Ibid., chüan 424/12, p. 1a; chüan 424/20, p. 1a; chüan 424/2, p. 1a.

⁶⁰ Huang-ch'ao wên-hsien t'ung-k'ao, chüan 298, -- pp. 7469-7470.

Having considered the geographical collections compiled under Imperial auspices, we turn our attention to the examination of a few of the significant geographical works composed by individual authors in the seventeenth and eighteenth centuries. Since they were conditioned by the same attitudes towards foreigners, and since most of the works they consulted were Chinese rather than Western, they were apt to contain the same mistakes. Most common of all was the usage of Hsi-yü 西域, the familiar "Western Regions" in Chinese literature, to designate Europe. To give a few examples, in the Yü-kang chia-pi chu 鬱岡齋筆塵, Wang K'ent'ang 王肯堂 wrote: "I have seen the Western books shown me by Matteo Ricci, a European from Hsi-yü."⁶¹ Also, Wang T'ing-na 王庭納 said in his Tso-yin i-p'u 坐隱夾譜: "In the Year I-ssu [i.e., 1605], I met in Peking the philosopher from the West, Matteo Ricci of Europe, Hsi-yü."⁶²

Next, there were some who, apparently following closely the description of foreign countries set forth in the Ming-shih, were not clear about the countries of Europe. Some confused Holland with Italy;⁶³ others thought Portugal

⁶¹Ku-kang chia-pi-chu, chüan 4, p. 6, quoted in Chang Wei-hua, op. cit., p. 162.

⁶²Quoted in ibid., p. 162.

⁶³Yü Yung-ho 郁永河, Pei-hai chi-yu 裨海紀遊 in Chao-tai ts'ung-shu 朝代叢書, wu-chi 戊集, pp. 35 ff.

was south of Java;⁶⁴ some said there were two Spains;⁶⁵ some said that Rome was on the southern border of Holland, that the people of Prussia were Russians and that Prussia bordered Siberia on the East Coast;⁶⁶ and some said that the Portuguese, who were formerly Buddhists but later converted to Catholicism, had, during the reign of Wan-li, conquered and taken possession of the Philippines.⁶⁷ Of special concern to us, there were some, erroneously identifying the activities of the Jesuit missionaries with those of Spain, who mistook Spain for Portugal and the Philippines for Europe which they said was adjacent to Fukien and Kwangtung. The following passage written by Shen Ch'üeh 沈灌, with the title Ts'an-yuan i-su 參遠夷疏 sheds some light on the picture:

Lately I inquired in detail of the people in Fukien who knew his [Ricci's] native place and they said that he really is a Fu-lang-chi [Portuguese]. . . . In former years he and his colleagues pretended that they were Catholics preaching their religion, but instead they deceived the Philippines, took away their land, and

⁶⁴ Ku Yen-wu 顧炎武, T'ien-hsia chün-kuo li-ping shu 天下郡國利病書, chüan 119, pp. 53a-b.

⁶⁵ T'ü-li-chun 圖理琛, I-yü-lü 異域錄 (1723) in Chao-tai ts'ung-shu, pp. 1b ff.

⁶⁶ Ch'ên Lun-ch'ung 陳倫炯, Hai-kuo wen-chien 1 海國圖見錄 in Chao-tai ts'ung-shu, wu-chi, chüan 1, pp. 28 ff.

⁶⁷ Yin Kuang-jen 印光仁 and Chang Ju-lin 張汝霖, Ao-mên chi-liao 澳門紀略 (1752), pp. 33a ff.

changed its name to Ta-hsi-yang [the Atlantic Ocean]. So after all, Fukien and Kwangtung are neighbors to a shrewd, savage country. How can they be 80,000 li apart? ⁶⁸

⁶⁸ SCPHC, chüan 1, pp. 14-17. Cf. Su Chi-yü 蘇及寓, "Hsieh-tu shih-chü" 郭嘉據 in ibid., chüan 3, pp. 32a-36a.

EPILOGUE

In making a recapitulation of the complicated problem discussed, we find that the existing intellectual vacuum among the intelligentsia in sixteenth-century China, both in the spheres of religion and science, provided a situation favorable for the Jesuits to invade China with Western religion and science, through their conciliatory-persuasive policy--a policy directed to the top level of the society. We have seen, first of all, that the Jesuits in their critical evaluation of Chinese thought against their own religious dogma, embraced pre-Han Confucianism which was at variance with late Confucianism. They adopted Chinese ways by paying tribute to the reigns of the Three Sages; colored Chinese terminology, such as shang-ti or t'ien with Christian connotations; and advocated Christianity as a supplementary means through which Confucianism might achieve its perfection: this was done with an aim to facilitate Chinese approval of their religious dogma, to avoid antagonizing China's traditionalism, to recreate the ancient religious characteristics of the pre-Han period, and above all, to harmonize and synthesize Christianity with Confucianism. Concurrently, in order to gain a place for Catholicism in Chinese thought,

the Jesuits, while advancing the Christian ideas, attacked Buddhism for its "Emptiness," Taoism for its spiritism and "Nonbeing," and Neo-Confucianism for its "Supreme Ultimate" and such other qualities as its nonreligious attitudes, its cosmological-metaphysical theories and its Buddhist and Taoist influences and tendencies. We have also seen that the Jesuits, as a partial fulfillment of their conciliatory-persuasive policy, introduced Western "modern" science, which consisted primarily of astronomy and calendar-making, mathematics, technology and geography, to create sensationalism within China, and to arouse the curiosity and fascination of the Chinese mind. Like the Jesuits' attempt to harmonize the teachings of Christian dogma with those of Chinese thought, the exhibition of Western scientific novelty aimed, among other things, at gaining an audience with the Emperor whereby the approval of establishing a more permanent Chinese mission might be secured.

This Jesuit conciliatory-persuasive policy, as indicated in the above pages, attracted only a fraction of the late Ming and early Ch'ing Chinese officials, men who were either frustrated with the emptiness of the current Chinese thought, or who began to realize that native science had become retarded in its development. At the same time, it may be said that there appeared on the surface a partial acceptance of Western science and techniques; this was due

partly to the frequent inaccuracies in astronomical calculations based on traditional observations, namely, those recorded in the Ta-t'ung-li (Ming calendar) and the Hui-hui-li (Muslim calendar), partly to the need of modern arms to counter the threats from the outside during late Ming and to strengthen the military power during early Ch'ing, and partly to the fascination and curiosity aroused by Western mechanical instruments. This temporary acceptance resulted in the employment of Jesuits in the Imperial Astronomical Bureau to readjust and improve the traditional calendar and astronomy; the manufacture of horological, mathematical and astronomical instruments, as well as armaments, on Western models; the translation and publication of numerous scientific treatises; the reproduction of Ricci's Map of the World, and the utilization of the Jesuits in geographical surveys. Correspondingly, as a response and reactions to the Jesuits' scientific activities in China, there was a semi-popular movement of re-examining and re-evaluating the Chinese science, which resulted particularly in a revival of Chinese mathematics and astronomy.

However, on the whole, the religious and scientific innovations of the Jesuits caught the nation intellectually unprepared to undertake a movement away from traditionalism and from Neo-Confucianism in particular. Due to professional jealousy, condemnation of Christianity as a heresy, skepticism

and xenophobic suspicion, opposition to both Western religious ideas and Western science sprang up everywhere, particularly among the scholar-officials. The latter, in terms of the conventional metaphysical beliefs and the rational spirit of the age and of the satisfactory metaphysical explanation of the mysteries of the Creation, kept aloof from the Jesuits' religious and spiritual interpretations, and were not seriously affected by the new elements of Western scientific thought. They referred to the I-ching and its commentaries (particularly on the hexagram of ch'ien, the Creative force which symbolized the character of Heaven in all its perfection) for evidence to show that t'ien was li, the universal principle from which all things came into existence. In contrast to the Jesuits, they believed in an impersonal God (Heaven or Tao) instead of a personal one in the form of a Creator, denounced Immortality and Deity, asserted man was fundamentally good even without God's help, believed the growth of creatures was by li instead of by the Creator, and rebuffed the idea that mind or conscience was bestowed by God.

Specifically, the Jesuits' desire to conciliate or supplement Confucianism on the one hand, and to replace Buddhism on the other, prompted the scholar-officials, both Buddhists and Neo-Confucianists, to conduct a crusade to eliminate this "heterodoxy." Moreover, for them, the

acceptance of any of their Western opponents' ideas, notably religious propositions, would mean doing away with the spirit of Neo-Confucianism whose emphasis was in the sphere of metaphysics rather than religion; it would mean a return to the ancient religious characteristics of the pre-Han period, from which many eminent scholars and philosophers throughout Chinese history, specifically those in the Sung time, tried so hard to free themselves; and particularly it would be acceptance of "barbarian ways to change the Chinese." Accordingly, arguments were advanced as measures of a cultural defense mechanism, to safeguard Chinese traditional heritage and at the same time to resist Western ideological infiltration of any sort. Aiming to maintain and solidify traditionalism and concurrently to combat "heterodoxy," there were, aside from a political demonstration of anti-foreignism and anti-Catholicism which manifested itself in the semi-nationalist Nanking Religious Incident of 1616-1622, an anti-Christian crusade and a movement of anti-Westernization within our period of concern.

Of the argumentations advanced by both the Buddhists and the Confucianists in the anti-Christian movement--to maintain the status quo of Chinese thought and to refute any charge of accepting "the barbarian ways to change the Chinese"--the most significant formulae applied in this connection, aside from the condemnation of Christianity as a heresy, were

the contention that the completeness of Chinese thought rendered superfluous any supplementation with alien ideas; the application of Lao Tzu's theory on the Sinization of barbarians by indicating that Christianity was nothing but a by-product of Chinese thought; the acknowledgment of the fundamental good of man who thus had the power to reach his best state of development, free from sin and crime, without assistance from God; and the usage of ideas behind Neo-Confucian and Buddhist theories to argue that the growth of creatures was by li and that all things were of the same substance. With regard to the means utilized to safeguard the Chinese cultural heritage, the most significant was Wang Ch'i-yüan's advocacy of Confucianism as the state religion to combat Christianity, even though this advocacy was contrary to the spirit and beliefs of that time. The Chinese-Jesuit religious controversy was manifested in terms of shang-ti or t'ien versus the Christian God, or of Equalitarianism versus Anthropocentrism.

Like the Chinese opposition to Western religion, the danger of accepting "the barbarian ways to change the Chinese," the Jesuits' criticism of the inaccuracies in Chinese "traditional" science, the complete acceptance of the Western scientific methods by some eminent Chinese scholar-officials and native converts, and the Imperial patronage of the Western missionaries in the various Imperial scientific boards,

paved the way for the controversialists to combine the movement of anti-Westernization with the Nanking Religious Incident. The classical arguments used by the traditionalists to minimize the Jesuits' scientific contributions, particularly in the fields of astronomy and calendar-making, mathematics, technology and geographical knowledge, were manifested in the following six ways: First, there were some who, conditioned by the traditional beliefs and by the skeptical and distrustful attitude of late Ming and early Ch'ing scholars towards the Jesuits, showed little inclination to believe or consult the new scientific knowledge introduced by the Jesuits. A notable example is the objection to the small size and to the slightly northwestern position of China in Ricci's Map of the World and the non-acceptance of new Western geographical knowledge revealed either in private travelogues or in Imperial collections composed in the seventeenth and eighteenth centuries. Second, out of the appeal to China's antiquity for the preservation of Chinese traditional science and for endorsements and justification of changes, was the total nonacceptance of Western science. A typical example is Yang K'ang-hsien's contention that "it is better to have no good astronomy than to have Westerners in China," a basic formula utilized by the obstructionists throughout the Manchu dynasty to hinder the infiltration of Western science. Third, in the

unwillingness to accept the superiority of Western science over that of the Chinese, the traditionalists, looking upon the Tseng Tzu shih-pien, the Chou-pi suan-ching and the Chiu-chang suan-shu as the keys to all science, and believing that Europe was the sole depository of Chinese scientific classics, notably mathematics, came out with the argument that Western scientific ideas and techniques introduced by the Jesuits, such as the sphericity of the earth, the Ptolemaic theory, the Heliocentric system, the application of longitude and latitude to measure the width and length of the earth, the self-alarm clock, the principle of mechanics, the formula for computing the circumference of a circle, and the application of algebra, had all originated in China. This theory of the Chinese origin of Western science had some psychological effectiveness. On the one hand, it provided a reason for total rejection of Western science by some, on the ground that since the ideas had already been fully recorded and explained in Chinese texts, a supplement from the Jesuits was unnecessary. On the other hand, it supplied the opportunity for some to make an apology for the underdevelopment of Chinese science, thus making a partial acceptance of some aspects of Western science permissible within the context of traditionalism. Fourth, there were some, such as Juan Yüan, who, taking advantage of the different Western views expressed among the Jesuits concerning

the universe, namely, the Ptolemaic system and the Heliocentric theory, attempted to show diversity and contradiction within Western science by using one "barbarian" idea to defeat another "barbarian" theory on the same subject--providing a precedent for nineteenth-century policies of using "the barbarians to fight against the barbarians" and of using "the Western arms to fight against the West." Fifth, there were others who, embracing the spirit of the age, viz., the Neo-Confucian concept of the mind, argued that the cultivation of one's mind was far more important than the comprehension of a few Western technical skills; they thus, in the form of the Chinese hsin (mind) versus the Western i (skill), sought to remove the danger of possible complete Western technological domination of Chinese society. Sixth, unable to find any powerful instruments to counter Western science effectively, the traditionalists made a Confucian attempt in syncretism, as a last resort in their efforts to preserve the Chinese cultural heritage and to avoid the total acceptance of Western science. Accordingly, they held with Chinese traditionalism on the whole, and only took Western scientific knowledge into consideration when the re-examination of Chinese science became a necessity. Supplying Chang Chih-t'ung with a precedent and endorsement for his "Chinese learning for the fundamental principles, Western learning for practical application"--a famous slogan used in the nineteenth

century in connection with the whole issue of Westernization --Kuo Cheng-chung, an eclectic of early Ch'ing, formulated the idea that "Chinese astronomy should not be entirely abolished and Western astronomy should not be exclusively used."

These arguments, advanced in opposition to Western religion and science, showed the late Ming and early Ch'ing scholar-officials' reluctance to accept the "barbarian ways to change the Chinese," their profound reverence for traditionalism and antiquity, and their spirit in the defense of Chinese cultural heritage. This traditional Chinese opposition, coupled with the half-century-old Rites controversy between the Jesuits and competing orders, the position taken by Emperor K'ang-hsi in favor of the Jesuits, and the Papacy's support of other denominations in these matters, resulted in the expulsion of all missionaries from Chinese soil, save a few who were retained for scientific work. It is not an exaggeration to say that despite the Jesuits' great efforts to introduce Western religion and science into China during the period of late Ming and early Ch'ing, despite the Imperial patronage of the Jesuits in the various scientific boards, and despite the friendly reception of Western ideas by certain scholars and members of the Imperial family, the majority of the native scholars, entrenched with traditional beliefs and speculations, were not seriously affected by the new elements of Western thought.

APPENDIX I

CHINESE MATHEMATICAL TREATISES BEFORE MING

Of works which formulated the nucleus of arithmetical science in China, the most important are: the Chou-pei suan-ching 周髀算經 (The Arithmetical Classic of the Gnomon and the Circular Pathus: -first century), the oldest classic, probably containing material from Chou, which claimed to cover every aspect of mathematics;¹ the Chiu-chang suan-shu

¹ To show what the Chou-pei suan-ching contains, the following dialogue quoted in Alexander Wylie, Chinese Researches (Shanghai, 1897), pp. 163-164, between Chou-kung 周公 and Shang Kao 商高, one of the Chou ministers, will shed some light on the picture: "Formerly Chou Kung addressing Shang Kao, said: I have heard it said my lord that you are famous at numbers; may I venture to ask you how the ancient Fo-li established the degrees of the celestial sphere? There are no steps by which one may ascend the heavens, and it is impracticable to take a rule and measure the extent of the earth; I wish to ask then how he ascertained these numbers? Shang Kao replied: the art of numbering originates in the circle and quadrangle. The circle is derived from the quadrangle. The quadrangle originates in the right angle. The right angle originates in the multiplication of the nine digits. Hence, separating a right angle into its component parts, if the base be equal to 3, and the altitude to 4, a line connecting the farther extremities will be 5. Square of the external dimensions, and half the amount will give the area of the triangle. Add together all the sides, and the result will equal to the sum of 3, 4 and 5. The square of the hypotheneuse being 25, is equal to the square of the two short sides of the triangle. Thus the means by which Yü restored order throughout the empire was by following out the principles of these numbers. Chou Kung exclaimed: How truly great is the theory of numbers. May I ask what is the

九章算經術(Nine Chapters on the Mathematical Arts: first century), another Han work, containing 246 problems devoted to the principles and explanations of (1) Mensuration of Plane Figures (方田), (2) Problems involving the Rule of Three (粟米), (3) Partnership (差分), (4) Extraction of Square and Cube Roots (少廣), (5) Mensuration of Solids (商功), (6) Alligation (均輸), (7) "Excess and Deficiency" (using the Rule of Falsity of Position) (盈不足), (8) Linear Equations (involving one or more unknown quantities (方程)),

principle of the use of the rectangle? Shang-ka'o replied: The plane rectangle is formed by uninclined straight lines. The direct rectangle is used for observing heights. The reversed rectangle is used for fathoming depths. The flat rectangle is used for ascertaining distances. By the revolution of the rectangle the circle is formed. By the junction of rectangles the square is formed. The square pertains to earth, the circle belongs to heaven, heaven being round and the earth square. The number of the square being the standard, the dimensions of the circle are deduced from the square. The circular plate is employed to represent heaven; the celestial colors are blue and black, the terrestrial are yellow and red; the circular plate is formed according to the celestial numbers; it is blue and black outside, red and yellow inside, in order to represent the celestial and terrestrial stations. Therefore he who understands the earth is a wise man; he who comprehends the heaven is a sage. This knowledge begins with the straight line; the straight line is a component part of the rectangle, and the numbers of the rectangle are applicable to the construction of all things. Chou Kung exclaimed, excellent indeed." The Chou-pe'i suan-ching has a commentary by Chao Chün-ch'ing 趙君卿 of Han, together with further elucidations by Chên Luan 甄鸞 in the sixth century and Li Shun-feng 李淳風 of Tang. In addition there is an appendix entitled the Chou-pe'i suan-ching yin-i 周髀算經音義 by Li Chi 李籍 concerning the pronunciation and meaning of the words in the Chou-pe'i suan-ching. Wylie, pp. 113-115; Sarton, Vol. 1, p. 494; Li Yen, p. 15. This work is available in two chüan in the Ssu-pu ts'ung-k'an, Vol. 23, pp. 1-70 and the Ts'ung-shu chi-ch'eng, Vol. 1262.

and (9) Trigonometry (勾股);² the Sun-tzu suan-ching 孫子算經 (Arithmetical Classic of Sun-tzu: ca. third century), an elaborate and methodical treatise, which consists of a series of problems on the solution of indeterminate equations of the first degree, the decimal number system and the density of various substances;³ the Hai-tao suan-ching 海島算經 (Sea-Island Arithmetical classics: third century), a treatment of Liu Hui 劉徽 implying some knowledge of algebra which deals with, among other things, the measurement of an island from a distance;⁴ the Wu-ts'ao suan-ching 五曹算經 (The

²For a description of the Nine Sections listed in the Chiu-chang suan-shu, see Wylie, Chinese Researches, pp. 170-173. In 263 A.D., Liu Hui 劉徽 wrote a commentary on the Chiu-chang suan-shu. Other commentaries included those written by Chên Luan and Li Shun-feng. A critical analysis of this text was composed by Yang Hui 楊輝 in 1261, entitled the Hsiang-chieh chiu-chang suan-shu 詳解九章算術. Wylie, p. 113; Sarton, Vol. I, p. 187, p. 211, pp. 338-339, p. 494 and Vol. II, p. 1023; Li Yen, pp. 16-17 and pp. 18-19. For a full account of the Chiu-shang suan-shu, see Mikami, The Development of Mathematics in China and Japan, pp. 8-25. The text may be located in the Tai-chiao suan-ching shih-shu 戴校算經十書, a collection of ten oldest mathematical treatises in 1773 by Tai Chen 戴震; the Ts'ung-shu chi-ch'eng, Vol. 1263 and the Ssu-pu ts'ung-k'an, Vol. 23, pp. 1-104.

³Nothing is known of the author Sun-tzu. Both Tai Chen and Juan Yüan believed that he lived after Han Ming-ti 漢明帝 (58-75 A.D.). It has commentaries by Chên Luan and Li Shun-feng. The original text as a whole has been lost long; the text now available was extracted piecemeal from the Yung-lo ta-tien 永樂大典 (1407). Wylie, p. 114; Mikami, op. cit., pp. 25-33; Li Yen, pp. 25-26.

⁴This work has a commentary by Li Shun-feng. The text available was extracted piecemeal from the Yung-lo ta-tien. CJC, chüan 5, pp. 9a-16a; Sarton, Vol. I, pp. 338-339 and p. 494; Wylie, p. 114; Mikami, op. cit., chapter 5.

Wu-ts'ao Arithmetical Classics: ca. sixth century), a treatise by an unknown author which contains five different arithmetical problems, viz., Land Measure Calculation, Military Calculations, Calculations on the Comparative Value of Grains, Calculations on the Bulk of Grains, and Calculations on the Circulating Medium;⁵ the Hsia Hou-yang suan-ching 夏侯陽算經 (Arithmetical Classic of Hsia Hou-yang: ca. sixth century) is, based partly upon the Chiu-chang suan-shu, partly upon the Sun-tzu suan-ching and partly upon the Wu-ts'ao suan-ching, the "most simple and practical" of all the ancient texts, which has some important notes on weight and measures, especially on the variation in measures of capacity and length;⁶ the Wu-ching suan-shu 五經算術 (Arithmetical in the Five Classics: sixth century), an elucidation of various mathematical matters stated in the Five Classics by Chên Luan 甄鸞 which, in addition to its worth as an ancient mathematical classic, is valued as a history of mathematics;⁷ the Chang Ch'iu-chien suan-ching 張丘建算經, a

⁵This work has a commentary by Chên Luan; and the available text was extracted from the Yung-lo ta-tien. Wylie, p. 114; Li Yen, pp. 27-28.

⁶It is not known when the author lived; but according to Tai Chen, he apparently flourished during the beginning of the Sui dynasty (581-618). This work has commentaries by Chên Luan and Li Shun-feng; and the available text was extracted piecemeal from the Yung-lo ta-tien. CJC, chüan 6, pp. 10b-12a; Sarton, Vol. 1, p. 449; Mikami op. cit., p. 39; Wylie, p. 115; Li Yen, pp. 26-27.

⁷This work has a commentary by Li Shun-feng; and the available text was extracted from the Yung-lo ta-tien. Chên

treatise of uncertain date, containing exercises in Fractions, problems in Trigonometry, and questions in Alligation, Mensuration of Solids, Partnership and Plane Mensuration;⁸ the Ch'i-ku suan-ching 緝古算經 (The Ch'i-ku Arithmetical Classics: seventh century), a somewhat "abstruse" text by Wang Hsiao-t'ung 王孝通 which consists of twenty problems on the earliest Cubic Equations in Chinese mathematics and also on the principle of Solid Mensuration;⁹ the Shu-shu chiu-chang 數學九章 (The Nine Sections of Mathematics: 1247), a work by the Sung mathematical genius, Ch'in chiu-shao 秦九韶, which contains a new formula for the resolution of indeterminate problems, together with the introduction of the t'ien-yüan-shu, the Chinese system of algebra;¹⁰ the Ts'e-yüan hai-ching

Luan's main work are collected in the Tai-chiao suan-ching shih-shu. CJC, chüan 11, pp. 7a-8a; Sarton, Vol. 1, p. 450; Wylie, p. 115; Li Yen, p. 28.

⁸ This work has commentaries by Chên Luan and Li Shun-feng and Liu Hsiao-sun 劉孝孫 (Tang). This work has come down to us perfect, from the edition printed in the Sung dynasty. CJC, chüan 6, pp. 9b-10b; Sarton, Vol. 1, p. 494; Wylie, p. 115; Li Yen, p. 26.

⁹ CJC, chüan 13, pp. 5a-6b; Wylie, pp. 115-116; Mikami, op. cit., pp. 53-56; Sarton, Vol. 1, p. 474; Li Yen, pp. 38-40. The complete text has come down to us in the Tai-chiao suan-ching shih-shu.

¹⁰ The nine sections of the Shu-shu chiu-chang are: resolutions of indeterminate problems; chronological calculations; land mensuration; trigonometry; state service; imposts; fortifications; military arithmetic; and barter. Sarton, Vol. 11, pt. 2, pp. 626-627; Wylie, p. 116; Li Yen, pp. 107-108. A critical study of Ch'in Chiu-shao's text was published in 1842 by Sung Ching-ch'ang 宋景昌, entitled the Shu-shu chiu-chang cha-chi 數書九章札記. Ch'in also composed another

測圓海鏡 (Sea-Mirror of the Circle Measurement: 1248), an outstanding work by another mathematical giant, Li Yeh 李冶 (1192-1279) in which the principle of t'ien-yüan was further developed and elaborated;¹¹ the Hu-shih suan-shu 弧矢算經 (Arithmetical Rules for Arcs and Versed-Sines: ca. 1300), an indispensable work by the great Yüan astronomer-mathematician, Kuo Shuo-ching who, within this work, introduces the principle of spherical trigonometry, as developed by the Muslims, with the help of illustrations;¹² the Hsiang-chieh chiu-chang suan-shu 詳解九章算法 (The Analysis of the Arithmetical Rules in Nine Sections: 1261) and the Yang-Hui suan-fa 楊輝算法 (Arithmetics of Yang Hui: 1275), two works by Yang Hui 楊輝 which give supplementary explanations to the problems raised

less important work called the Shu-shu ta-lüeh 數書大略 (General Rules on Arithmetic). The Shu-hsüeh chiu-chang may be found in the Ts'ung-shu chi-ch'eng, Vol. 1269-1273.

¹¹ Sarton, Vol. 11, pt. 2, pp. 627-628; Mikami, *op. cit.*, pp. 79-84; Wylie, pp. 116-117; L. Vanhée, "Li Yé," T'oung Pao, Vol. 14 (1913), pp. 537-568. For details of this work, see Li Yen, "Ts'e-yüan hai-ching yen-chiu li-ch'eng hsu" 測圓海鏡研究歷程序 ("A Historical Inquiry into the Ts'e-yüan hai-ching"), Hsüeh-i tsa-chih 學藝雜誌 11:2, 6, 8, 9, 10 (1931) and *ibid.*, 12:1-4 (1932). Li Yeh also wrote another work entitled the I-ku yen-tuan 益古演段 (Exercises and Applications improving the Ancient Method: 1259), containing sixty-four problems on circles and quadrilaterals.

¹² Sarton, Vol. 11, pt. 2, p. 1022; Wylie, p. 167; Li Yen, pp. 110-113. Kuo Shuo-ching's spherical trigonometry was apparently of Arabic origin; the transmission of Arabic trigonometry to China would have been easy at that time, because the Muslim East and China were then integral parts of the same Mongol Empire.

by ancient authors;¹³ the Suan-hsüeh ch'1-meng 算學啟蒙 (Introduction to Mathematical Studies: 1299) and the Ssu-yüan yü-chien 四元玉鑑 (Precious Mirror of the Four Elements: 1303) by the immortal Chu Shih-chieh 朱世傑 (1280-1303), in which the former consists of 259 problems on the various ways of calculations and mensurations, whereas the latter, illustrated by 288 problems, is an extension of the t'ien-yüan-shu to a system of four linear equations with four unknown quantities.¹⁴

¹³ CJC, chüan 22, pp. 18a-18b; Sarton, Vol. 11, pt. 2, p. 1023; Wylie, p. 117; Mikami, op. cit., pp. 84-88; Li Yen, pp. 109-110. In addition to the above-mentioned two works, Yang Hui also published the Hsiang-chia1 jih-yung suan-fa 詳解日用算法 (Explanation of Arithmetic for Daily Use) and the Ch'eng-ch'u t'ung-p'ien pen-mo 乘除通變本末 (Complete Treatise on the Mutations of Multiplication and Division).

¹⁴ Sarton, Vol. 111, pp. 701-702; Wylie, pp. 117-118; Mikami, op. cit., pp. 89-98; Herbert Chatley, "Science in Old China," Journal of North China Branch of the Royal Asiatic Society, 54 (1923), p. 76; Li Yen, pp. 113-114.

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*The list of works given here is not intended to be in any way a complete bibliography of such an important subject. It is based on the writer's experience as to both documents and books especially reliable or especially illuminating for this particular project.

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