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978-0-521-55695-8 - Adversaries and Authorities: Investigations into Ancient Greek and Chinese Science

G. E. R. Lloyd

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This is a wide-ranging exploration of the similarities and differences between ancient Greek and ancient Chinese science and philosophy, concentrating on the period down to AD 300. Professor Lloyd studies such questions as the attitudes towards authority, the practice of confrontational debate, the role of methodological inquiries, the development of techniques of persuasion, the assumptions made about causal explanation, and the focus of interest in the study of the heavens and in that of the human body. In each case the Greek and Chinese ways of posing the problems are carefully distinguished, to avoid applying either Greek categories to Chinese thought or vice versa. Throughout, the characteristics of the science produced are related to the values of the societies concerned and to the institutional framework within which the scientists worked. Professor Lloyd shows that the science produced in each ancient civilisation differs in important respects, and relates those differences to the values and social institutions in question.

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IDEAS IN CONTEXT

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# ADVERSARIES AND AUTHORITIES

*Investigations into ancient Greek and Chinese science*

G. E. R. LLOYD

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Master of Darwin College*



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*For Nathan Sivin*

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## *Preface*

The year 1987 marked a turning point in my studies in ancient science. I owe it to my seminar audiences in Beijing in that year that they brought home to me the desirability, or rather I should now say the necessity, of studying neither ancient Greek science nor its Chinese counterpart in isolation. This is not with the object of assessing the strengths and weaknesses, the superiority or inferiority, of either tradition, let alone in order to engage in the pointless exercise of establishing chronological priorities. Rather, the features of either tradition that scholars working in just one of them tend to take for granted turn out to be anything but unproblematic: in many cases they relate to key issues for our understanding of what 'science' itself meant for the society concerned.

There is nothing automatic about the ways in which different inquiries – say what we call medicine, or astronomy, or mathematics – were developed and practised in the ancient world. On the contrary, the particular ways in which they were raise deep and difficult questions, to answer which we have to engage in a sustained analysis of the conditions under which the inquirers worked and of the societies in which they operated. Why were the problems defined in the ways they were? What expectations were entertained for adequate solutions? Whom were the investigators trying to convince and how did they hope to do so? What was the institutional framework within which they worked? How were they recruited and organised (if they were organised)? What were their motivations and aspirations, what, indeed, their sources of livelihood?

Since 1989 I have been engaged in a wide-ranging study of these questions in collaboration with Nathan Sivin, where we have been exploring anew the whole field of Chinese and Greek



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science from circa –300 to circa +200, that is, roughly, down to the time when Buddhist and Christian influences came to be major factors in China and in Greece respectively. Our aim in this project is, precisely, first to relate Chinese and Greek science far more closely than is ordinarily done to their respective social, cultural, political and institutional backgrounds; and secondly to examine *both* those backgrounds *and* the intellectual products – the science done – in each case in the light of the other, that is, keeping the *comparison* between China and Greece constantly in mind.

The present collection of essays is not the envisaged prime outcome of that collaboration, although it is undertaken very much in the spirit that animates it and what I owe to Professor Sivin will be evident throughout. Rather, what is presented here is in the nature of a set of sighting shots, the record of some preliminary forays that I have made in the past five years, in lectures, seminars or contributions to conferences or workshops, in Europe, North America and the Far East. If I write, obviously, as primarily a Hellenist, it will also be evident that I do so as one who is far from content with remaining within the conventional boundaries of a Hellenist's agenda.

Most of these papers have appeared in earlier versions in journals or in conference proceedings, but all have been revised and in some cases substantially modified in response to criticism and in the light of further reflection. The tentativeness of many of the arguments advanced will be apparent, as also will their speculative nature. But they are designed to suggest new lines of inquiry and are offered in the hope of stimulating further discussion.<sup>1</sup>

The major methodological difficulties stemming from the lacunae and bias of our sources will be aired in Chapter 1. Brief observations on the structure and authenticity of the chief Chinese texts used will be made, as necessary, when they are first introduced,<sup>2</sup> and so also similarly, though more rarely, with the

1. Readers may be referred to Sivin's two volumes of selected essays 1995d, 1995e for a number of detailed new analyses of aspects of the materials to be discussed in our joint book.
2. The volume edited by Loewe (1993) now makes easily accessible authoritative and up-to-date views on the provenance and dating of all the major Chinese texts of the period with which I am concerned.

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primary Greek texts. While the chief periods under investigation are, as noted, the Greek world before Christianity became a dominant influence, and the Chinese world before Buddhism did there, I have not here stuck rigidly to authors writing before the end of the +2nd century, but have allowed myself the occasional reference to later texts, especially on the Greek side when these appear to work, in the main, within pagan traditions.

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## *Acknowledgements*

My foremost debt has already been mentioned. This is to Nathan Sivin, who has guided and inspired all my work on topics related to Chinese science – and not just on the questions investigated here – and who has also given me the benefit of constant critical advice on issues both specific and strategic. This has saved me from many inaccuracies and errors, while those that remain are, of course, entirely my own responsibility.

I have learnt much on questions to do with Chinese mathematics from Karine Chemla, Catherine Jami and Donald Wagner, with the last of whom I have engaged in extensive correspondence relating to the interpretation of particularly problematic texts in Liu Hui, and with the first of whom I have exchanged views on many other topics as well, not least in connection with the issues raised in recent numbers of *Extrême-Orient Extrême-Occident*. Karine Chemla has also been kind enough to give me detailed comments on many aspects of the arguments in this book.

I have benefited from detailed discussions of the similarities and differences between Chinese and Greek medical case-histories with Elisabeth Hsü, who has been engaged in a detailed study of the *Canggongzhuan* and related texts.

Then more generally I owe much to all those who have allowed me to consult them on a wide variety of problems related to the subject-matter of these essays and their background, to Myles Burnyeat, Christopher Cullen, Mark Lewis, Michael Loewe, David McMullen, David Sedley, Robert Wardy.

Not least I wish to record my thanks to Bridie Andrews, who was – with Professor Zhen Li – the first to encourage me to read classical Chinese texts in the original, and to all those who have participated in the groups undertaking such readings in Cambridge over the past five years.

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As noted in the Preface, these studies stem from talks given on various occasions in different places across the world in recent years, and my thanks go both to my hosts, for their hospitality, and to my audiences, for their constructive comments. Thus an earlier version of Chapter 1 was presented to the Greek-China workshop in Cambridge in 1991, at Tohoku University, Sendai, later that year (the volume entitled *Is it Possible to Compare East and West?*, edited by H. Numata and S. Kawada, Tokyo 1994, contains the papers given to the Sendai conference), at the Taiwan National University, Taibei, in 1992, and at the Scuola Normale at Pisa in 1993.

Chapter 2 derives from a presentation to the Cambridge Philological Society in 1993, the original version of which was published in the *Proceedings* XL, 27–48.

Chapter 3 amalgamates the arguments of a submission to a McGill conference on medical traditions and their epistemologies in 1992 (which I was, however, unable to attend in person: the proceedings, edited by Don Bates, have been published by Cambridge University Press, 1995, under the title *Knowledge and the Scholarly Medical Traditions*), and those of a paper given to a conference on method organised by Jyl Gentzler at Amherst in 1993 (the proceedings of which are forthcoming from Oxford University Press).

Chapter 4 is a much expanded version of a contribution to the number of *Extrême-Orient Extrême-Occident* devoted to 'Regards obliques sur l'argumentation en Chine', published as volume 14, 1992.

Chapter 5 stems from a contribution to a conference on causation, held at Saint-Germain-en-Laye, under the auspices of the Fyssen foundation, in 1993, the proceedings of which have been published under the title *Causal Cognition*, edited by D. Sperber, D. Premack and A. J. Premack, Oxford 1995.

Chapter 6 develops themes from an article I published in *Dialogos* 2, 4–23, in 1995.

Chapter 7 stems from a contribution to the numbers of *Chinese Science* devoted to a Festschrift for Nathan Sivin, and earlier versions were given as lectures at Pittsburgh in 1992 and at Yale in 1993.

The original ideas developed in Chapter 8 stem from a further contribution to an *Extrême-Orient Extrême-Occident* set of papers on

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number (16, 1994) and from seminar papers presented in Cambridge in 1993–4.

An earlier version of Chapter 9 was given as a University lecture at Cornell in 1992. Finally material in Chapter 10 was presented at Toronto (as a Stubbs lecture) in 1993, at Seoul National University later that year, at Zurich in 1994, and at McGill and Harvard in 1995. The Stubbs lecture will be included in a volume entitled *Modes of Thought*, edited by David Olson and Nancy Torrance, to be published in 1996 by Cambridge University Press.

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Ancient Chinese texts are cited as follows:

春秋繁露 (*Chunqiu fanlu*), of 董仲舒, Dong Zhongshu, in the edition of

賴炎元 (Lai Yanyuan), Taipei, 1984, cited by *juan* and page number.

韓非子 (*Hanfeizi*) in the edition of 陳奇猷 (Chen Qiyou), Shanghai, 1958, cited by *pian* and page number.

漢書 (*Hanshu*) in the edition with commentary by 顏師古 (Yan Shigu), Zhonghua shuju, Beijing, 1962, cited by *juan* and page number.

淮南子 (*Huainanzi*) in the edition of 劉文典 (Liu Wendian), Shanghai, 1923, cited by *juan* and page number.

黃帝內經 (*Huangdi neijing*: 'Inner Canon of the Yellow Emperor'). The 靈樞 (*lingshu*: 'Divine pivot') and 素問 (*suwen*: 'Basic questions') recensions are cited according to the edition of 任應秋 (Ren Yingqiu), Beijing, 1986, cited by *pian*, *zhang* and where necessary page number. The 太素 (*taisv*: 'Grand basis') recension is cited according to the edition of Kosoto Biroshi, Osaka, 1981.

晉書 (*Jinshu*) in the Zhonghua shuju edition, Beijing, 1974, cited by *juan* and page number.

九章算術 (*Jiuzhang suanshu*: 'Nine Chapters of the Mathematical Art') in the edition of 錢寶琮 (Qian Baocong), *Suanjing shishu*, Beijing, 1963, cited by page number.

呂氏春秋 (*Lüshi Chunqiu*) in the edition of 陳奇猷 (Chen Qiyou), Shanghai, 1984, cited by *juan* and *pian* number.

論衡 (*Lunheng*) of 王充 (Wang Chong) in the edition of 劉盼遂 (Liu Pansui), Beijing, 1957, cited by *pian* and page number.

馬王堆 (*Mawangdui*) medical texts, according to Vol IV of *Mawangdui Hanmu boshu*, Beijing, 1985, and the 五星占 (*wuxingzhan*) from *Zhongguo tianwenxue shi wenji*, Beijing, 1978.

孟子 (*Mengzi*: 'Mencius') in the Harvard-Yenching Institute Sinological Index Series, Supplement 17, Beijing, 1941, cited by the sections of that edition.

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- 墨子 (*Mozi*), in general, in the edition of 張純一 (Zhang Chunyi), but for chapters 40–45 I rely on the edition of A. C. Graham, London and Hong Kong, 1978, cited by the sections and pages of that work.
- 史記 (*Shiji*) of 司馬遷 (Sima Qian) in the Zhonghua shuju edition, Beijing, 1959, cited by *juan* ('chapter'), page and where necessary column number.
- 太平御覽 (*Taiping yulan*) in the facsimile of the Sung edition produced by Shangwu yinshu guan, Shanghai, 1960, cited by *juan* and the original page number.
- 荀子 (*Xunzi*) in the Harvard-Yenching Institute Sinological Index Series, Supplement 22, Beijing, 1950, cited by *pian* and line number.
- 戰國策 (*Zhanguo ce*) in *A Concordance to the Zhanguo ce*, Institute of Chinese Studies, Ancient Chinese Text Concordance Series, Hong Kong, 1992, according to the State and chapter number, page and line of that edition.
- 周髀算經 (*Zhoubi suanjing*: 'Arithmetic Classic of the Zhou Gnomon') in the edition of 錢寶琮 (Qian Baocong), *Suanjing shishu*, Beijing, 1963, cited by page number.
- 莊子 (*Zhuangzi*) in the Harvard-Yenching Institute Sinological Index Series, Supplement 20, Beijing, 1947, cited by *pian* and line number.

*Greek and Latin*

I cite the major Greek and Latin authors by standard editions, for example the fragments of the Presocratic philosophers according to the edition of H. Diels, revised by W. Kranz, *Die Fragmente der Vorsokratiker*, 6th ed. (Berlin, 1952) (referred to as DK), the works of Plato according to Burnet's Oxford text, the treatises of Aristotle according to Bekker's Berlin edition. The works of Euclid are cited by the edition of J. L. Heiberg *et al.*, revised by E. S. Stamatis, those of Archimedes by Heiberg's edition, revised by Stamatis (referred to as HS with the volume number), Ptolemy's *Syntaxis* by the edition of J. L. Heiberg (volumes 1 and 2 being referred to as H I and H II respectively), his *Tetrabiblos* by the edition of F. Boll and E. Boer (Leipzig, 1940) and his *Harmonics* by the edition of I. Düring (Göteborg, 1930).

Greek and Latin medical texts are cited, for preference, according to the *Corpus Medicorum Graecorum* and *Corpus Medicorum Latinorum* editions (referred to as CMG and CML respectively), together with the *Corpus Medicorum Graecorum Supplementum Orientale*. Thus for the Hippocratic treatise *On Ancient Medicine*, I use CMG I 1, for *On the Nature of Man* CMG I 1, 3, for *On Regimen* CMG I 2, 4, while for Galen's

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*On Sustaining Causes (De Causis Contentivis)* I use *CMG Suppl. Or.* II, and so on. But for Hippocratic treatises not included in *CMG*, I use E. Littré, *Oeuvres complètes d'Hippocrate*, 10 vols, Paris, 1839–61, cited as L followed by the volume number and page. For Galen's works not included in *CMG*, I use the edition of C. G. Kühn, Leipzig, 1821–33, cited as K followed by the volume number and page.

Abbreviations for Greek works are those used in the *Greek-English Lexicon* of H. G. Liddell and R. Scott, revised by H. S. Jones, with Supplement (1968). Thus Simplicius, *In Ph.*, refers to Simplicius' work *In Aristotelis Physica Commentaria*, ed. H. Diels (*Commentaria in Aristotelem Graeca*, Vols IX and X), Berlin, 1882–95.

*Modern*

All modern works are cited by author's name and year of publication. Full details are to be found in the bibliography on pp. 232ff.

Throughout this book the practice of writing dates as BC and AD is avoided by the use of – and + respectively.

With the exception of 'Confucius' and 'Mencius', all Chinese names and words are transliterated according to the Pinyin, not the Wade-Giles or other, convention. This is done throughout including in the quotations from authors who use other systems.