



A Review of Michael Matthews' Feng Shui Teaching About Science and Pseudoscience

Michael John Paton¹

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I said at the outset that I did not want to examine to what extent the manner of worship of the Chinese could be condemned or justified, and that I only wanted to investigate their doctrines. Gottfried Leibniz

I first heard of fengshui at the Fourth International Conference on the History of Science in China at the University of Sydney in 1986. Angus Graham had just presented an insightful plenary on correlative thinking, and a Malaysian academic suggested that I, a geologist pondering possible topics for my honour's thesis in Chinese studies, should look into fengshui as an early science on the energy of the land. This resulted in my translations of two of the first existing texts, Guo Pu's *Book of Burial Rooted in Antiquity* (*Book of Burial*) circa 300 CE and Wang Wei's *Yellow Emperor's Classic of House Siting* (*Classic of Siting*) circa 430 CE, which are respectively the forerunners of the two major schools of fengshui, the Form and the Compass Schools. My interest from a science perspective was particularly piqued by the theoretical framework of the *Book of Burial*, which though framed around the decidedly unscientific nourishment of the spirits of the dead showed an early seemingly empirically based insight into the relationship between mountains, water, and fertility. This interest led me to translate three later fengshui texts for my doctoral thesis to gain an insight into the development of fengshui theory and to attempt to answer the conundrum posited by Joseph Needham that although it was a "grossly superstitious system", it "embodied a markedly aesthetic component, which accounts for the great beauty of the siting of so many of the forms, houses and villages throughout China" and that research into fengshui was "still nothing like as much as it deserves". I undertook full translations of these texts in light of Sal Restivo's criticism of the disembodied quotes used in Needham's *Science and Civilisation in China* project. My thesis was entitled *Towards a Scientific Understanding of Fengshui*.

Thus, I welcome the publication of Michael Matthews' *Feng Shui: Teaching About Science and Pseudoscience*. After all, my geology degree was in science education with minors in education, history and philosophy of science (HPS), and mathematics. I, like Matthews, have

✉ Michael John Paton
michael.paton@sydney.edu.au

¹ China Studies Centre, University of Sydney, Jane Foss Russell Building (G02), 156 City Road NSW 2006 Darlingtown, Australia

been a high school science teacher and concur completely with Matthews' argument that "(s)cience needs to be taught in conjunction with the history and philosophy of science (HPS) as it is only in this way that proper student understanding and appreciation of science—its methodology, ontology, epistemology and interrelations with culture—can be acquired" (p. x). Matthews is also from Australia and so understands the necessity of scientific realism to enable humanity to flourish in a desert that does not look like a desert.

The book is a very detailed discussion of the historical, philosophical, cultural, and practical aspects of all qi-based knowledge systems but with a focus on fengshui. Matthews' basic thesis is that such knowledge systems should be explicitly shown to be pseudoscience in science teaching programs to enhance student appreciation of reality. His analysis involves the relationship of culture to science education, the theory and practice of fengshui, the history and philosophy of fengshui, and fengshui from the perspective of HPS. The debunking of qi as a scientific concept is the major thread throughout.

Chapter headings show the thrust of the work: The Cultural Contribution of Science Education; Fengshui and Chi (Qi); Fengshui Practice; Fengshui and Traditional Chinese Medicine; Matteo Ricci: A Sixteenth-Century Appraisal of Fengshui; Ernst Johann Eitel: A Nineteenth-Century Appraisal of Fengshui; Science, Westernization, and Fengshui in Early Twentieth-Century China; Fengshui, Science, and Politics in Contemporary China; Joseph Needham on Fengshui and Traditional Chinese Science; The Science and Teaching of Energy; Scientific Testing of Chi (Qi) Claims; and Fengshui as Pseudoscience.

In his discussion of culture and science education, Matthews outlines his *raison d'être* for the inclusion of fengshui in a science curriculum. He argues that science enables students to see through world views such as racist attitudes and anti-vaccination campaigns that are detrimental to the flourishing of society with its insights into the processes of the natural world and the development of critical thinking fostered by an understanding of the scientific method. By consideration of worldviews that have attempted to skew science towards their metaphysics such as Catholicism, Islam, and Marxism, Matthews shows that although science and metaphysics may not be able to be disentangled, a scientific "habit of mind" gives students a process for evaluation of knowledge claims. Explicit classroom discussion of HPS would engender such a scientific attitude. The necessity for such an attitude is exemplified by the extent of scientific Denialism, prevalent in even Enlightenment founded countries such as the USA, where studies indicate that around a third of the citizenry believe in ghosts, see astrology as being scientific, and negate evolution as valid theory. This has led to a populace that is willing to accept the "outrageous claims" (p. 25) of Donald Trump without critical reflection. Such a major societal effect indicates that school science programs have a cultural responsibility to delineate real science from pseudoscience and from superstition and religion. This is particularly necessary with a pseudoscientific belief that has the cultural impact of fengshui.

Matthews targets not only the present-day practitioners of fengshui but all knowledge systems based on qi through a discussion of the development of qi theory. He traces qi theory through its origins in Daoist thought from Laozi's fourth century BCE *Dao De Jing*, to the first mention of *dimai* (land veins) in the *Meng Tian* section of the *Shi Ji* (Record of History, circa 94 BCE) and Guo Pu's (circa 300 CE) first extant definition of fengshui as obtaining water and storing the wind. There is then an extended discussion on the "outstanding" (p. 49) Song dynasty (960–1269 CE) neo-Confucian scholar, Zhang Zai, who developed a materialist and naturalist ontology/cosmology based on qi, fusing Daoist and Confucian thought, and the reinforcement of this worldview by Ming dynasty (1368–1644 CE) philosophers, Luo Qinchun and Wang Fuzhi. These ideas are then compared with those of contemporaneous

Enlightenment philosophers to show the lack of quantification, precision, and testability inherent in qi theory. This careful examination is then used to dismantle any claim to science for qi-based theory including those of philosophers of physics such as He Zouxu and Yi Desheng as well as the myriad contemporary practitioners of fengshui.

However, the fact that Matthews is not a scholar of classical Chinese language is sometimes apparent. For instance, the translation after Dubs (1926) of Xunzi's *li* as custom rather than the more usual "ritual" creates a minor flaw in his conception of Confucian thought and natural law. Moreover, the focus on qi does not allow any discussion of *xing* and *shi*, the basic physical concepts of original fengshui theory. *Xing* is the local landform, and *shi* is the configurational force or power of the surrounding countryside. *Shi* is another pervasive concept in traditional Chinese thought. It was the political power of the Legalist philosophy behind the formation of the first integrated Chinese (Qin) dynasty (221–206 BCE), the power of the brush stroke in calligraphy, and strategic advantage in Sunzi's *Art of War*. Some discussion of this concept in particular would have enhanced Matthews' argument. What's more, his argument for the "changelessness" (p. 59) of fengshui belies the shift of Guo Pu's ideas from the local to the sub-continental level by the late Tang dynasty scholar, Yang Yunsong (834–904 CE), and the later split into the Compass and Form schools, which he himself documents.

Matthews goes on to detail the domain of fengshui. He shows the prevalence of its use in the siting and construction of buildings and propitious dates for business decisions in Hong Kong and Taiwan as well as its use in Western architecture and construction. The strong relationship between present day fengshui practice and business worldwide is highlighted by Matthews' consideration of the plethora of fengshui sites on the Web offering their services. His list of quotes from a 15-min English language search is enough to convince one that for science teachers the "educational and cultural challenge is how to prepare students to deal with such arrant and fraudulent nonsense if they, friends or family, happen to enter its orbit" (p. 80). Divination generally and the *Yi Jing* in particular are criticised as part of the fengshui domain with Matthews concurring with Joseph Needham's assessment that unlike Five Phase and yin-yang theories, the *Yi Jing* had a very deleterious effect on the development of science in China. Leibnitz's study of the *Yi Jing* is mentioned but the extent of its effect on the development of his binomial theory is not considered.

Traditional Chinese medicine (TCM) is the next target of Matthews' argument. The thrust is that because TCM and all its offshoots, including acupuncture, moxibustion, reiki, and qigong, are based on correlation and a non-existent qi, they cannot have scientific value beyond that of a placebo. Two meta-analyses of the efficacy of acupuncture are used as the main evidence for this mere placebo effect. Scientists who have embraced qi-based medical systems such as Fritjof Capra and the renowned science educator "constructivist", Ken Tobin, get short shrift. The concern is that what Xi Jinping regards as a "gem of the country's scientific heritage", has now become a state-sponsored all pervasive international mega-business. There is concern especially over the "nationalism and triumphalism" (p. 107) of the Chinese State Council Information Office 2016 report into TCM.

I very much appreciate this concern over the relationship between politics and science. Sociologists of science have long pointed to the issues around power and knowledge production. However, the words of Nathan Sivin in a plenary at the 2002 International Society for Intellectual History conference with the theme of early modernity come to mind. To paraphrase: if you were sick at the time of Isaac Newton, you would want to be in China. Moreover, the inoculation in China of armies against smallpox by means of variolation some 500 years before the "beginnings" of immunology with Edward Jenner somewhat belies

complete negation of TCM from the history of science and from possible continued efficacy. In this context, it is a pity that Matthews did not address the writings on qi of his fellow-Australian philosopher of science, Rey Tiquia of the University of Melbourne, who considers the effect of a southern hemisphere perspective on TCM theories.

After debunking TCM, Matthews takes us on a historical and philosophical journey through the scientific relationship between Europe and China. The initial focus is on Matteo Ricci and Ernst Eitel and their encounters with fengshui as a basis for excursions through protoscience and experiment, science and metaphysics, science and romanticism, and the problems with Chinese Five Phase theory and astrology as well as the astronomy on which it was based. There is then a discussion of the westernization of Chinese intellectual thought and the advocacy of science in late nineteenth and early twentieth century China, starting ironically with the naturalist tradition of Xunzi (circa 310–235 BCE) and the Han dynasty's Wang Chong (27–100 CE), through a short history of China's fall from grace due to the modern science-based powers of Europe and Japan. Matthews casts the political and philosophical reactions to this, such as the "hundred-day reforms", New Thought and May Fourth movements, and the Philosophy of Life debate, as a debate about worldviews. He argues that in this debate a world view that includes fengshui is a hindrance "to the development of an intellectually healthy culture" (p. 176).

From a history of science perspective, however, the argument might have been enhanced by some mention in this context of the geologist Weng Wenhao, a member of the Chinese Geological Survey, who introduced the concept of space and time ore formation to Chinese geology, emphasising the magmatic source of ore deposits and regional zoning. Geology was one of the first natural sciences in China to become institutionally and scientifically sound because, as Ding Wenjiang argued at the time, historical sciences like geology have many parallels with the concerns and methods of traditional Chinese scholarship.

A 1925 scientific paper by Weng traced the history of the development of the Chinese conception of mountain ranges, literally "mountain veins", a concept basic to fengshui. He quoted the afore-mentioned Tang dynasty fengshui scholar, Yang Yunsong, noting that the "dragon" veins of fengshui came from perceptive observation of nature. However, these "dragon veins" were not based on geology but on the line that was taken by the watercourses, thus creating an unavoidable false analogy. Nevertheless, Weng did consider them a valid addition to the development of what he dubbed "orography". He argued in his conclusion that the theories of European geologists came merely from their own experience and thus queried why Chinese geology should "cut its feet to make the shoes fit".

Matthews could have reflected on this in his discussion of fengshui, science, and politics in contemporary China. Matthews argues that the Enlightenment and the continuous criticism it engendered, i.e. open inquiry in all areas, enabled the development of both liberal democracy and modern science as necessarily entwined entities, but this is a complex issue with no simple answer. He contrasts this with Marxist dialectic conceptions of knowledge and reality and documents the sad vicissitudes of Chinese philosophers and scientists such as Tang Yijie, Wei Jingsheng, Liu Xiaobo, and Fang Lizhi, who have advocated a more liberal political system to enable science to flourish in China. The argument is that the forced marriage of science and Marxism produces a "stunted" science much as Islam and Christianity, exemplified by Thomism, do. Though with my engrained Australian democratic egalitarianism, I can only concur that "(t)here is a historical and philosophical concordance between science and liberalism" (p. xi), an issue not addressed within Matthews' argument is that Marxism itself is a product of the Enlightenment. Moreover, as Matthews himself shows, in 2018 Tsinghua

University had the most cited academic papers in mathematics and computing science, and a year later Chinese scientists and engineers were able to land a spacecraft on the dark side of the moon.

A history of the Chinese Marxist government's attitude to fengshui is discussed in this context. Its practice was banned completely when the Communist Party came to power in 1949 and this ban was upheld through the upheavals of the Great Leap Forward and Cultural Revolution. However, the practice has undergone somewhat of a revival since Mao's time perhaps because of the shallow materialism of Mao-inspired science. Matthews ties this revival to the state's acceptance of qigong as a health enhancing activity because both practices are qi-based. He questions why qigong should be accepted whereas the Falun Gong movement has been so repressed. To me, this is merely understandable wariness due to historical precedence. Two of the greatest upheavals in China in the last 200 years have been based on such sects, the Boxer uprising and the Taiping rebellion, one of the bloodiest conflicts in history.

Moreover, there are minor flaws in Matthews' description of the rehabilitation of fengshui in present day China, particularly regarding its acceptance by the Chinese academic community. He disparages, for instance, a course teaching fengshui at Nanjing University but does not mention that it was in a philosophy program, where fengshui was critically analysed in much the same way that Matthews advocates. Moreover, this course, rather than being readily accepted, was shut down after only two semesters due to governmental pressure. Furthermore, in a conversation last year, Wu Tinghai, professor of town planning at the Tsinghua University, who studies the fengshui planning principles in ancient Chinese cities, stressed the need to research fengshui through a critical scientific lens.

The last section of Matthews' argument entails a discussion of fengshui from the perspective of the philosophy of science. This begins with a description of the development of science in China through an appraisal of Joseph Needham's project, which leads to a comparison of qi with the modern scientific and metaphysical concept of energy with a detailed history of its conceptual refinement. In this history, possible Western equivalents of qi such as found in the theories of animal magnetism, mesmerism, the imponderable fluids of the ether, and spiritualist science are discussed, the difference from the theories of qi being that each was subject to rigorous experimentation that led to their rejection or at least abeyance over time.

Matthews argues that that the science teaching curriculum should include the historical development of concepts such as of energy, force, and photosynthesis in juxtaposition to fengshui to delineate the demarcation between science and non-science. He dismisses the "all cultural truth claims are equal" arguments of the adherents of multicultural science education via a critical examination of the experimental evidence for the existence of qi that enables the "fanciful claims" of qigong researchers such as the scientists Yan Xin, Zhang Xiangyu, and Lu Zuyin. He bemoans the fact that Qian Xuesen, when chairman of the Chinese Association of Science and Technology, declared Yan Xin's research to be scientific. Matthews also rightly bemoans Ken Tobin's "multilogical methodology" that sees science as merely enabling a Western "power discourse" of "(s)cientism, crypto-positivism, neoliberalism, and meritocracy". After all, Friedrich Hayek on whose theories much of this power discourse is based turned his back on critical rationalism. Knowledge is power, but power does not necessarily equate to knowledge, as Mencius mused in his discussion of shi over two millennia ago. All societies survive through science, that is, processes that seek truth in the natural and social worlds. It is "nonsense" (p. 260) to see this process as merely Western.

Nevertheless, science may strive towards geographic neutrality or spatial monism, but geography has affected the development of science. Britain, for instance, was in the right

place, a large island-arc at the extremity of the Eurasian continental knowledge exchange with a maritime economy that necessitated exact empirical knowledge, at the right time, the beginning of globalisation, to enable its peoples to be at the forefront of scientific development.

A discussion of methodological and ontological naturalism as compared to methodological and ontological materialism is then used by Matthews to negate arguments for Liu JeeLoo's qi naturalism as a "rational, coherent and respectable view of nature" (p. 262). The possibilities of seeing qi as a metaphor or an intervening variable, where "qi occupies conceptual space but pays no rent" (p. 264), are also noted. However, a discussion of the tension between field and laboratory science would have been useful in this context. For example, Erwin Schrödinger posited that historical sciences such as geology correlate the past with the present, and thus are not completely based on causation. Matthews' argument here might also have been improved through some mention of imaginary numbers and engineering science. The square root of -1 may not exist but is a useful theoretical tool much like qi.

The demarcation between science and non-science provides the final element to Matthews' thesis. Its history is traced from David Hume's "sensible" ideas through Ernst Mach's phenomenalism to Karl Popper's falsifiability and Imre Lakatos' methodology. The social constructivist arguments against such a demarcation between science and pseudoscience such as those of Larry Laudan and Roger Cooter are rejected through reference to their subsumption by Mario Bunge's account of the scientific cognitive field. Bunge's ten features of a mature science are juxtaposed with Sven Hanson's list of factors enabling judgement of the pseudoscientific to identify fengshui in the latter category. These are used to establish a diagrammatic pentagonal conceptual ecology of science and pseudoscience pitting humanism against commercialism, systemism against compartmentalism, materialism against spiritualism, realism against subjectivism, and scientism against irrationalism. Matthews argues that the growth of science or the popularity of pseudoscience in a culture can be gauged by its leanings in each of these five factors.

I very much appreciate Matthews' argument for scientific realism as a prism for criticising the ancient Chinese practice of fengshui and the pseudoscience of those who purvey good luck. After all, a Ming dynasty fengshui theorist wrote of the sorrow of seeing such practitioners conduct the "art of swindlers" with their non-traditional theories centred around the all-encompassing cosmology of the fengshui compass. However, not all present day fengshui advocates see their practice as scientific. For instance, the Berlin-based Australian architect and fengshui and qigong practitioner, Howard Choy, has long argued that fengshui practice is not science per se as it is based on correlative rather than causal thinking. As he wrote in recent correspondence: "I find with working on consultations over a long period of time, correlative thinking has three major consequences, one is giving meaning to a location or direction or place and make the ordinary into something extraordinary, the second it can stimulate creative thinking and the third is that correlations allow for an expression of emotions that seem to be reasonable and logical as symbols and metaphors".

In this context of emotional response to a site, it is unfortunate that Matthews does not address Needham's question as to the beauty of siting in traditional China. His only argument is that this was mere common sense and that there were also beautifully designed gardens in Europe. He does not seem to understand that this siting was a continuum throughout traditional China, based on an empirical understanding of topographical form and force of water and land as well as the feeling this engenders. The need for a site to have feeling, qing, as well as a suitable structure goes back to the original texts. Thus, the argument would have been enhanced, for instance, by consideration of Maurizio Paolillo's research on the influence of

Chinese religious and cosmological traditions on the formation of Chinese aesthetics, with attention to theories of space representation and landscape.

Moreover, because of its focus on mountains, water, and fecundity, Weng Wenhao's fengshui orography still allows a rough approximation of fertility for human habitation. For example, the theory explains the facility of the lands of China and India to support their immense populations and why some 80% of the population of Australia lives on a thin strip between the Great Dividing Range and the east coast.

If fengshui is to be taught in a science program, its rationality as well as irrationality needs to be investigated. An understanding of the positive societal outcome of its overlap between rationality and emotion would lead to discussion of the advances in cognitive science that indicate rationality's basis in emotion. Matthews does allow emotion as an aid to the development of hypotheses, but a greater understanding of the nexus between rationality and emotion could take students in the direction of another realist philosopher of science, Nicholas Maxwell, and his argument for wisdom through science rather than mere knowledge. This might help them comprehend the reasons behind the turn to pseudoscience and its relationship to humanity's unfettered hubris engendered by the power of science, which has culminated in wicked dilemmas such as nuclear war, plastic pollution, and human-induced climate change.

Three further criticisms could be advanced. Firstly, the book is a careful denunciation of all qi-based knowledge systems not only fengshui and this should have been made explicit with some reference to qi in its title to capture its much wider relevance. Secondly, I'm unconvinced by Matthews' argument that fengshui is not an integral part of the Chinese cultural tradition, such that the latter can be affirmed without the former. Even the great upheaval of the Cultural Revolution wasn't able to achieve such an affirmation. Thirdly, though I largely agree with his criticisms of constructivism, the sociologist of science, Steve Fuller's court appearance as an expert witness for the teaching of Creationism in US science classes being its apotheosis, my experience as an undergraduate of studying both geology and Thomas Kuhn's *The Structure of Scientific Revolutions* whilst the theory of plate tectonics was taking hold does not allow me to completely disregard its insights. The enthusiasm of younger tutors and lecturers for the theory was palpable whereas the older professors tended to disapprove of its insights seemingly because of its negative effect on their stature.

These criticisms aside, this book is a tour de force. Its careful and wide-ranging scholarship makes it an essential text across the fields of history, philosophy, and sociology of science as well as science education. It should be read by all academics undertaking research on qi-based knowledge systems, especially TCM. It is also hoped that the present-day practitioners of such systems take Matthews' arguments into consideration. At a time when departments in history, philosophy, and sociology of science are rapidly disappearing because of their supposed irrelevance to the market-framed university and its logic of short-term advantage, Matthews shows the great importance of the insights of HPS and the necessity for their inclusion in any science teaching curriculum.

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