Chinese Mathematical Astrology

Reaching out to the stars

Ho Peng Yoke

CHINESE MATHEMATICAL ASTROLOGY

The ability to predict has always been, and remains, an important aim of science. In traditional China, astronomers devised methods of divination that were not only applied to natural events such as weather forecasting, but also to mundane human affairs. The three most sophisticated devices were shrouded in clouds of secrecy. During the eleventh century and for hundreds of years thereafter, candidates were examined on their knowledge of these devices behind the closed doors of the Chinese Astronomical Bureau.

Known by little other than their names, this is the first book in any language that attempts to make an academic study of the three methods, known as the *sanshi* (three cosmic boards), which turned out to have a profound influence on Chinese society.

Ho Peng Yoke has published widely on Chinese alchemy, astronomy, divination and mathematics. He occupied senior academic positions in Singapore, Kuala Lumpur, Australia and Hong Kong before becoming the Director of the Needham Research Institute in 1990. He is an academician of the Australian Academy of Humanities, Academia Sinica and the International Euro-Asia Academy of Science.

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This book is dedicated
to the memory of

Dr Wu Lien-teh, renowned Plague Fighter and
Founder of Modern Hospitals in China, Healer
and Philanthropist in Southeast Asia

and

Dato Dr Lee Kong Chian, celebrated Industrialist
and Banker in Southeast Asia, Philanthropist
and Patron of Learning and Education

and

their two families in friendship

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PREFACE

In the year 1953 I embarked on translating and annotating the astronomical chapters (*tianwenzhi* 天文志) in the official history of the Jin dynasty (251–420) at the suggestion of Joseph Needham (1900–1995). The aim was twofold. Dr Needham considered that a full translation of the astronomical chapters in one of the Chinese official histories was an essential reference for his preparation of the astronomy section in Volume 3 of *Science and Civilisation in China* and, in exchange, my translation and annotations, having benefited from Needham's advice, would serve as the first draft of my doctoral dissertation. Our interest then was mainly confined to the astronomy content of the text, although by modern standards the predominance of astrological material would suggest a different title more in keeping with modern usage. My research was focused on astronomical records in the official dynastic histories as a result of my initial training and employment as a physicist.[1] Thus, my interest in the history of science came essentially from the standpoint of science. This was the same standpoint I adopted whenever I collaborated with Needham on three different occasions in his *Science and Civilisation in China* project.[2]

In 1964 I accepted an invitation to take up the Chair of Chinese Studies at the University of Malaya. In order to avoid working in splendid isolation away from my own colleagues in the humanities and to show the leadership in research as expected of a departmental head, the main thrust of my research turned towards the relation of Chinese science to literature and poetry, with textual collations and dating of texts, and other areas more remote from those taken up by Needham. At the same time, I would take Needham's approach whenever I managed to take time off to work in collaboration with him in his *Science and Civilisation in China* project.

Needham looks at traditional Chinese science from the standpoint of a modern scientist. But it is also interesting to try to see what science was in the mind of a Chinese thinker in a different space and time continuum. My third and last period of collaboration with Needham ended in 1978 when I sent him my draft on the gunpowder epic section of his project.[3] Working in East Asia in the next decade provided me with an opportunity to live among the local communities and to gain a better feeling for their thoughts.

In order to avoid duplicating what Needham and his other collaborators would be writing, I sometimes took different approaches in my research, including trying to see things from the viewpoint of a traditional Chinese scholar – not to conflict with but rather to complement Needham's work.

While I was at the University of Hong Kong between 1981 and 1987, I made a study of a *Dunhuang* manuscript on predictions through the observations of cloud and vapour. In 1983, while walking towards the Royal Hotel in Kyoto with Professor Yano Michio 矢野道雄, my attention was attracted by a fortune-teller who was reading the fate of a client using the *shizu suimei* method. I was reminded of the similarity of this method with that used by a fortune-teller in Canton (modern Guangzhou) during the 1930s to read my own father's horoscope. I thought that there might be some rationale in the method. This eventually resulted in the publication of my book on the *Ziping* method of fate-calculation. It also happened that Yano had become an expert on Hellenistic and Iranian astrology after having spent some time at Brown University to write his doctoral dissertation under the guidance of Professor David Pingree for submission to Kyoto University. Together with Professor Nakayama Shigeru 中山茂, the two provided a friendly source of expertise on Greek, Hindu, Islamic and Japanese astrology. I was able to exchange ideas with them on astrology in congenial surroundings from Hakone to Kyoto and Fukuoka in Japan and, not least, in Cambridge.

Since 1987 I have made frequent visits to Taiwan, mainly to the Academia Sinica in Nankang and the National Tsing-Hua University in Hsinchu. Both institutions have excellent library and working facilities and always made me feel completely at home whenever I went there. I gave public lectures dealing with the *Yijing* to audiences including academics, the general public and practitioners of the art. The Director of the Institute of History of the National Tsing-Hua University at that time was Dr Chang Yung-tang 張永堂. He was then launching a project with the support of the Chiang Ching-kuo Foundation for International Scholarly Exchanges to collect materials on Chinese astrology and various forms of divination, to compile bibliographies and biographies and to hold seminars on the study of *shushu* 術數, which is a general term encompassing all methods for probing the future or calculating the unknown. It was then that I became interested in finding more about the three cosmic boards. During the process I have received much help from Chang Yung-tang and from his able research assistant Miss Hsu Shou-min 許守泯. Other aspects of *shushu* were among the research interests of Professor Fu Daiwei 傅大為 and Professor Huang Yi-Long 黃一農. In a sense, I have always been regarded as the unofficial senior member of the Tsing-Hua *shushu* research team. Chang Yung-tang has arranged for the publication of my collected papers on *shushu*, written during my visits to Taiwan. I also had the opportunity to benefit from the expertise of Professor Ho Ping-ti 何炳棣 on the *Ziping* method of fate-calculation during our mutual visits to the Academia Sinica in Nankang.

Dr Chu Ping-i 祝平一 of the Institute of History and Philology, Academia Sinica, has assisted me in the use of the database of his Institute.

In the 1990s I gave a number of public lectures and seminars on the three cosmic boards in Taiwan, Hong Kong, Xi'an and Singapore. The purpose was to test their reception within the culture where the methods originated and were still practised. I needed to explain that my purpose was not promotion, but to do so without offending practitioners of the trade. I remember an amusing incident in Singapore in the month of August 1997 when, after a public lecture in Chinese delivered at the United Press Auditorium, a member of the audience asked me which was the most accurate and proven divination system that I had found among those I knew. My reply was that not being a practitioner I had never tested any method at all, and I followed this with an apology to my audience for not being able to provide an answer. My lectures in East Asia resulted in a series of publications in Taiwan, Singapore and Xi'an, Shaanxi province. After my experience with mixed audiences in East Asia I had several opportunities to talk about the three cosmic boards in small groups at the Chinese text-reading sessions in Cambridge, both at the Needham Research Institute and at the Faculty of Oriental Studies. My lectures and text-readings form the groundwork of this book.

Sir Geoffrey Lloyd FBA, Professor David McMullen FBA and Professor Francesca Bray have kindly read the draft of this book and made valuable suggestions, and so have Mr Kenneth Robinson and Dr Christopher Cullen. Mr John Moffett has been always ready to draw my attention to new acquisitions of *shushu* publications. Dr Sally Church helped me with editing, while Ms Sue Bennett and Yan Xuefeng 閻學鋒 assisted with the illustrations. Professor Tim Barrett and Professor Marc Kalinowski have read over the manuscript with great care and offered valuable suggestions. To all of them, and to the two institutions in Taiwan mentioned above, I wish to record my heartfelt thanks. Last but not least, it ought to go on record that this work would not have materialized so smoothly without the understanding and assistance of members of my family in Brisbane. Not only has my health been in good hands, state-of-the-art word processing equipment with a low radiating and non-flickering screen was spontaneously made available to me. I count myself a very fortunate writer on this particular score.

'While drinking water one (should) think about its source' (*yin shui si yuan* 飲水思源) – as a Chinese saying goes. I am remembering two friends who were at least one generation my senior but without whom I would not have turned out to be what I am today and without whom perhaps there might not even be a Needham Research Institute in Cambridge. In 1940 I first met the famous plague fighter Dr Wu Lien-teh 伍連德 (1879–1960) (Gnoh Lean Tuck – Emmanuel 1896–1905) in Ipoh when I was only a young lad of fourteen.[4] He gave me much encouragement to go to college, and after my graduation he encouraged me to write. He was interested to

hear about my collaboration with Needham in the *Science and Civilisation in China* project. He and Needham were both students of Sir Frederick Gowland Hopkins albeit some 21 years apart. To encourage Needham, he approached two Singapore tycoons for financial grants. The first person he went to see was the Tiger Balm King, Mr Aw Boon Haw 胡文虎, in the early 1950s.[5] A few years later he spoke to his friend Dato Dr Lee Kong Chian 李光前. To oblige the plague fighter, Dr Lee Kong Chian quietly sent Needham 'a splendid contribution towards the expenses of research' in the late 1950s.[6] This munificent gift must have been the inspiration for Needham as he soon formed the Friends of the Project committee, which included Dr Victor Purcell, to raise funds for the *Science and Civilisation in China* project.

In 1962 Dr Lee Kong Chian (1894–1967) became the first Chancellor of the University of Singapore. I was then Reader in History of Science at the same university. He was extremely friendly and kind to me, and I am sure he must have heard about me from Dr Wu. He showed personal interest in my research on the history of Chinese science in particular and my work in the university in general. I was then responsible for organizing public lectures for the Faculty of Science and on one occasion I invited Sir Harrie Massey of University College London to give a talk. At the luncheon club in his bank building Dr Lee asked me to make a tape recording of the lecture, which he would be unable to attend because of another engagement. I was much touched by the personal interest of a university Chancellor in the academic activities of his university. His interest in the history of Chinese science could be seen from his visit to Gonville and Caius College to call on Dr Needham in 1962 during his world tour. He later told me that he had dinner at Caius as the guest of Dr Needham who was then President of the College. He continued to give me encouragement even after I left the service of the University of Singapore in 1964 to take up the Chair of Chinese Studies at the University of Malaya, Kuala Lumpur. Dr Lee passed away in 1967. He bequeathed half of his estate to the Lee Foundation that he founded and handed over the chairmanship of the Overseas Chinese Banking Corporation, not to one of his sons but to Tan Sri Tan Chin Tuan 陳振傅, his able deputy and friend. Tan Sri Tan Chin Tuan later led the list of benefactors contributing to the building funds for the Needham Research Institute in Cambridge.[7]

Despite Dr Wu's fame in eradicating pestilence and in building modern hospitals in China, and Dr Lee's prestige and immense wealth, which he never talked about himself, charity had always been in their hearts. Members of Dr Wu's family have distinguished themselves in education, in public service and in the legal profession, while those of Dr Lee are widely known and highly esteemed in industry, in education, in the Red Cross, and last but not least in the management of the vast charity foundation they inherited.[8] Although the Lee Foundation operates mainly in Southeast Asia and East Asia, benefaction from a member of the Lee family has even

extended to higher education in Britain and across the Atlantic, in recognition of which the rare distinction of an honorary fellowship of the British Academy was awarded to Dr Lee Seng Tee.

I cherish the thought of having two great men regard me as a friend in spite of the wide gap in age between us, as well as the pleasure of being friends with members of their families. Dr Wu and Dr Lee both took a great interest in libraries and museums and their families are still keeping this fine tradition alive. The Lee Kong Chian Museum at the National University of Singapore and the Bodleian Library in Oxford are only two examples among many. The subject dealt with in this book was often regarded as classified knowledge affecting national security in traditional China, but it has been overtaken by the passage of time and has been shunned by those under the strong influence of the May Fourth Movement. However, the role of *shushu* in shaping Chinese society in the past cannot be ignored. This book attempts to unveil some of the secret knowledge that was hidden in the traditional Chinese Astronomical Bureaux. I hope that it will find a place in many libraries, since both Dr Wu and Dr Lee had taken so much interest in these institutions during their lifetimes. I respectfully and warmly dedicate this work to my two great friends and mentors in their memory, and to their families in friendship.

REFERENCES TO HISTORICAL CHINESE GEOGRAPHICAL NAMES

(adapted mainly from Wei Songshan, ed. (1995))

Baiqing 百頃 (mountain) SW of modern Xihexian 西和縣 in Gansu province, also called Chouchi 仇池 mountain.

Bingzhou 并州 (prefecture) One of the traditional nine prefectures, applied to different locations at different periods of time, somewhere in modern Shanxi, Shaanxi and Hebei provinces.

Cai 蔡 (state) Originally NE of modern Changyuanxian 長垣縣, Henan province, but later moved to SW of modern Shangcaixian 上蔡縣; during the Spring-and-Autumn period the capital was moved to Xincai 新蔡 in modern Xincaixian, Henan province and finally to Xiacai 下蔡 in modern Fengtaixian 風台縣, Anhui province, before it was annexed by the Chu 楚 state in 447 BC.

Chouchi 仇池 (mountain) Various grades of administrative divisions, such as township, district and prefecture, were once known by this name, which originated from a pool in a mountain in Gansu province. The text in the Historiographer's 'Remarks' refers to the mountain on which the pool named Chouchi was found. See Baiqing (mountain).

Chu 楚 (state) Territory varied with different periods of history, covering various parts of modern Hubei, Henan, Anhui, Jiangsu and Zhejiang provinces at different periods. Its heyday was during the Spring-and-Autumn and the Warring States periods when its capital was at modern Ji'nancheng 紀南城 NW of modern Jianglingxian 江陵縣, Hubei province.

Han 韓 (state) First established in the eleventh century BC as a princedom by the first king of Zhou and situated to the east of modern Hejinxian 河津縣, Shanxi province. At the beginning of the Spring-and-Autumn period it was annexed by Jin 晉 state.

	However, it was reestablished during the middle of the fourth century BC, when Jin itself was subdivided into three states. Its capital was first at Pingyang 平陽 (SW of modern Linfenshi 臨汾市, Shanxi province), then at Yiyang 宜陽 (west of modern Yiyangxian, Henan province) and at Yangzhai 陽翟 (modern Yuzhoushi 禹州市, Henan province). Finally it moved to Zheng 鄭 (in modern Xinzhengxian 新鄭縣) after annexing Zheng state, but in 230 BC it was annexed in turn by Qin 秦 state.
Jin 晉 (state)	In modern Shanxi province. Once a powerful state during the Spring-and-Autumn period when its capital was at Xintian 新田, situated to the west of modern Houmashi 侯馬市, Shanxi province. During the middle of the fourth century BC, it was subdivided into the three states of Han 韓, Zhao 趙 and Wei 魏.
Jingzhou 荊州 (prefecture)	One of the traditional nine prefectures, applied to different locations at different times of history, in modern Hubei, Hunan and Guizhou provinces.
Jizhou 冀州 (prefecture)	One of the traditional nine prefectures occupying parts of modern Hebei and Shanxi provinces.
Liangzhou 梁州 (prefecture)	One of the traditional nine prefectures referring to the territory bounded by the Huashan 華山 mountain in Shaanxi province and the Heishui 黑水 river that has not yet been exactly identified. Also the name of an administrative area established at various times in various places in Shaanxi province. In the year 496 the Northern Wei kingdom was renamed Chouchi prefecture Liangzhou (SW of modern Xihexian 西和縣, Gansu province).
Lu 魯 (state)	In modern Shandong province with its capital in Qufu 曲阜, the ancient city east of modern Qufushi, Shandong province.
Qi 齊 (state)	In modern Shandong province with its capital in Linzi 臨淄 (NE of modern Bozishi 博淄市, Shandong province), annexed by Qin Shihuangdi in 221 BC.
Qin 秦 (state)	Originally somewhere in modern Gansu province, but during the Spring-and-Autumn period first moved to Pingyang 平陽 (SE of modern Baojixian 寶雞縣, Shaanxi province) and then to Yong 雍 (south of modern Fengxiangxian 鳳翔縣, Shaanxi province), and during the Warring States period its capital was moved three times until it settled down in the year 350 BC in Xianyang 咸陽 (NE of modern Xianyangshi, Shaanxi province). In 221 BC, Qin Shihuangdi unified China.

Qingzhou 青州 (prefecture) One of the traditional nine prefectures somewhere from Taishan mountain eastward towards the sea. Location of the prefecture as well as its capital changed many times during the course of history. They were at the early stage mainly within modern Shandong province, but later had moved to modern Hebei and Jiangsu provinces.

Sanhe 三河 (prefecture) Traditionally comprising the three sub-prefectures of Hedong 河東 (in Shanxi province with its capital at Yuwangcheng 禹王城 (NW of modern Xiaxian 夏縣, Shanxi province)); Henei 河內 (in Henan province with the capital moved several times in the course of history, at the Jin period in Yewang 野王 in modern Shenyangshi 沁陽市, Henan province); and Henan 河南 (in Henan province with its capital NE of modern Luoyangshi). These formed the three legs of a tripod supporting the 'centre of the heaven' believed to be over its centre (in modern Shanxi and Henan provinces).

Shu 蜀 Abbreviation for Sichuan province.

Shu 蜀 (state) An ancient state in Sichuan province of the Shang and Zhou periods with its capital in Chengdu (modern Chengdu, Sichuan province).

Shu 蜀 (kingdom) The Shu Han kingdom (221–264) with its capital in Chengdu in modern Sichuan province.

Song 宋 (state) Established in early Zhou with its capital at Shangqiu 商丘 (south of modern Shangqiuxian, Henan province). The capital moved to Pengcheng 彭城 (in modern Xuzhoushi, Jiangsu province) during the Warring States period. In the year 286 BC it was annexed by Qi state.

Wei 衛 (state) Established in early Zhou with its capital at Mo 沫 (in modern Qixian 淇縣, Henan province). During the Spring-and-Autumn period the capital moved to Cao 曹 (east of modern Huaxian 滑縣, Henan province), then to Chuqiu 楚丘 (NE of modern Huaxian, Henan province), and finally to Diqiu 帝丘 (SW of modern Puyangxian 濮陽縣, Henan province). In 254 BC it was annexed by Wei 魏 state. Later it was restored with the help of Qin state with its capital in Yewang 野王 (in modern Shenyangshi 沁陽市, Henan province), but finally it was subjugated by Qin Shihuangdi's son.

Wei 魏 (state) A state established in early Zhou north of modern Ruichengxian 芮城縣, Shanxi province. It was conquered by Jin state in 661 BC. In the middle of the fourth century BC, Jin state itself met its fate when it was subdivided into three different states, one of which was Wei. The capital of the new Wei

	state was first in Anyi 安邑 (NW of modern Xiaxian 夏縣, Shanxi province).
(kingdom)	The Wei kingdom (220–264) established by Cao Pi 曹丕 with its capital at Luoyang, Henan province.
Wu 吳 (state)	An ancient state in modern Jiangsu province that grew in strength during the later part of the Spring-and-Autumn period when its capital was in Wu 吳 (modern Suzhou, Jiangsu province), but was annexed by the Yue 越 state in 473 BC.
(kingdom)	(222–280) One of the Three Kingdoms founded by Sun Quan 孫權 in eastern China south of the Yangzi river with its capital in Jianxing 建興 (modern Nanjing, Jiangsu province).
Xuzhou 徐州 (prefecture)	One of the traditional nine prefectures occupying south Shandong province and the region east of Jiangsu province and north of the Yangzi. Its boundaries and capital city changed several times in the course of history. During the Three Kingdoms period the Wei kingdom moved its capital to Pengchengxian 彭城縣, which was subsequently renamed Xuzhou (in modern Xuzhoushi, Jiangsu province). There were many later changes.
Yan 燕 (state)	Established in early Zhou somewhere in modern Hebei province with its capital at Ji 薊 (SW of modern Beijing), and annexed by Qin state in 222 BC.
Yangzhou 揚州 (prefecture)	One of the traditional nine prefectures referring variously to regions south of the Yangzi in modern Zhejiang, Jiangsu, Jiangsi and Fujian provinces. Also the name of one of the 13 administrative regions of Eastern Han in modern Anhui province that was renamed Yuzhou 豫州 on several occasions, but subsequently had the name Yangzhou restored; in the year AD 589 there was a switching over of names – Yangzhou here became known as Shouzhou 壽州, but the name Wuzhou 吳州 (with its capital in Guanglingxian 廣陵縣, NW of modern Yangzhoushi 揚州市, Jiangsu province) was replaced by Yangzhou. Also the name of a prefecture in Jiangsu province with its capital in modern Nanjing, established by the Wu kingdom in the Three Kingdoms period, but which was renamed Jiangzhou 蔣州 in AD 589.
Yanzhou 兗州 (prefecture)	One of the traditional nine prefectures stretching from modern Henan province eastwards to modern Shandong province and part of Hebei province. The location of its capital changed with different dynasties.

Yizhou 益州 (prefecture) One of the 13 administrative regions established by Western Han in modern Sichuan province. Its capital was at first in Luoxian 雒縣 (north of modern Guanghanxian 廣漢縣, Siquan province), but was moved several times until it came to Chengduxian 成都縣 (in modern Chengdushi). Also the name of a prefecture established in AD 471 by the Northern Wei dynasty with its capital in Yandongxian 燕東縣 (modern Longhuaxian 隆化縣, Hebei province) and the name of another prefecture established by the Liao dynasty (907–1125) in Jilin province, NE China.

Yongzhou 雍州 (prefecture) One of the traditional nine prefectures in Western China in the region of the Heishui 黑水 and Xihe 西河 rivers that has been variously interpreted as modern Qinghai province, Gansu province and Shaanxi province, together with Shanxi province where the Yellow River flows. Name of several prefectures established at different times in different places. The Qin state established the Qinzhou 秦州 prefecture in 243 BC with its capital in Pubanxian 蒲坂縣 (SW of Yongjixian 永濟縣, Shanxi province), renamed Yongzhou by the Western Han in 134 BC, but later abolished then restored and finally renamed Qinzhou in AD 432 by the Northern Wei dynasty. Also a prefecture established in AD 194 with its capital in Guzangxian 姑臧縣 (modern Wuweishi 武威市, Gansu province), which later moved to Changan 長安 (NW of modern Xi'anshi 西安市, Shaanxi province).

Youzhou 幽州 (prefecture) One of the traditional nine prefectures in NE China starting from modern Hebei province. One of the 12 administrative divisions established in Western Han with its capital in Jixian 薊縣 (SW of modern Beijing), but the name was changed to Yan 燕 at the fall of the Tang dynasty in the early tenth century. During the fourth century, the Eastern Jin temporarily established a prefecture by the same name with its capital in San'acheng 三阿城 (SE of modern Jinhuxian 金湖縣, Jiangsu province), but soon abolished it.

Yue 越 (state) Existed from the Xia 夏 to the Warring States period, when its capital was at Guiji 會稽 (modern Shaoxingshi 紹興市, Zhejiang province). In 473 BC it annexed Wu state and moved its capital to Langye 琅琊 (SW of modern Jiaonanshi 膠南市, Shandong province), but was itself later annexed by the Chu 楚 state.

Yuzhou 豫州 (prefecture) One of the traditional nine prefectures comprising regions in modern Henan, Anhui and Hubei provinces. One of the 12 administrative divisions in Western Han. There were many name changes as well as change of location of the capital city subsequently. One of the better known locations for the capital was Luoyang. It had once changed name with Yangzhou (see Yangzhou prefecture above).

Zhao 趙 (state) A state instituted during the early Zhou period with its capital somewhere north of modern Hongdongxian 洪洞縣, Shanxi province. Had its capital first in Jinyang 晉陽 (SW of modern Taiyuanshi 太原市, Shanxi province) during the Warring States period and later in Handan 邯鄲 (SW of modern Handanshi, Henan province). In 222 BC it was annexed by Qin state.

Zheng 鄭 (state) A state instituted during the early Zhou period with its capital in modern Huaxian 華縣, Shaanxi province. The capital was moved to Xinzheng 新鄭 (modern Xinzhengxian, Henan province) during the eighth century BC. In 375 BC it was annexed by Han 韓 state.

A BRIEF NOTE ON CHINESE ROMANIZATION

There are several systems for the romanization of Chinese characters. The *pinyin* system, which is the official system adopted in the People's Republic of China, has now become popular among Western scholars. This official system does not apply to Chinese personal names outside the PRC that are romanized in other ways.[1] Another system which used to be adopted almost universally in the English-speaking world and is still in use is the Wade–Giles system, which originated from Cambridge, England. Joseph Needham modifies the Wade–Giles system in his *Science and Civilisation in China* and his other publications on Chinese science and China by replacing the aspirate ‘’ with the letter ‘h’ and sometimes omitting the circumflex mark over the letter ‘e’. A conversion table is given below for easy reference.

From Pinyin *to Wade–Giles*

Pinyin	*Wade–Giles*	Pinyin	*Wade–Giles*	Pinyin	*Wade–Giles*
a	a	ca	ts'a [tsha]	chuang	ch'uang [chhuang]
ai	ai	cai	ts'ai [tshai]	chui	ch'ui [chhui]
an	an	can	ts'an [tshan]	chun	ch'un [chhun]
ang	ang	cang	ts'ang [tshang]	chuo	ch'o [chho]
ao	ao	cao	ts'ao [tshao]	ci	tz'u [tzhu]
		ce	ts'ê [tshê]	cong	ts'ung [tshung]
ba	pa	cen	ts'ên [tshên]	cou	ts'ou [tshou]
bai	pai	ceng	ts'êng [tshêng]	cu	ts'u [tshu]
ban	pan	cha	ch'a [chha]	cuan	ts'uan [tshuan]
bang	pang	chai	ch'ai [chhai]	cui	ts'ui [tshui]
bao	pao	chan	ch'an [chhan]	cun	ts'un [tshun]
bei	pei	chang	ch'ang [chhang]	cuo	ts'o [tsho]
ben	pên	chao	ch'ao [chhao]		
beng	pêng	che	ch'ê [chhe]	da	ta
bi	pi	chen	ch'ên [chhên]	dai	tai
bian	pien	cheng	ch'êng [chhêng]	dan	tan
biao	piao	chi	ch'ih [chhih]	dang	tang
bie	pieh	chong	ch'ung [chhung]	dao	tao
bin	pin	chou	ch'ou [chhou]	de	tê
bing	ping	chu	ch'u [chhu]	dei	tei
bo	po	chuai	ch'uai [chhuai]	den	tên
bu	pu	chuan	ch'uan [chhuan]	deng	têng