

HOLISM, CHINESE MEDICINE AND SYSTEMS IDEOLOGIES: REWRITING THE PAST TO IMAGINE THE FUTURE

Volker Scheid

Introduction

THIS CHAPTER EXPLORES the articulations that have emerged over the last half-century between various types of holism, Chinese medicine and systems biology. Given the discipline's historical attachments to a definition of 'medicine' that rather narrowly refers to biomedicine as developed in Europe and the US from the eighteenth century onwards, the medical humanities are not the most obvious starting point for such an inquiry. At the same time, they do offer one advantage over neighbouring disciplines like medical history, anthropology or science and technology studies for someone like myself, a clinician as well as a historian and anthropologist: their strong commitment to the objective of facilitating better medical practice.¹ This promise furthermore links to the wider project of critique, which, in Max Horkheimer's definition of the term, aims at change and emancipation in order 'to liberate human beings from the circumstances that enslave them'.² If we take the critical medical humanities as explicitly affirming this shared objective and responsibility, extending the discipline's traditional gaze is not a burden but becomes, in fact, an obligation.

With that in mind, this chapter seeks to accomplish three inter-related goals. It is first an inquiry into the historical processes whereby Chinese medicine, holism and systems biology have come to be entangled with each other in the present. The term holism is not originally Chinese and was only applied to Chinese medicine from the 1950s onward. Whether or not systems biology, the computational and mathematical modelling of complex biological systems, is holistic, as some of its proponents claim, also remains a contested issue. Holism clearly means different things to different people. Yet, in the early twenty-first century, those engaged in constructing an interface between Chinese medicine and systems biology widely agree that their project not only honours the holistic foundations of their respective traditions, but also is, in fact, driven by this shared commitment to holism and the development of a scientifically based personalised medicine. This raises the question of how this consensus was achieved and what it denotes.

At a second level, the unfinished nature of this emergence opens up a space precisely for the kind of critical engagement to which this volume aspires. It is an engagement that pertains not merely to the domain of the medical but also to the constitution of the medical humanities themselves. For, in its very emergence, the entanglement between systems biology and Chinese medicine, between what some see as the cutting edge of twenty-first-century science and a medical tradition that claims to date back two thousand years, questions the relevance and validity of the discipline's all too narrow focus on biomedicine in an age of criss-crossing globalisations.

Finally, I will bring the question at the heart of all critique to bear on this chapter. This is a question faced daily by Chinese medicine, systems biology, the medical humanities and, in the end, each one of us: namely, how to relate ourselves to the ongoing transformations of the world by the as yet unfinished project of modernity.

These questions rehearse, from a different perspective, issues also addressed in the chapters by Jolly and by Fitzgerald and Callard. To these ends, I will trace three different but repeatedly intersecting genealogies of the present. The first two of these genealogies explore the different trajectories along which Chinese medicine became holistic in China and the West. My third genealogy briefly charts the emergence of systems biology as a holistic science. Although the pathways along which these three genealogies progress over time are distinctly different, they share common roots and ultimately converge on the joint goal of enhancing human potential for calculating life. In practice, the personalised medicine imagined to emerge from the integration of Chinese medicine and systems biology thus ends up working towards broadly similar goals to those pursued by the reductionist medicine and science against which these practices otherwise define themselves. In the concluding section I will seek to resolve this apparent contradiction by reading them through the critique of modernity elaborated by the famous revolutionary and Chinese medicine scholar Zhang Taiyan 章太炎.

Common Roots: Holism Before and During the Interwar Years

Holism, like Chinese medicine or systems biology, is a fuzzy concept that cuts across many of the boundaries and categories that shape the institutional and intellectual landscape in which my three genealogies are situated. Holism is widely mobilised by practitioners of complementary and alternative medicines (CAM) to distinguish their own practices from biomedicine.³ Critics of CAM, on the other hand, point to the fact that biomedicine has always embraced holism as evidence for the (in their eyes) delusions of CAM practitioners.⁴ Holism is often defined in opposition to reductionism, but it can also be seen as complementary to it.⁵ It points to a specific epistemic orientation or even virtue, as developed, for instance, in Gestalt psychology, yet also designates an ontology where, to use a well-worn trope, the whole is always greater than its parts.⁶ For some, holism points to structures, for others to process.⁷

Such fuzziness does not arise from nowhere. Its roots lie in two different yet inter-related and criss-crossing conceptions of holism that developed out of Germany from

the eighteenth century onward: one cultural, structural and idealist, the other focused on science, process and material reality.⁸ Cultural holism embraces the idea, developed by Herder and Humboldt and supported by Kantian idealism, that cultures constitute integrated wholes that orient their members towards the world in unique ways. As a scalable concept, such holism can equally be applied to persons, nations or indeed any bounded system in its relations to the outside world. A historically related yet distinctly different notion of holism ties into Hegelian dialectics and its successors. This holism focuses on the search for the laws that underpin process, history and emergence. It is most clearly formulated in Friedrich Engels's critique of German idealism. Engels argued that all parts of the world are fundamentally inter-related, that these parts, even though they may be material, are always transient and thus historically constituted, and that a 'science of interconnections' is needed to understand this inter-related world.⁹ Cultural/structural holism is conservative in orientation, emphasising stability and difference from that which is not self. Epistemologically, it emphasises ground or context as the ultimate source for understanding life, leading directly to the emergence of the humanities as a group of disciplines that can probe this ground through technologies of 'Verstehen'.¹⁰ Engels's holism, on the other hand, was progressive and dynamic, aimed at the formulation of scientific laws and organising principles that revealed to humans the world as a field of emergently related things.¹¹ This concern for relationships distinguishes Engels's holistic vision of science from the more conventional reductionist approach that seeks to build up an understanding of the world from individual building blocks, even if it shares with it an ultimate interest in manipulation and control.

This chapter cannot explore in detail the complex entanglements between these different notions of holism, or how they reflect Germany's troubled path towards modernity. My starting point, instead, is the interwar years. By then, holism had become an important resource for people across Europe, the US and beyond – but once again specifically in Germany – for dealing with what Max Weber, in 1918, had famously analysed as a widely felt disenchantment with the modern world.¹²

The very word 'holism' (as opposed to ideas or practices designated as such today), as well as related words like 'emergence' or 'organicism', date from this time.¹³ It was coined in 1926 by Jan Smuts to describe a perceived tendency of evolutionary processes towards the formation of wholes, granting these wholes a special onto-epistemic significance that parts lack.¹⁴ This was cultural holism now underpinned by evolutionary science and deployed by Smuts not only as a tool for grasping the coming into being of the world but also as an ideological justification for the development of Apartheid in South Africa. In Weimar Germany and then under Nazism, holistic science became a mainstream academic endeavour, once more intermingling cultural politics and serious scientific research.¹⁵ Holistic perspectives also became popular in the interwar years among academics and the wider public throughout the UK and US. In France, it was associated with vitalist philosophies and the emergence of neo-Hippocratic thinking in medicine, manifesting the unease many people felt about the shifts that biomedicine was undergoing at the time.¹⁶ Even in China, young thinkers increasingly familiar with

the latest Western philosophies began to employ holism as a tool for understanding the world and for developing strategies of resistance against Western imperialism. It is to these troubled times that all of my three genealogies trace back, albeit along very different paths.

The First Genealogy: Entangling Chinese Medicine and Holism in China

Holism is not an ancient Chinese term. It is not, in fact, a Chinese term at all. 整體觀念 *zhengti guannian* (sometimes simplified to 整體觀 *zhengti guan*), the Chinese word we conventionally render into English as holism, is a compound term that more literally translates as ‘the conception (or idea) of wholes’. The *Comprehensive Chinese Word Dictionary* (漢語大字典 *Hanyu dazidian*) defines *zhengti* or ‘whole’ with passages from the works of Mao Zedong 毛澤東 (1893–1976) and Ai Siqu 艾思奇 (1910–66), a Marxist philosopher and populariser of dialectic materialism. *Guannian*, the second part of the compound word, is originally a Buddhist term referring to the direction of one’s attention and thinking towards a specific object. In its etymology, then, *zhengti guannian* already points to hybrid entanglements, to ways of thinking and perceiving the world imported into China from ancient India and modern Europe, assimilated into native discourse and practice, gaining and losing meanings and referents along the way.

Mao Zedong and Ai Siqu’s interest in wholes stemmed from their reading of European dialectical materialists, specifically Engels.¹⁷ At a historical juncture when Western rationality, personified as ‘Mr Science’ (賽先生 *sai xiansheng*), was replacing Confucius as a new cultural hero in the eyes of progressive Chinese, Engels’s ‘science of interconnections’ offered itself as an exciting new perspective on a familiar world constituted by dynamic relationships for over two thousand years. Yet, by reading materialist dialectics through concepts like the ‘interpenetration of opposites’ (通變 *tongbian*) that had traditionally been a key tool for grasping this relational world, Chinese thinkers fundamentally changed the emphasis of Engels’s thinking.¹⁸ Understanding change and transformation (變通 *biantong*) in order to act effectively in a complex world required that the situation be grasped in its entirety. In the hands of Mao and Ai, ‘dialectics’ (辯證 *bianzheng*) now replaced older techniques as the preferred way for doing so. Ultimately, however, the focus of their attention remained on the processes that mattered rather than on the matter of things.¹⁹ Not by accident are Mao Zedong’s two most influential works entitled ‘On Practice’ (實踐論 *Shijian lun*) and ‘On Contradiction’ (矛盾論 *Maodun lun*).

Presenting dialectics in terms that resonated with long-established modes of thought helped Chinese intellectuals to develop an enthusiasm for these new ideas and to employ them in order to modernise their worlds.²⁰ Chinese medicine is one field where these processes played themselves out in exemplary fashion. Individual physicians had begun to draw on Marxist dialectics in the 1930s in their struggle to define a space for Chinese medicine in a healthcare system increasingly modelled on Western

notions of science, professionalisation and bureaucratic governance. However, it was only after the establishment of the People's Republic in 1949 that these ideas became central to the definition of Chinese medicine itself. Through a protracted process analysed in detail by both sinophone and anglophone historians, the indigenous practice of pattern differentiation (辨證 *bianzheng*), which is a homonym of the Chinese term for dialectics (辯證 *bianzheng*), was aligned with then-current ideological trends to become the defining feature of Chinese medicine. In true (Chinese) dialectical fashion, pattern differentiation could then be opposed to the Western medical practice of 'disease differentiation' (辨病 *bianbing*) in order to emphasise Chinese medicine's uniqueness; but it could also be aligned with it in a meeting of opposites to create new forms of integrated medicine.²¹

It was in this context that holism was gradually defined as the onto-epistemological ground that allowed the effective mobilisation of pattern differentiation in clinical practice. In 1955, two papers were published in Chinese medicine journals that made references to holism as a distinguishing feature of Chinese medicine. One of these detailed the Chinese medicine treatment of nephrological disorders, which, in the absence of dialysis and kidney transplants, was an important focus of Chinese medicine at the time. The other was a more theoretical discussion of *yin/yang* thinking by Qin Bowei 秦伯未 (1900-70), one of the chief architects of modern institutionalised Chinese medicine.²² One year later, in 1956, a total of eleven papers addressing themselves to holism were published by prominent scholar physicians. These papers constituted a concerted effort to demonstrate to the country's leadership that Chinese medicine was a science grounded in a single overarching theoretical framework: namely, holism. In mid-1950s Maoist China, this was a shrewd political move. It aligned Chinese medicine with dialectical materialism and thereby transformed it from an assemblage of experience-based techniques into an ideologically exemplary (proto-) scientific practice worthy of state support. It also, however, significantly changed Chinese medicine itself.²³

Over subsequent years, publications referring to holism as a central element of Chinese medicine steadily increased. In 1959, only four years after his still somewhat defensive paper on *yin/yang* thinking, Qin Bowei wrote a textbook entitled *Introduction to Chinese Medicine* (中醫入門 *Zhongyi rumen*) that placed holism at the very core of Chinese medicine.²⁴ Qin's textbook, published with the official support of the Ministry of Health through its People's Medical Publishing House, was aimed at 'the increasing number of people who in the course of recent years have expressed their wish to study Chinese medicine'. The young Chinese students Qin was referring to needed a method whereby they could make sense of ancient knowledge from within their modern intellectual habitus. Qin's *Introduction* thus does not begin with *yin/yang* or the human body as explored in Classical texts. Instead, it opens up with a discussion of 'holism' and 'pattern differentiation' as the defining characteristics of Chinese medicine. Only after the importance of these fundamental concepts has been established is their application explained: first on the level of *yin/yang* thinking and the body's organisation, then on the level of clinical practice.

This mode of presentation has since become the blueprint for discussing the theoretical foundations of institutionalised Chinese medicine. Expunging all traces of the origins of this accommodation in the specific political context of the 1950s, Chinese medicine physicians today read European holism and dialectics back into ancient texts without experiencing any apparent sense of discontinuity. As in the political and philosophical domain, these exegetic techniques were facilitated by resonances between the concept of holism in the dialectic materialist writings from which it was borrowed and long-established modes of thinking within China. But such resonances do not establish equivalence between ‘a world of mysterious continuity that operates through change and between differences’²⁵ and one constituted by objects and their connections, even if these are perceived as emergent. Rather, such convergence tends to entangle hitherto unrelated concepts within new modes of practice that develop propensities of their own.²⁶ As Chinese thinkers developed the notion of Chinese medicine’s intrinsic holism further in the course of the 1980s and 1990s, bringing it into conjunction with cybernetics and systems theory, these initially hidden propensities became ever more clearly exposed.

The political context enabling these new transformations was Deng Xiaoping’s 鄧小平 programme of the four modernisations (of agriculture, industry, the military, and science and technology) and his policy of opening China to the West. In Deng’s view, science and technology were (ideally) universally available and intrinsically value-free productive forces that needed to be harnessed in order to catch up with the West. Beginning in the late 1970s, Chinese intellectuals thus turned to cybernetics and systems theory in order to articulate notions of science that were at once intrinsically Chinese, ultra-modern and politically correct. Drawing on Ludwig van Bertalanffy, Alvin Toffler, Illya Prigogine and a host of other newly accessible Western authors while continuing to honour Engels, Lenin and Mao Zedong, the party ideologue Wu Jie, for instance, elaborated a general ‘Systems Dialectics’ that attempted to understand the world through holistic thinking.²⁷ He detected ‘rudimentary holistic thinking’ in ancient Chinese as well as Greek philosophy, explicitly including the *Inner Canon* in this list.²⁸ The more fully worked-out systems dialectics of the present, however, was to the technological transformations of the present what Engels’s dialectical materialism was to the Industrial Revolution.²⁹ Significantly, though, the purpose of this new dialectics was no longer revolution but ‘holistic optimisation’: the benign management by the state of all aspects of society, from economics and social coherence to ideology and culture, war and peace, via a newly powerful understanding of systems.³⁰

Revealingly, it was not a Chinese medicine physician but an engineer with a background in cybernetics who first discussed Chinese medicine from a systems perspective. In 1981, Qian Xuesen 錢學森 (1911–2009), one of China’s ‘superscientists’, whose contributions to the nation’s military space and aeronautics programmes had given him direct access to Chinese Communist Party (CCP) leaders and the power to speak on any issue of his choice, asserted that Chinese medicine was akin to cybernetics and systems science in grasping the world from a holistic perspective.³¹ Chinese medicine,

in other words, did not have to ‘catch up’ with science but the natural sciences were gradually taking hold of a perspective that had been present in China all along.

Chinese medicine physicians readily took up this new opportunity to define their tradition as a systems science. As Liu Changlin 劉長林, a contributor to these debates, put it: ‘As the entire traditional Chinese culture constitutes a whole, so also Chinese medicine reflects the same systems thinking.’³² Others argued that the famous Needham question (Why had China been overtaken by the West, given its earlier technological advantages?) was no longer meaningful, for we were now witnessing the coming together on equal terms of Western science and East Asian cultural wisdom.³³ The most audacious writers even proclaimed that the twenty-first century would be the century of Chinese medicine.³⁴

Beyond the political opportunism and nationalist chauvinism that inspired such claims, some more sophisticated syntheses can also be discerned. Zhu Shina 祝世納, widely acknowledged as the first author to discuss Chinese medicine systematically with reference to systems science and cybernetics, summarised Chinese medicine with the help of two ideograms: 辯 *bian*, referring to the dialectic viewpoint Chinese medicine takes to grasp its objects and make clinical decisions; and 統 *tong*, denoting a focus on whole systems and their regulation. Read together, *bian* and *tong* allude to *biantong* 變通, a common phrase in traditional medical writings where it referred to the capacity of master physicians to act effectively by responding flexibly to the constantly changing nature of disease. This phrase, in turn, can be read back all the way to the *Book of Changes* (易經 *Yijing*), a key Classical text since the second century BCE, and its emphasis on ‘the comprehensive observation of changes’, 通變 *tongbian*. This concept constitutes a primary source of inspiration for the later development of much of Chinese philosophy, including, as we saw before, Ai Siqu’s and Mao Zedong’s reading of Engels. In the hands of a writer like Zhu Shina, holism, systems theory, cybernetics, dialectics, Chinese medicine, philosophy and culture thus merge into a single multi-faceted practice that easily criss-crosses boundaries between different historical epochs and cultural domains.³⁵ Yet, precisely because thinkers like Zhu ground contemporary systems holism in ancient models of thought and vice versa, they erase their differences. In doing so, they enable others to insert Chinese medicine into the world of twenty-first-century techno-science without needing to deal any longer with complex problems of intercultural translation.

The Second Genealogy: Entangling Chinese Medicine and Holism in the West

Knowledge about Chinese medicine had entered Europe from the seventeenth century onward, but interest waxed and waned in relation to wider evaluations of China and Chinese culture.³⁶ The most recent and prolonged period of attraction has its origin in France during the interwar years, where a widespread interest in vitalist philosophies provided a fertile seedbed into which the mysterious but therefore also attractive practice of acupuncture, suitably translated into vitalist terms, could be

transplanted.³⁷ It was from France that interest in acupuncture travelled to other European countries and then to the Americas and Australia, where it was gradually attached to holistic thinking.

The first Western discussion of Chinese medicine as explicitly holistic thus stems from Germany, where naturopathic medicine and holistic Gestalt perspectives had an established pedigree. It can be found in a 1951 essay entitled ‘*On the Holistic Perspective in the Chinese Healing Art*’ (*Über Ganzheitsbetrachtung in der Chinesischen Heilkunst*), published in a biomedical journal and dedicated to the famous nutritionist Erich Grafe, recently removed from his post at the University of Würzburg because of his Nazi allegiances.³⁸ The essay depicts medicine as a vocation that must go beyond a concern with bodies to a more comprehensive care for life, a concern that specifically includes attending to the soul.

J. Otto, the author of the essay, is not widely known in Chinese medical circles today and there is no evidence that his ideas had any direct influence on other authors in the field. They are reflective, however, of tendencies that become visible again and again in Western depictions of Chinese medicine as holistic over subsequent decades. These include an equation of Chinese medicine with Chinese culture and a reading of holism as a concern specifically for the integration of body, mind and spirit. Otto refers to the German physician Hübötter, who had published an exhaustive and well-received account of Chinese medicine in 1929, and to Richard Wilhelm’s famous translations of the *Book of Changes*, first published in 1923. Hübötter did not accord much practical value to Chinese medicine, yet he portrays it sympathetically as embodying all of the positive aspects of a great culture. Wilhelm, likewise, argued that the *Book of Changes*

affords a comprehensive view of the formations of life to place [the reader] in a position to shape his life organically and independently so that it comes into accord with the ultimate MEANING (sic), which lies at the root of all that exists.³⁹

Chinese culture is thereby brought into a direct relationship with holism, enabling a self-fashioning of existence that derives power from a mode of knowing beyond that of reductionist science. Joseph Needham, the first Western historian of science to take China seriously, used the term ‘organicism’ rather than holism to refer to ‘the great movement of our time towards a rectification of the mechanical Newtonian universe by a better understanding of the meaning of natural organisation’.⁴⁰ Like myself, he traced the roots of this movement back to Germany, but interestingly not to Germany’s engagement with modernity, but rather to the philosopher and polymath Gottfried Wilhelm Leibniz (1646–1716), who he suggests may have been influenced, via the Jesuits, by Chinese neo-Confucianism.⁴¹ Like so much else in the present story, Needham’s hypothesis is, historically, extremely problematic. It does, however, reflect a wider desire to find in China the possibility of a science untainted by reductionism – and thereby a future that would be able to cash in on modernity’s promise of progress without having to pay the price of disenchantment.

This vision was elaborated even more clearly in C. G. Jung’s foreword to the English translation of Wilhelm’s *I Ching*, which he wrote in 1949. Jung followed

Wilhelm in portraying the *Book of Changes* as expressing the essential wisdom of Chinese culture, which he variously equated with ‘the Chinese mind’, ‘the old tradition’ and ‘Taoist philosophy’. What made this ancient knowledge relevant even today and especially to the West, according to Jung, were resonances with developments taking place in physics that were shaking science and its ‘axioms of causality’ to the ground.⁴² Ancient China and quantum physics, in Jung’s mind, mapped out two different routes towards the same truth.

One of Jung’s students in prewar Europe, a participant in his Eranos seminars and a lecturer at his institute in Zurich was Frederic Spiegelberg (1896–1994), a scholar of Asian religions who had also studied with the theologian and philosopher Paul Tillich and with Martin Heidegger. In 1937, Spiegelberg emigrated to the US, where he eventually became Professor of Indian Religion and Culture at the University of California at Berkeley’s Department of Asian Studies. In 1951, the same year that Otto published his article on Chinese medicine, Spiegelberg and local businessman Louis Gainsborough established the American Academy of Asian Studies (AAAS) in San Francisco, which popularised Asian philosophies, religions and spiritual practices throughout the Bay Area. Besides Spiegelberg himself, the most influential teacher at AAAS was the young British philosopher Alan Watts (1915–73).⁴³

Spiegelberg had met Watts in London en route to the US and was sufficiently impressed to invite him to join the AAAS faculty. Watts’s early followers included Beat luminaries Jack Kerouac, Stephen Snyder and Allen Ginsberg, who further popularised Asian spirituality among their own generation and the hippies that followed them. Spiegelberg and Watts also influenced the foundation of the Esalen Institute on California’s Big Sur in 1961, sometimes described as the most important laboratory in the development of 1960s counter-culture, whose seminary organisation was directly modelled on Jung’s earlier Eranos seminars in Zurich. In these seminars, Esalen hosted an eclectic mix of speakers and activists, notably Fritz Perls, another German émigré, inventor of Gestalt therapy and former assistant to Kurt Goldstein, whose book *The Organism* is widely viewed as one of the classics for a holistic conception of the organism; Abraham Maslow, an influential proponent of a holistic notion of spiritual health, who counted the German Gestalt psychologist Max Wertheimer as one of his mentors and was a great admirer of von Bertalanffy’s organicist systems theory;⁴⁴ Gregory Bateson, anthropologist, cybernetician and proponent of systems thinking as a meta-theory for science; and Feng Gia-Fu 馮家福, a Taoist teacher, calligrapher and translator of the *Book of Changes* and the *Inner Canon*. Other visitors who shaped the discourse at Esalen and were, in turn, influenced by its attempts at synthesising spirituality, mysticism and science were Gary Zukav and Fritjof Capra, two physicists who followed Carl Jung in positing parallels between ancient Asian wisdom and modern physics.⁴⁵

There was much more to the AAAS and Esalen’s melange of people, ideas and practices from Asia, Europe and the US than can be recounted here. Its influence on the development of Chinese medicine in the West was indirect and diffusionist rather than direct and causative. Their core vibrations, nevertheless, can be clearly outlined and

serve as a case study for how the entanglement of holism and Chinese medicine developed in the West. Esalen's many links to Weimar Germany encouraged a perception of wholes across multiple domains – from organisms to human beings to cultural traditions – that combined Romantic yearnings for a life less disenchanting with an appreciation of systems science, cybernetics and quantum physics, and a fascination with high Asian cultures. West Coast Beats, hippies, academics and social activists added a more rugged individualism, concern for the environment, and religious spirituality, but chose to leave the murkier aspects of holism in Nazi Germany, Zen Buddhism's relationship with Japanese militarism, or Jan Smut's Apartheid of cultural wholes unexplored.

At the intersections of these intellectual currents, Chinese medicine's holism came to be seen as an essential attribute of the culture from which it hailed, as well as a living example of the holistic practices to which the 'West Coast renaissance' aspired.⁴⁶ Evolutionary holism also offered up a vision for how to deal with the varied mixture of ideas, practices and cultures thus assembled, for, just as individual wholes extend their parts, different traditions could now be merged into larger systems that cancelled out individual deficiencies while enhancing mutual strengths; for, as we know, the whole is always bigger than its parts. Channelling Hegel and Engels, writers like Fritjof Capra detected the inexorable movement of history towards a turning point where reductionist modernity would be replaced by a more holistic civilisation informed by 'a systems view of life'.⁴⁷ Already in the 1980s, Capra had identified Chinese medicine as an important platform for developing the holistic medicine of the future that would combine the best of all worlds. It would utilise Chinese medicine's existing focus on the whole person – body, mind and spirit – but overcome its limited individualist perspective by aligning it with contemporary ecological concerns.⁴⁸

A similar vision is articulated by Prince Charles, one of the highest-ranking advocates of holistic medicine on the world stage. In a speech delivered at the World Health Assembly in Geneva in 2006, for instance, he outlined a holistic medicine that was, at one and the same time, traditional and postmodern, guided by intuition as much as by science, that not just cures physical disease but also succeeds in aligning the individual with society and nature.⁴⁹ The oppositions he evoked – between the rationality of science and the intuitive knowledge of tradition, between mechanistic reductionism and organic holism, between body on the one hand and mind/spirit on the other, between East and West – and then proposed to overcome through integration directly point to San Francisco, to Esalen, and the ideas of culture developed in Germany by Herder and Humboldt in the course of the eighteenth century. The ultimate goal of 'maximising potential', meanwhile, resonates with the contemporary fusion of West Coast spirituality and capitalist business agendas also found in the more recent writings of Capra and others. Prince Charles, after all, is not just a romantic but also a businessman, and the second-highest representative of the nation that ushered in the Industrial Revolution and spearheaded the imperialist transformation of the world. Not surprisingly, his views converge with contemporary interpretations of holism and systems science in China, where, as we saw above, the management and control of systems have for some time been recognised as key political goals. As Slavoj Žižek puts it in his own

inimitable style, '[I]f Max Weber were alive today, he would definitely write a second, supplementary, volume to his *Protestant Ethic*, entitled *The Taoist Ethic and the Spirit of Global Capitalism*.⁵⁰

The Third Genealogy: Entangling Holism and Systems Biology

Systems biology is a young discipline that only emerged in the 1990s. Like Chinese medicine, it is a plural and heterogeneous 'living tradition'⁵¹ that does not point to one single origin.⁵² It is multi-disciplinary, drawing on collaborative inputs from fields such as molecular biology, genomics, computer modelling, mathematics and information theory.⁵³ At present, there exists little consensus among its practitioners about the definition of systems biology, whether the term is actually the best one to label what they do, and how the discipline should develop.⁵⁴ Yet, almost all systems biologists define themselves against other ways of doing biology by emphasising their non-reductionist focus on complex systems and networks. Often they use the term 'holistic' as a label for specifying this difference.⁵⁵ They tend to portray themselves as members of an avant-garde that is actively redefining the frontiers of biology, even as they share with their more reductionist colleagues a vision of making biological processes more predictable and open to controlled intervention.⁵⁶

Systems biology became one of the fastest-growing fields of bioscience research in the first decades of the twenty-first century, strongly supported by governments in both Asia and the West. Such support is provided on the expectation that systems biology will deliver solutions to the complex medical problems of our age that are proving increasingly resistant to the existing 'magic bullet' approach of molecular biology. Systems biologists claim to deliver on this promise by creating a personalised medicine capable of deciphering the uniqueness of each human system.⁵⁷ Chinese medicine, meanwhile, asserts that it has been a personalised medicine for thousands of years precisely because it understands itself today as fundamentally holistic in orientation. Systems biologists have thus become extremely interested in Chinese and similar types of traditional medicines and ethnopharmacologies as a practical resource for realising their goals.⁵⁸ Chinese medicine physicians, on the other hand, turn to systems biology in the hope that it will ensure the future of their tradition.⁵⁹ Indeed, as the title of one recent paper claims: 'Ethnopharmacology and Systems Biology: A Perfect Holistic Match'.⁶⁰

If one examines this paper more closely, though, or indeed the manner in which the matchmaking is being conducted, a number of contradictions quickly become apparent that cast a shadow on the perfect nature of this marriage. For Chinese medicine is courted only as long as it promises to render itself legible to the inscription devices and agendas that drive systems biology research. To understand these, we need to reach back once more to the interwar years, when the intellectual parents of systems biology, systems theory and cybernetics themselves emerged.⁶¹

General systems theory was brought to life single-handedly by the Austrian biologist and philosopher Ludwig von Bertalanffy (1901–72), a complex man who left

an equally complex and still only partially explored oeuvre. Throughout his life, von Bertalanffy attempted to overcome what he perceived to be the destructive tendencies of mechanistic and atomistic modernity by formulating an all-encompassing science that would accord with a humanistic perception of people as 'open systems' far from equilibrium, engaged in a constant process of growth and development. That is, von Bertalanffy attempted to realise the desire for unity characteristic of conservative humanistic holism through the progressive holism of a unified science of systems. Not surprisingly, he supported at least some aspects of fascist ideology and politics, which, of course, constitute but another attempt at accomplishing the same kind of fusion.

Systems theory orders the world hierarchically into nested systems at higher and lower orders. This is one reason why it was attractive to von Bertalanffy, who openly despised the, in his eyes, superficial egalitarianism of the counter-culture movement.⁶² True enough, the members of this movement initially emphasised the romantic community-centred strand of holism's heritage. Yet over time, as we saw above, they increasingly sought also to fuse it with scientific holism. Von Bertalanffy thus came to assert a tremendous influence on post-1960s ideologues of holistic medicine and science, who rarely questioned his wider beliefs and sympathies.

A similarly complicated relationship also exists between cybernetics and the counter-culture movement. Deriving from the Greek word for steersman (*kybernetes*), cybernetics is a related field that seeks to understand, modify and direct the behaviour of systems at all levels of complexity. The origins of cybernetics are diffuse, involve many people, and are impossible to recount here in detail. Suffice to say that inasmuch as its proponents claimed to be providing a meta-theory for everything that cut across not only the human/machine distinction but also all existing disciplinary fields, cybernetics came to exert an extraordinary influence on the scientific imagination during its heyday between the 1950s and 1970s.⁶³ That influence was transmitted to the counter-culture movement through a range of people with a foot in both science and counter-culture, including Buckminster Fuller, Gregory Bateson and R. D. Laing. Like general systems theory, cybernetics, therefore, has an official and a forgotten history, though with somewhat reversed connotations. The early cyberneticians discovered, much to their own surprise, that even relatively simple systems are capable of producing entirely novel and often unpredictable behaviours. However, rather than developing a performative engagement with this potentiality, as attempted most radically perhaps by R. D. Laing, the discipline as a whole has retreated towards a predominantly calculative focus on engineering and control.⁶⁴

Systems biology has inherited this orientation. As we saw above, the overarching goal for most of its practitioners is the 'calculation of life': opening the human being in its totality to new forms of manipulation and control. Whether or not its practitioners see it as such, their multiple entanglements with state and industry firmly entangle them in the progressive advancement of the biopolitical regimes first outlined by Foucault, which have since become a core focus of understanding the organisation and functioning of advanced capitalist systems.⁶⁵ Bringing Chinese medicine under the domain of such calculation requires its transformation from a practice centred in

the final instance on artistry to one whose diagnostic categories and practices can be mapped, transformed into numbers and ultimately commodified.⁶⁶ Imagined once as resistance against precisely this orientation to life, making Chinese medicine holistic in the final analysis ended up laying the groundwork for its assimilation into contemporary biopolitical regimes.

Holism and Chinese Medicine Revisited

To understand these developments, we need to return, once more, to the reasons that engendered the emergence of holism in the first place: a lived awareness of the transformation of all areas of life brought about by the diffusion of modernity across the globe, a rupture that many people chose and still choose to resist. Marxist historians like György Lukács identified the core of this transformation as a process of objectification/commodification that renders the world into an assemblage of independent things that can be described, analysed, controlled, measured and, above all, exchanged for each other.⁶⁷ In this view, the emergence of modern science, including that of systems biology, is not an accidental and unrelated event but an integral part of a complex and still ongoing process of transformation of the entire world.⁶⁸ The holistic imagination constitutes a moment of resistance, but from the very beginning it was compromised by two fundamental flaws. Max Weber already realised that the conservative, backward-looking holism that tried to hold on to a more enchanted past was simply no match for the power unleashed by the forces of modernity. Holism as a science, on the other hand, is simply not an alternative at all, as explained by the Italian historian of science, Toni Tonietti, with specific reference to China.⁶⁹

Tonietti argues that the successes of Western science, specifically since the scientific revolution, are predicated on attempting ‘to introduce order into that which changes, by fixing its static, eternal foundations’.⁷⁰ Cybernetics and the systems sciences are but attempts to extend this desire for order to the understanding of things that resist capture by other means. Unlike other historians, who detect in Chinese medicine and culture the presence of systems theory *avant la lettre*, Tonietti understands that, prior to their encounter with modernity, the Chinese sciences were not, in fact, interested in universal laws. They were attracted to change, which they sought to understand by concepts like *yin/yang* or *qi*, concepts that are themselves unstable and completely relational. As Tonietti emphasises, precisely because they never sought to describe, analyse or regulate complexity, the Chinese sciences cannot be said to be holistic in its second (dialectical or scientific) sense.⁷¹ We may add that they were not holistic in the first (structural or cultural) sense either because their origins have nothing at all to do with modernity.

If Tonietti is correct, then Qin Bowei or Fang Yaozhong’s attempts to assimilate holism to Chinese *yin/yang* thinking were fated to fail for the same reasons that Ai Siqi and Mao Zedong’s readings of Engels were overtaken by Deng Xiaoping’s pragmatic modernisations. Like the Weimar holists or the counter-cultural revolutionaries of the 1960s they underestimated the transformative power of capitalist modernity

partly because they failed to grasp fully the contradictory tensions within the concept of holism itself. Hence, even as they read holism through *tongbian* philosophy, they introduced modern concerns for control into the very heart of their tradition, opening it up to become a medicine aimed at restoring balance and managing system states rather than one that ‘rides the *qi*’ of constant change.

Beyond Hybridity and Either/Or: Neither Donkey nor Horse⁷²

My examination might well stop here. Something hitherto hidden or grasped merely in outline has been exposed more clearly. As a critical scholar, I could now step back and invite the clinicians, researchers and regulators involved to take note – or not. Or I can move beyond description and analysis towards a critique that involves the formulation of concrete practical alternatives. In the present case, this implies, at the very least, reflection on the possibilities for the existence of a Chinese medicine – or, indeed, any practice – that is both non-traditional and non-modern, that is of the present without being subsumed to its forces of equalisation and domination. To this end, I turn to the philologist, revolutionary and Chinese medicine scholar, Zhang Taiyan 章太炎 (1869 -1936).

Zhang Taiyan is widely known for his pivotal role in the 1911 revolution that overthrew the Qing dynasty and established the Chinese Republic.⁷³ His accomplishments, though, go far beyond politics, encompassing pivotal contributions to modern Chinese philosophy, language, philology and medicine. Risking injustice to such a multi-faceted person, I shall view Zhang Taiyan’s life-work, nevertheless, as centred on a single question: what, about traditional Chinese culture, is worth preserving in the modern world, and how? In that sense, he sought to find a solution to the same problem that concerned the advocates of holism active during his lifetime. His own solution, though, was utterly different and far more radical.

Zhang’s struggle to resist modernity was informed by three key assumptions. Firstly, he grasped that the modern world is a given that cannot be imagined away through retreat into the past. Indeed, if the imperialist expansion of the Western powers into China taught Zhang anything, then it was that China’s traditional institutions had failed. Yet, and this is Zhang’s second insight, the apparent universalism underpinning concepts such as science, democracy, evolution, history, time – and one may add holism and systems to this list – hides their true nature as ideological tools that facilitate the global expansion of modernity and capitalism. This expansion transforms the West as much as it does the rest of the world. Thus, it cannot be grasped through an opposition of cultural essences, of the West vis-à-vis China/Asia. Thinking a different future than that enacted by modernity and the capitalist mode of production requires us to think outside both the discourses offered by traditional interpretations of Chinese history and modern universalism. Yet, these discourses are also the only places from where such thinking can begin.

Zhang Taiyan was a truly interdisciplinary scholar who drew on Indian Yogacara Buddhism, Chinese Daoism, and writers in the German idealist tradition from Hegel to

Nietzsche. His goal was to present a radical critique of the hegemonic value judgements embodied in both the dominant Chinese tradition, with its track record of oppression enacted through the rewriting of history, and that of modernist universalism in all its imperialist destructivity. Focusing on his philosophical and political writings, biographers like Viren Murty unfortunately interpret Zhang's efforts as ultimately leading him into a nihilist cul-de-sac,⁷⁴ for what he apparently advocates is the pursuit of an embodied transcendence that negates the world, time and history altogether but leaves little scope for concrete political action.

However, if we take into account Zhang Taiyan's life-long involvement with Chinese medicine, his critique acquires a much more positive dimension. Zhang stemmed from a family of physicians, studied medicine from an early age, and published extensively on medical topics. He deployed his philological expertise and knowledge of history to make innovative contributions to long-standing disputes within the tradition, practised on friends and family, and had distinctive views about how Chinese medicine should respond to the challenge of Western science. Virtually all of the important modernisers of Chinese medicine during the 1920s and 1930s were his students, and during the last period of his life he served as president of a Chinese medical college in Suzhou.⁷⁵ Yet, Zhang's deep immersion into the world and life of Chinese medicine is virtually ignored by his biographers and by historians of modern China, perhaps out of fear of tainting their revolutionary hero by association with tradition and the past.

If such preconceptions can be put aside, then Zhang Taiyan's support of Chinese medicine emerges precisely as a form of practical resistance to both conventional traditionalism and the scientific universalism imposed by the imperialist powers. This distinguishes Zhang's critique from that afforded by holism, which, as we have seen, aligns itself with tradition against modernity even as it also seeks to outdo reductionist science in the construction of the modern. It thereby overcomes the fatal flaws of holistic medicine that are so starkly exposed by its ultimate assimilation into contemporary biopolitics. It is all the more powerful because it does not rely on categories and modes of thought borrowed from the West even as it engages with them.

This allowed Zhang to address simple, practical problems such as reconstituting the precise meaning of ancient medical terms, or accurately translating historical measurements into contemporary ones. He taught his students to employ *Hetuvidyā*, a system of Buddhist logic, which he considered superior to Western logic, as a tool for subjecting knowledge claims to critical examination. He rejected some of the most fundamental aspects of Chinese medical doctrine, such as the five phases, as speculative mysticism and emphasised the grounding of medical practice in empirical observation. If certain ways of practising Chinese medicine produced reliable results where the Western medicine of its time or, indeed, other currents of the tradition did not, this helped in deciding what was worth taking seriously and what was not. Yet, what was worth taking seriously had then to be seriously engaged with. It had to be mastered on its own terms. It was open to change but not for the sake of change alone. It had to be respected, transmitted and practised within newly developed institutional frameworks.

As in so many other areas of his life, Zhang Taiyan thus stood between radical modernisers like his students Lu Xun 魯迅 or Yu Yunxiu 余雲岫, who rejected all of Chinese medicine on purely ideological grounds, and traditionalists, who perceived of Chinese medicine as an inviolable totality that, if it had to be modernised, had to be modernised in toto. Zhang's influence on Chinese medicine is visible in the work of students like Yun Tieqiao 運鐵鍬, Lu Yuanlei 陸淵雷 and Zhang Cigong 章次公, frequently portrayed within the Chinese medical community as misguided modernisers who were 'neither donkey nor horse' (非驢非馬 *fei lü fei ma*).⁷⁶ It is surely no coincidence that the influence of this cohort diminished at precisely that historical moment when Qin Bowei and Fang Yaozhong attached holism to the very heart of Chinese medicine.

Conclusion

As a Buddhist intellectual, Zhang Taiyan employed the notion of karma as a tool for understanding historical process independent of the ideologies of progress and linear time that the West was then imposing on China. In this view, history is produced by the activity of karmic seeds (業種 *bijia*). These seeds are brought to fruition through action, producing karmic fruits (業果 *vipaka*), which in turn become seeds for new fruits and so on. Existence is perfumed by these seeds, which produce habits that have karmic consequences. This karmic cycle or *samsara* (輪迴 *lunhui*) can only be broken by bringing into awareness and then transcending the conditioning brought forth by the karmic seeds.

Viewed from this perspective, the convergence of the three genealogies I have presented on to a common endpoint is not accidental or inevitable. Neither is the whiff of totalitarianism that so persistently attaches to holism, systems, cybernetics and their efforts at calculating life. They arise from the unrecognised and unresolved tensions that attach to holistic ideologies. Expressing disenchantment with modernity and a yearning for difference, they also seek to gain the upper hand on reductionist science by reducing life to the logic of systems. Bringing these tensions and their enduring effects into consciousness is a necessary step towards overcoming them. The genealogical approach I have employed in this chapter is one possible method for accomplishing this.

A space is thereby opened up for different types of action, the production of different seeds, and different fruits. A nihilistic reading of Zhang's philosophy rests on the perception that he advocated stepping out of *samsara* in order to stop all cycles of cause and effect. His involvement with Chinese medicine suggests another possibility: namely, the piecemeal adjustment of traditional practice to changed contexts of life in the light of critique. This effort was aimed at generating not hybridity but something that is neither traditional nor modern. It is practised resistance, but unlike that driven by totalitarian ideologies – and holism ultimately is one such ideology, points to Zhang's fundamental insight 'that transforming our world involves a transformation of both subjectivity and objectivity'.⁷⁷

The continued presence of non-modern practices like Chinese medicine in the modern world invariably brings us face to face with precisely the questions that Zhang Taiyan sought to resolve. They have not yet been rendered obsolete as tradition, nor have they been completely assimilated to the modern. It is therein that their value lies. The interdisciplinary orientation and openness to constant redefinition the medical humanities claim for themselves make it an ideal space in which critique of the kind inspired by Zhang Taiyan or Max Horkheimer may be enacted. The possibility for doing so, however, depends on the discipline's willingness to engage critically with its own karmic seeds and their fruits. If the medical humanities truly intend to become a space for critique rather than mere criticism, its practitioners will need to find ways of moving beyond the modern constitution that defines and constrains them, not least through their one-sided attachment to biomedicine.

The present chapter argues that opening ourselves up to non-modern medical traditions, not as objects of inquiry but as resources for thinking critically about the fundamental issues of our time, presents an opportunity for doing precisely that.

Acknowledgements

I would like to thank the Wellcome Trust for supporting my research through a Senior Research Fellowship in the Medical Humanities. Judith Farquhar, Dan Bensky and Sue Cochrane provided important feedback on earlier drafts of this chapter. I am grateful to Anne Whitehead and Angela Woods for allowing me to develop the ideas presented here and for their editorial advice and support throughout.

Further Reading

- Bridie Andrews, *The Making of Modern Chinese Medicine, 1850–1960* (Vancouver: UBC Press, 2014).
- Sean Hsiang-lin Lei, *Neither Donkey nor Horse* (Chicago: University of Chicago Press, 2014).
- Karl Mannheim, *Konservatismus* (Frankfurt am Main: Suhrkamp, 1984).
- Viren Murthy, *The Political Philosophy of Zhang Taiyan* (Leiden: Brill, 2011).
- Denis Noble, *The Music of Life* (Oxford: Oxford University Press, 2006).
- Andrew Pickering, *The Cybernetic Brain* (Chicago: University of Chicago Press, 2010).
- Volker Scheid, *Chinese Medicine in Contemporary China: Plurality and Synthesis* (Durham, NC: Duke University Press, 2002).
- Volker Scheid, *Currents of Tradition in Chinese Medicine, 1626–2006* (Seattle: Eastland Press, 2007).

Notes

1. Victoria Bates, Alan Bleakley and Sam Goodman, *Medicine, Health and the Arts* (London: Routledge, 2013); Angela Woods, 'Medicine, Health and the Arts: Approaches to the Medical Humanities', *Medical Humanities*, 9 June 2014 <<http://mh.bmj.com/content/41/1/2.abstract>> (accessed 31 May 2015).
2. Max Horkheimer, *Critical Theory* (New York: Seabury Press, 1982).

3. Vincent Di Stefano, *Holism and Complementary Medicine* (Crows Nest: Allen & Unwin, 2006); Assaf Givati, 'The Holistic Discourse and Formalising Education of Non-Medically Qualified Acupuncturists and Homeopaths in England,' *Medical Sociology Online* (2012) <<http://eprints.port.ac.uk/10597/http://eprints.port.ac.uk/10597/>> (accessed 31 May 2015).
4. Michael Baum, 'Concepts of Holism in Orthodox and Alternative Medicine', *Clinical Medicine* 10.1 (2010), pp. 37–40.
5. Assaf Givati, 'Performing "Pragmatic Holism": Professionalisation and the Holistic Discourse of Non-Medically Qualified Acupuncturists and Homeopaths in the United Kingdom', *Health* 19.1 (2014), pp. 34–50.
6. Christopher Lawrence and George Weisz, *Greater Than the Parts* (Oxford: Oxford University Press, 1998).
7. Jerry Fodor, *Holism* (New York: Wiley, 1992); Marcel Weber and Michael Esfeld, 'Holism in the Sciences', Encyclopedia of Life Support Systems Publishers, 2003 <<http://www.unil.ch/webdav/site/philol/shared/EOLSS-HolismSciences03.pdf>> (accessed 20 August 2014).
8. These were first traced in their full inter-relationships by Karl Mannheim in his habilitation, later published as *Konservatismus* (Frankfurt am Main: Suhrkamp, 1984).
9. Friedrich Engels, *Dialectics of Nature* (Moscow: Progress, 1972); Peter Manicas, 'Engels' Philosophy of Science', in Manfred B. Steger and Terrell Carver (eds), *Engels After Marx* (College Park: University of Pennsylvania Press, 2000).
10. David E. Cooper, 'Verstehen, Holism and Fascism', *Royal Institute of Philosophy Supplement* 41 (1996), pp. 95–107.
11. Manicas, 'Engels' Philosophy of Science'.
12. Max Weber, 'Science as a Vocation', in *From Max Weber: Essays in Sociology* (Oxford: Oxford University Press, 1946), pp. 129–56.
13. Weber and Esfeld, 'Holism in the Sciences'.
14. Jan C. Smuts, *Holism and Evolution* (Whitefish: Literary Licensing, 2013).
15. Anne Harrington, *Reenchanted Science: Holism in German Culture from Wilhelm II to Hitler* (Princeton: Princeton University Press, 1996).
16. Lawrence and Weisz, *Greater Than the Parts*.
17. Chenshan Tian, 'Tongbian in the Chinese Reading of Dialectical Materialism', *Philosophy East and West* 52.1 (2002), pp. 126–44.
18. Chenshan Tian, 'Tongbian: A Chinese Strand of Thought', *Journal of Chinese Philosophy* 27.4 (2000), pp. 441–68.
19. Chenshan Tian, *Bianzhengfa: A Chinese Representation of Marxian Dialectics* (Honolulu: University of Hawai'i Press, 1999).
20. Tian, 'Tongbian: A Chinese Strand of Thought'.
21. Bridie Andrews, *The Making of Modern Chinese Medicine, 1850-1960* (Vancouver: UBC Press, 2014); Sean Hsiang-lin Lei, *Neither Donkey nor Horse* (Chicago: University of Chicago Press, 2014); Volker Scheid, *Chinese Medicine in Contemporary China* (Durham, NC: Duke University Press, 2002); and Kim Taylor, *Medicine of Revolution: Chinese Medicine in Early Communist China (1945-1963)* (Cambridge: University of Cambridge Press, 2000).
22. Zhang Xuyou 張繼有, 'Zhuyao miaonixi jihuan zhiliaofa' 主要泌尿係疾患的中醫療法 ('Essential Chinese Medicine Treatment of Patients Suffering from Diseases of the Urinary System'), *Midlevel Medicine* 中級醫刊 12 (1955); Qin Bowei 秦伯未, 'Zhongyi lilun zhong de yinyang guandian' 中醫理論中的陰陽觀點 ('The Yinyang Perspective within Chinese Medicine'), *Shanghai Journal of Chinese Medicine* 上海中醫藥雜誌 3 (1955).
23. Scheid, *Chinese Medicine in Contemporary China*; Taylor, *Medicine of Revolution*.

24. Qin Bowei 秦伯未, *Zhongyi rumen* 中醫入門 (*Introduction to Chinese Medicine*), (Beijing: Renmin weisheng chubanshe, 1959).
25. Tian, 'Tongbian', p. 136.
26. François Jullien, *The Propensity of Things* (New York: Zone Books, 1999).
27. Jie Wu, *Systems Dialectics* (Beijing: Foreign Language Press, 1996).
28. *Ibid.*, p. 11.
29. *Ibid.*, pp. 6–9, 21.
30. *Ibid.*, pp. 75–90, 335–44, 355–9.
31. Lü Bingkui 呂炳奎, 'Duidang qian zhongyi gongzuo zhong jige wenti de kanfa' 對當前中醫工作中幾個問題看法 ('A Perspective on Several Problems Facing Chinese Medicine Work'), *Shanghai Journal of Chinese Medicine* 上海中醫藥雜誌 4.1 (1981).
32. Liu Changlin 劉長林, *Neijing de zhexue he zhongyixue de fangfa* 內經的哲學和中醫學的方法 (*The Philosophy of the Inner Canon and the Methodology of Chinese Medicine*) (Beijing: Science Press, 1985).
33. Hua Guofan 華國凡 and Jin Guantao 金觀濤, 'Zhongyi: kexueshang de yige qiji' 中醫：科學上的一個奇蹟 ('Chinese Medicine: A Miracle in Science'), *Natural Dialectics News* 2 (1979), p. 20.
34. Wang Qi 王琦, 'Ershiyi shiji – zhongyiyao de shiji' 二十一世紀 — 中醫藥的世紀 ('The 21st Century: The Century of Chinese Medicine'), *Traditional Culture and Modernisation* 傳統文化與現代化 2 (1995), pp. 64–7.
35. Zhu Shina 祝世納, *Zhongyixue fangfalun yanjiu* 中醫學方法論研究 (*Chinese Medicine Methodology Research*) (Jinan: Shandong Science and Technology Press, 1985), p. 3. See also Zhu Shina 祝世納 and Sun Guilian 孫桂蓮, *Zhongyi xitong lun* 中醫系統論 (*On Chinese Medicine Systems*) (Chongqing: Chongqing Press, 1990).
36. Linda L. Barnes, *Needles, Herbs, Gods, and Ghosts* (Cambridge, MA: Harvard University Press, 2009).
37. Lucia Candelise, 'La Médecine chinoise dans la pratique médicale en France et en Italie, de 1930 à nos jours: représentation, réception, tentatives d'intégration', PhD dissertation, Department of History, École des Hautes Études en Sciences Sociales (EHESS), Paris, and Università degli Studi di Milano Bicocca (2008); Johan Nguyen, *La Réception de l'acupuncture en France* (Paris: Editions L'Harmattan, 2012).
38. J. H. F. Otto, 'Über die Ganzheitsbetrachtung in der Chinesischen Heilkunst', *Ärztliche Wochenschrift* 6.8 (1951).
39. Richard Wilhelm, *I Ging: Text und Materialien*, 5th edn (Düsseldorf: Eugen Diederichs Verlag, 1980), p. 21.
40. Joseph Needham, *Science and Civilisation in China. Vol. 2: History of Scientific Thought* (Cambridge: Cambridge University Press, 1956), p. 291.
41. *Ibid.*, p. 292.
42. Carl Gustav Jung, 'Foreword', in Richard Wilhelm (ed.), *I Ching* (Princeton: Princeton University Press, 1950).
43. For a history of the AAAS, see the Academy's website at <<http://www.mysterium.com/aaas.html>> (accessed 31 May 2015).
44. David Pouvreau, *The Dialectical Tragedy of the Concept of Wholeness* (Litchfield Park: Isce Publications, 2009).
45. For a more detailed history of the Esalen Institute, see Linda Sargent Wood, *A More Perfect Union: Holistic Worldviews and the Transformation of American Culture After World War II* (Oxford: Oxford University Press, 2010).

46. I take the term ‘West Coast renaissance’ from Alan Watts. See <<http://www.mysterium.com/aaas.html>> (accessed 31 May 2015).
47. Fritjof Capra, *The Turning Point* (New York: Bantam, 1983); Fritjof Capra and Pier Luigi Luisi, *The Systems View of Life* (Cambridge: Cambridge University Press, 2014).
48. Capra, *The Turning Point*; Fritjof Capra, *Uncommon Wisdom* (New York: Bantam, 1989).
49. <<http://www.princeofwales.gov.uk/media/speeches/speech-hrh-the-prince-of-wales-integrated-healthcare-the-world-health-assembly-geneva>> (accessed 31 May 2015).
50. Slavoj Žižek, ‘From Western Marxism to Western Buddhism’, *Cabinet* 2 (2001) <<http://www.cabinetmagazine.org/issues/2/Western.php>> (accessed 18 September 2014).
51. Volker Scheid, *Currents of Tradition in Chinese Medicine, 1626–2006* (Durham, NC: Duke University Press, 2007).
52. Alexander Powell, Maureen A. O’Malley, Staffan Müller-Wille, Jane Calvert and John Dupré, ‘Disciplinary Baptisms: A Comparison of the Naming Stories of Genetics, Molecular Biology, Genomics, and Systems Biology’, *History and Philosophy of the Life Sciences* 29.1 (2007), pp. 5–32.
53. Marc W. Kirschner, ‘The Meaning of Systems Biology’, *Cell* 121 (2005), pp. 503–4; Fulvio Mazzocchi, ‘Complexity and the Reductionism-Holism Debate in Systems Biology’, *Wiley Interdisciplinary Reviews. Systems Biology and Medicine* 4.5 (2012), pp. 413–27.
54. Jane Calvert and Joan H. Fujimura, ‘Calculating Life? A Sociological Perspective on Systems Biology’, *EMBO Reports* 10 (2009), pp. 46–9.
55. Iris R. Bell and Mary Koithan, ‘Models for the Study of Whole Systems’, *Integrated Cancer Therapy* 5.4 (2006), pp. 293–307; Calvert and Fujimura, ‘Calculating Life?’; Jan van der Greef, Herman van Wietmarschen, Jan Schroën, Mei Wang, Thomas Hankemeier and Guowang Xu, ‘Systems Biology-based Diagnostic Principles as Pillars of the Bridge between Chinese and Western Medicine’, *Planta Medica* 76.17 (2010), pp. 2036–47; Mei Wang, Robert-Jan A. N. Lamers, Henrie A. A. J. Korthout, Joop H. J. van Nesselrooij, Renger F. Witkamp, Rob vander Heijden, Peter J. Voshoi, Louis M. Havekes, Rob Verpoorte and Jan van der Greef, ‘Metabolomics in the Context of Systems Biology: Bridging Traditional Chinese Medicine and Molecular Pharmacology’, *Phytotherapy Research* 19.3 (2005), pp.173–82; and Xijun Wang, Aihua Zhang and Hui Sun, ‘Future Perspectives of Chinese Medical Formulae: Chinmedomics as an Effector’, *Omic*s 16.7 (2012), pp. 414–21.
56. Jane Calvert, ‘The Commodification of Emergence: Systems Biology, Synthetic Biology and Intellectual Property’, *BioSocieties* 3.4 (2008), pp. 383–98; Calvert and Fujimura, ‘Calculating Life?’
57. Alessandro Buriani, Maria L. Garcia-Bermejo, Enrica Bosisio, Qihe Xu, Huige Li, Xuebin Dong, Monique S. J. Simmonds, Maria Carrara, Noelia Tejedor, Javier Lucio-Cazana and Peter J. Hylands, ‘Omic Techniques in Systems Biology Approaches to Traditional Chinese Medicine Research: Present and Future’, *Journal of Ethnopharmacology* 140.3 (2012), pp. 535–44; and Rui Chen and Michael Snyder, ‘Systems Biology: Personalized Medicine for the Future?’, *Current Opinions in Pharmacology* 12 (2012), pp. 623–8.
58. Buriani et al., ‘Omic Techniques in Systems Biology’; Halil Uzuner, Rudolf Bauer, Tai-Ping Fan, De-an Guo, Alberto Dias, Hani El-Nezami, Thomas Efferth, Elizabeth M. Williamson, Michael Heinrich, Nicola Robinson, Peter J. Hylands, Bruce M. Hendry, Yung-Chi Cheng and Qihe Xu, ‘Traditional Chinese Medicine Research in the Post-Genomic Era: Good Practice, Priorities, Challenges and Opportunities’, *Journal of Ethnopharmacology* 140.3 (2012), pp. 458–68; van der Greef et al., ‘Systems Biology-based Diagnostic Principles’.

59. Volker Scheid, 'Convergent Lines of Descent: Symptoms, Patterns, Constellations, and the Emergent Interface of Systems Biology and Chinese Medicine', *East Asian Science, Technology and Society* 8.1 (2014), pp. 107–39.
60. Robert Verpoorte, Young Hae Choi and Hye Kyong Kim, 'Ethnopharmacology and Systems Biology: A Perfect Holistic Match', *Journal of Ethnopharmacology* 100.1 (2005), pp. 53–6.
61. Rudolf Seising, 'Cybernetics, System(S) Theory, Information Theory and Fuzzy Sets and Systems in the 1950s and 1960s', *Information Sciences* 180.23 (2010), pp. 4459–76; Olaf Wolkenhauer, 'Systems Biology: The Reincarnation of Systems Theory Applied in Biology?', *Briefings in Bioinformatics* 2.3 (2001), pp. 258–70.
62. Pouvreau, *The Dialectical Tragedy*.
63. Geoffrey C. Bowker, *Memory Practices in the Sciences* (Cambridge, MA: MIT Press, 2008), pp. 75–105.
64. Andrew Pickering, *The Cybernetic Brain* (Chicago: University of Chicago Press, 2010).
65. Michel Foucault, *Society Must Be Defended: Lectures at the Collège de France, 1975–1976* (New York: St Martin's Press, 1997), p. 242.
66. Calvert, 'The Commodification of Emergence'; Scheid, 'Convergent Lines of Descent'.
67. György Lukács, *History and Class Consciousness* (Cambridge, MA: MIT Press, 1971).
68. Calvert, 'The Commodification of Emergence'.
69. Toni Tonietti, 'Towards a History of Complexity: A Comparison between Europe and China', in Vieri Benci, Paola Cerrai, Paolo Freguglia, Giorgio Israel and Claudio Pellegrini (eds), *Determinism, Holism, and Complexity* (New York: Springer, 2003), pp. 387–401.
70. *Ibid.*, p. 387.
71. *Ibid.*, p. 395.
72. The title of this section is a reference to Sean Hsiang-Lin Lei's authoritative study of the modernisation of Chinese medicine during the Republican period. I am indebted to Sean for his valuable insights into this process, communicated to me in many personal conversations as well as his publications.
73. Shimada Kenji, *Pioneer of the Chinese Revolution: Zhang Binglin and Confucianism*, trans. Joshua A. Fogel (Stanford: Stanford University Press, 1990); Kauko Laitinen, *Chinese Nationalism in the Late Qing Dynasty: Zhang Binglin as an Anti-Manchu Propagandist* (London: Curzon, 1990); and Viren Murthy, *The Political Philosophy of Zhang Taiyan* (Leiden: Brill, 2011).
74. Viren Murthy, *The Political Philosophy of Zhang Taiyan*.
75. Hu Yue 鬚樾, 'Zhonggui gexin daoshi Zhang Taiyan' 國醫革新導師章太炎 ('Zhang Taiyan: Leader of National Medical Reform'), *Chinese Journal of Medical History* 中華醫史雜誌 4 (1995); Chen Yu 陳瑜 and Xu Jingsheng 許敬生, 'Qianlun Zhang Taiyan dui zhongyi wenxianxue zhi gongxian' 簡論章太炎對中醫文獻學之貢獻 ('A Synopsis of Zhang Taiyan's Contribution to Chinese Medicine's Literary Culture'), *Journal of Chinese Medicine Literary Culture* 中醫文獻雜誌 3 (2005); Duan Xiaohua 段曉華 and Chang Gongyi 暢洪昇, 'Zhang Taiyan yixue yanjiu lichen jianche' 章太炎醫學研究歷程簡析 ('A Brief Analysis of the Development of Zhang Taiyan's Medical Research'), *Journal of the Jiangxi College of Chinese Medicine* 江西中醫學院學報 6 (2008).
76. Lei, *Neither Donkey nor Horse*.
77. Murthy, *The Political Philosophy of Zhang Taiyan*.