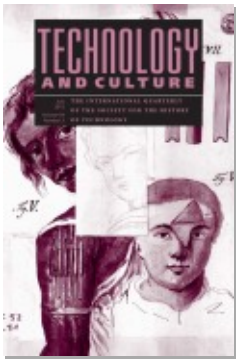
How Blind Is Love?

How Blind Is Love?: Simon Winchester's The Man Who Loved China

Francesca Bray



Technology and Culture, Volume 51, Number 3, July 2010, pp. 578-588 (Article)

Published by The Johns Hopkins University Press
DOI: 10.1353/tech.2010.0015

How Blind *Is* Love?

Simon Winchester's *The Man Who Loved China*

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In SHOT we think a lot about storytelling. We aim to tell good stories about technology—good as in sound, engaging, and well-crafted, and good as in thoughtful, critical, and politically and ethically aware. *Technology and Culture* was launched fifty years ago as a deliberate challenge to what the founders of SHOT saw as an impoverished mode of storytelling that reinforced myths, perpetuated hierarchies, and ignored absences. Since then we SHOT members have told many new kinds of stories about technology. We reflect, individually and collectively, on paths taken and those still untrodden. As members of a discipline unusually committed to public engagement, we are adventurous in exploring new styles, formats, and media for disseminating our stories. We try to eschew intellectual snobbery and wholeheartedly celebrate good storytelling about technology in any form. Significantly, SHOT awards prizes not only for academic achievements, but also for books or exhibitions that successfully reach out to the general public. Alas, despite our impeccably populist goals, few of the books we publish make it to the best-seller list. Furthermore, long and hard though we have fought to challenge such pernicious myths, most people outside our field still think that technological innovation is synonymous with human progress, and that Western civilizations are the natural heartland of technical achievement.

So should the next Sally Hacker Prize go to Simon Winchester for his biography of Joseph Needham?[1] The book offers us the "fantastic story" of

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0040-165X/10/5103-0002/578–88

1. Simon Winchester, *The Man Who Loved China: The Fantastic Story of the Eccentric*

one of technology's most remarkable and radical storytellers, written in best-seller format by an author widely acclaimed himself as a master narrator. As the blurb for the U.S. edition puts it, "Winchester brings to life the extraordinary story of Joseph Needham, the brilliant Cambridge scientist who unlocked the most closely held secrets of China, long the world's most technologically advanced country." The UK blurb declares that the book "tells the story of [Needham], his book, the passion that inspired it." In other words, Winchester sets out to popularize a very important message about the history of technology: West is not always Best. More than that, he promises an account of why and how a distinguished scientist made this message his crusade, and how he convinced the world that it was correct—in other words an accessible historiography of the *Science and Civilisation in China* project (*SCC* to its friends)[2] and its impact. So how good a story does Winchester actually tell? Should SHOT members consider adding *The Man Who Loved China* to the reading list for undergraduate classes on history of technology, or perhaps for graduate seminars on intellectual history?

In my view the book gives an intellectual historian much to ponder, but is definitely *not* a title to add to the reading list for History of Technology 101. In this review I shall ask how well *The Man Who Loved China* accounts for Joseph Needham's grand project. Since it is now just over forty years since SHOT awarded Needham the da Vinci Medal in 1968, I also take the opportunity to assess how Needham's radical narratives have stood the test of time.

Simon Winchester is a journalist and author who specializes in grand themes: the Yangzi River, the eruption of Krakatoa, the making of the *Oxford English Dictionary*. He combines scientific literacy (he has a degree in geology) with a talent for writing in picturesque prose. How did Winchester fix on Needham and *SCC* as a suitable grand theme? In 1995, stimulated no doubt by a voyage up the Yangzi River the previous year, Winchester bought "on impulse" a used copy of *SCC* volume 4, part 3, *Civil Engineering and Nautics*, and was "instantly enthralled by the sweep and scope of the mind behind it" (p. 281). It was some years, however, before he (and presumably his agents and publishers) chose to take up the tale of *The Man Who Loved China*. The publication date of the U.S. edition was well planned—it coincided with the Beijing Olympics, whose stupendous opening ceremony dazzled a global public with images of Chinese technologies ancient and contemporary.

Winchester never met Needham, who died in 1995 at the age of ninety-four, but he was given free access to almost all of Needham's papers and correspondence, he spoke to colleagues and friends, and he retraced the

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Scientist Who Unlocked the Mysteries of the Middle Kingdom (New York: HarperCollins, 2008, pp. 336, $27.95/$15.99). Published in the UK by Penguin/Viking as *Bomb, Book & Compass: Joseph Needham and the Great Secrets of China*.

2. Joseph Needham et al., *Science and Civilisation in China* (Cambridge, 1954–).

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two most spectacular of the many journeys Needham made through China on his first, formative visit. He also draws freely on short memoirs of Needham and the *SCC* enterprise, written for a 1982 Festschrift by two intimate friends and associates, Lu Gwei-Djen and Huang Hsing-tsung. Out of these materials Winchester weaves a cracking yarn.

A lonely, gifted boy becomes a brilliant and eccentric biochemist given to Christian-tinged communism, steam trains, free love, morris dancing, and nude bathing.[3] After some years of open marriage to another distinguished scientist, Dorothy (Dophi) Moyle, Needham falls deeply in love with a young Chinese researcher, Lu Gwei-Djen, who joins his Cambridge lab in 1937. Over a post-coital cigarette she lures him into the study of the Chinese language and the history of her native land. His "diminutive, intense, pretty and very intelligent young paramour . . . hammer[ed] into his head a notion first planted in her mind by her father in Nanjing—that China had made an immensely greater contribution to world science and technology than anyone in the West had ever acknowledged" (p. 57).

When an opportunity arose to spend time in China on a scientific mission, Needham seized the moment. In 1939 a Chinese professor of philosophy visiting Oxford had pled for help for his colleagues back in China, where the invading Japanese were systematically targeting schools, universities, and laboratories. Sympathetic British academics eventually persuaded the government to take action. In 1942, soon after Pearl Harbor, the Sino-British Science Co-operation Office was set up under the auspices of the Royal Society and the Foreign Office to provide material aid and moral support to Chinese scientists starved of resources or driven out by the relentless advance of Japanese troops. Needham successfully applied for the position of director, which he held from 1942 to 1946.

The office was based in Chongqing, the base of the Chinese government in exile. Accompanied by his personal assistant, the young science teacher Huang Hsing-tsung ("HT"), Needham sallied out on eleven expeditions to isolated and beleaguered scientific outposts, delivering equipment, discussing research, and building valuable bonds of friendship and respect. He also took advantage of these long journeys to investigate and document existing technologies of every kind, to pick his hosts' brains on premodern science and the various forms in which it was expressed, transmitted, and preserved, and to build up a collection of books that included many rare old editions. (In such desperate times, items from private collections could often be bought for a song.) Drawing on Needham's notebooks, reports, and voluminous correspondence, as well as HT's vivid memoir of the period, Winchester retraces two of Needham's longest journeys—one north and west along the furthest stretches of the Great Wall and out to the Buddhist grottoes of Dunhuang; one south and east to Fuzhou—suggesting

3. Such tastes, whatever Winchester might imply, were pretty conventional among the English intelligentsia at the time.

how the ideas behind *SCC* gradually took shape. Over his four years in China Needham acquired a trove of observations, insights, and materials that he felt would allow him to write a small book on premodern China's scientific achievements.

Needham was briefly diverted after the end of the war by a spell in Paris "putting the 'S' into UNESCO," as his friend Julian Huxley put it. But by 1948 it was clear that the U.S. government would oppose UNESCO providing support to any scientific projects which it deemed left-wing, and Needham resigned. He returned to his Cambridge college and began work on what was to become his masterpiece. Colleagues from China sent materials, research papers, and rare books; the notes piled up; the ideas flowed; the box-files of papers on different topics multiplied inexorably. The plan for the project spilled over from a single volume into a series, arranged according to a taxonomy of modern Western science and its applications. The series began with an overview of Chinese civilization; then followed volumes on philosophy, followed by mathematics and astronomy, through physics and engineering, chemistry and its applications (from alchemy and metallurgy to brewing, ceramics, and papermaking), biology (medicine, botany, and agriculture), and finally, in volume 7, the Great Needham Question: Why did modern science not develop in China?

In 1954 the first volume of *SCC* was published. Needham, Dophi, and Gwei-Djen awaited the reviews with trepidation. Needham's enthusiasm for the new communist regime in China might pass as a personal eccentricity, but two years earlier his reputation as a responsible scientist had been badly tarnished when he agreed to head an international commission to investigate Chinese allegations of U.S. germ warfare in the Korean War. The commission's report upheld the allegations. Scientists, scholars, and government officials in the West rejected the report and excoriated the commission members, especially Needham, for being too politically biased and gullible to recognize that the evidence they had examined was fabricated.[4] If Needham's enthusiasm for the new China and its science had branded him as intellectually unreliable, then how would his study in praise of China's scientific past be received? In fact the response was overwhelming. Reviewers compared Needham to Erasmus or even to Aristotle. The *SCC* project was immediately hailed as a work of genius, the most important contribution to intellectual thought of the decade, if not the century. Subsequent volumes met equal acclaim. Gratifyingly for Cambridge University Press, whose syndics were taken aback when their initial undertaking to publish a single volume morphed into a commitment to an apparently endless series of fat tomes, all 5,000 copies of volume 1 quickly sold out: a classic had been born.

4. A sophisticated analysis of why and how the Chinese state and its scientists put together their claims can be found in Ruth Rogaski, "Nature, Annihilation, and Modernity: China's Korean War Germ-Warfare Experience Reconsidered," *Journal of Asian Studies* 61 (2002): 381–415.

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It is not until some pages into the final chapter of his book that Winchester reaches the publication of volume 1 of *SCC*. In previous chapters he devotes short passages to signature technologies and themes in *SCC*, and to the patterns of Needham's collaboration and coauthorship with his closest colleagues like Wang Ling and especially Lu Gwei-Djen. There is a pleasing four-page section in chapter 5, "The Making of His Masterpiece," where Winchester lays out the elegant structuring of volume 4, part 3, *Civil Engineering and Nautics*, as it progresses from stone to water, from walls and roads through bridges and canals to ships and navigation. Winchester itemizes the contents of one of the *Nautics* box-files and suggests how Needham, Wang Ling, and Lu Gwei-Djen integrated the wildly diverse materials into the volume, filtering, composing, and checking with experts over a period of fifteen years. The section nods in passing to Needham's fundamental belief that science and civilization are inseparable, quoting a single sentence to illustrate what Winchester calls "explication," namely the discussions in which the authors set the rise and fall of technological advances in navigation in their political context.

The final chapter of *The Man Who Loved China* covers the publication of volume 1, its reception, and the forty remaining years of Needham's life. The steady appearance of further volumes of *SCC*, of monographs on clocks and acupuncture, and of influential collections of essays serves Winchester essentially as backdrop in this chapter. The meat of his story is an unfolding of how Needham's admiration for socialist China fared in the face of successive campaigns and policy turns, and how Needham, his friends, and supporters eventually managed to build a durable institution, the Needham Research Institute, to carry the *SCC* project into the future. The chapter ends with Needham's death in 1995. In an epilogue, Winchester sketches the roiling dynamism of the new China and makes the very reasonable claim that China's immense confidence and technical optimism today would not be possible without the pride in past achievements that Needham and *SCC* did much to shape. Winchester concludes with an appendix, a list compiled by Needham over the years of almost three hundred Chinese inventions and discoveries and the dates when they were first mentioned. "The mere fact of seeing them listed brings home to one the astonishing inventiveness of the Chinese people," Needham wrote (p. 267), and it is this list and what it might tell us about the rise, fall, and resurgence of Chinese inventiveness that are the leitmotif of Winchester's story.

So is *The Man Who Loved China* an accurate account of Needham, his project, and his legacy? Is it a work that has something interesting to say on the history of technology? *The Man Who Loved China* is unashamedly a popular, not an academic, biography, and accuracy is certainly not one of its strong points. But need that matter in a broader perspective? A book written as a rattling good tale will naturally miss some historiographical niceties, but that doesn't necessarily disqualify it as a useful record or as a

source of stimulating insights. The problem as I see it is that Winchester has only grasped part of the passion that drove Needham, and part of what he set out to do in and through *SCC*.[5]

To summarize, in Winchester's rendering Needham fell in love with a Chinese woman, and through her he fell in love with China. Only then did he become interested in the historiography of science. Needham's radical contribution was to discover a multitude of Chinese inventions, and thus to persuade the world (and the Chinese themselves) that they had a glorious past. Many of these inventions and discoveries contributed to the making of the modern world as we know it: as a result of Needham's research China could no longer be discounted as an inferior civilization or excluded from the history of science. Yet Needham was confronted with a conundrum: after many centuries of unbroken creativity the Chinese capacity for innovation had waned to almost nothing by about 1500. Why did this occur? Why did the Scientific Revolution take place in Europe and not in China? This was the "Needham Question," and Needham himself could offer no single satisfactory explanation. Perhaps bureaucracy was to blame, perhaps the anti-metaphysical nature of Confucian thought. Needham, says Winchester, brilliantly uncovered the creativity in China's past, but then he and "the small army of sinologists who have followed in his footsteps" got bogged down in the question of why modern science did not arise in China. Misguided fools! In his epilogue Winchester sketches the headlong pace of change in China today: no longer poor, no longer "a sinkhole of decay and desuetude," China is a powerhouse of growth and innovation where "creativity, true inventiveness, is starting to flow again" (p. 262). If Chinese society is inherently inventive over the *longue durée*, says Winchester, perhaps the period of stagnation was just a hiccup and the Needham Question need never have been asked.

In Winchester's account, Needham's discoveries about China are reduced essentially to a list, and to a list of technological inventions that includes almost no mention of science. Nobody who reads *The Man Who Loved China* or pores over the appendix could be left in doubt that the ancient Chinese invented lots of neat stuff: gunpowder, the mariner's compass, the crossbow mechanism, chain suspension bridges, forms of algebraic notation, even—mysteriously—vinegar and steamed bread. As Winchester correctly observes, although without venturing any reflections on the reasons, Needham himself had a weakness for making lists of inventions and discoveries with their dates East and West, and as he grew older his list of Chinese firsts became something of an obsession. The rhetorical

5. Historian Gregory Blue, who worked for many years as Needham's personal assistant, is currently completing an intellectual biography of Needham. A short preliminary version can be found in Gregory Blue, "Science(s), Civilisation(s), Historie(s): A Continuing Dialogue with Joseph Needham," in *Situating the History of Science: Dialogues with Joseph Needham*, ed. S. Irfan Habib and Dhruv Raina (New Delhi, 1999), 29–72.

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power of such lists is not negligible in an age where innovation is equated with progress, and the incantation of the list in itself was sufficient to bring about a change in popular understanding of China's place in world history. The short version of Needham's list of Chinese inventions (paper, printing, the compass, and gunpowder) is now a commonplace, familiar to schoolchildren and to the general public around the world, not least in China itself where they are known as *si da faming* ("the Four Great Inventions"). It was the "Four Greats" that featured so dramatically in the opening ceremony of the Beijing Olympics.[6]

Winchester's story seldom takes us deeper, technologically speaking, than the name of the invented object and its function. Indeed, sometimes I began to suspect that the volume on *Nautics* was the only part of *SCC* itself, or indeed of any of Needham's writing on the relations between science, technology, and society, that Winchester had given a close reading, and that for the rest he relied on popularized versions like Robert Temple's, which also favor lists over systems.[7] The true magic of *SCC*—invisible in Winchester's account—lies in Needham's detailed and precise attention to the mechanics, or the organics as the case may be, of mills, alchemical procedures, medical therapeutics, or algebraic calculations.[8] This is the level at which Needham can legitimately discuss how items fit into systems. It is also the level at which Needham embeds technical devices or scientific ideas in a conceptual and cultural matrix, the level at which he links poetry and mechanics, medicine and cosmology, ecology and architecture, science and civilization. Moreover, as a Marxist historian, Needham was always critically attentive to the economic, political, and ideological context in which knowledge was produced and technological choices were made. It was at this sophisticated, organic level of analysis that many of Needham's most powerful and influential pronouncements about science, technology, and society in China were formulated—and of course it is this level at which the conundrum of the Needham Question was formulated.

A curious feature of Winchester's account is that he ignores both the

6. "Paper making was represented with a dance and an ink drawing on a huge piece of paper, printing by a set of dancing printing blocks, a replica of an ancient compass was showcased, and gunpowder by the extensive firework displays during the ceremony. A survey by the Beijing Social Facts & Public Opinion Survey Center found that Beijing residents found the program on the Four Great Inventions the most moving part of the opening ceremony"; "Four Great Inventions of Early China," http://en.wikipedia.org/wiki/Four_Great_Inventions_of_ancient_China (accessed 30 September 2009).

7. Robert Temple, *The Genius of China: 3,000 Years of Science, Discovery and Invention* (London, 1986; reissued 2007).

8. The enthusiastic critical responses to the two most recently published volumes of *SCC* demonstrate that this *SCC* approach still generates instant classics in the field: Rose Kerr and Nigel Wood, with Ts'ai Mei-fen and Zhang Fukang, volume 5, part 12, *Ceramic Technology* (Cambridge, 2004); Donald B. Wagner, volume 5, part 11, *Ferrous Metallurgy* (Cambridge, 2008).

science and the civilization of Needham's title almost entirely.[9] He is content to take technological inventions as a proxy, and it is the rate and variety of such inventions that he offers as indicators of civilizational vigor. In this he follows Needham's lead; indeed Needham was severely criticized for this reductionist tendency, among others by Lynn White jr. in his contribution to an *Isis* symposium on *SCC* published in 1984.[10] Yet although Needham sometimes (carelessly? cunningly?) led his readers to infer that the existence of a technical practice indicated a formal scientific understanding of the natural processes involved, more typically, in any case where sufficient context was available, he tried to investigate as precisely as possible the reciprocal impact of science and technology, scholarly and artisanal knowledge. Here Needham acknowledged Edgar Zilsel as an important influence.[11] Whatever interest historians of technology saw in the 1980s in arguing that technology and science should be studied as distinctive epistemological domains, today the articulations between craft and science, material techniques and formalized knowledge are recognized to be one of the most productive foci in the historical field.[12] Another important historiographical field that marries material practices and tacit and explicit knowledge is the study of the circulation of skills and knowledge, networks and nodes, techniques of inscription, grammars of representation, and modes of readership.[13] A further fundamental perspective is added by concepts like governance.[14] The scholars pursuing such research on premodern

9. He dismisses the *SCC* volumes on alchemy, which Needham and his colleagues considered key to the oeuvre, as "magnificently irrelevant" (p. 248).

10. *Isis* 75 (1984): 172–79.

11. See Joseph Needham, "Preface," in E. Zilsel, *The Social Origins of Modern Science*, ed. Diederick Raven, W. Krohn, and R. S. Cohen (Dordrecht, 2000), xi–xiv, as well as the essays in Joseph Needham, Wang Ling, Lu Gwei-Djen, and Ho Ping-yü, *Clerks and Craftsmen in China and the West: Lectures and Addresses on the History of Science and Technology* (Cambridge, 1970).

12. Recent examples in the field of Chinese history include Jacob Eyferth, *Eating Rice from Bamboo Shoots: The Social History of a Community of Handicraft Papermakers in Rural Sichuan, 1920–2000* (Cambridge, Mass., 2009); Francesca Bray, "Science, Technique, Technology: Passages between Matter and Knowledge in Imperial Chinese Agriculture," *British Journal for the History of Science* 41 (2008): 319–44; and Dagmar Schäfer, *Knowledge and Technology in 17th-Century China: Unfolding the Layers of the Tiangong Kaiwu* (forthcoming, Chicago, 2011).

13. E.g., Ji-ren Feng, "Bracketing Likened to Flowers, Branches and Foliage: Architectural Metaphors and Conceptualization in Tenth- to Twelfth-Century China as Reflected in the *Yingzao Fashi*," *T'oung Pao* 93, nos. 4–5 (2007): 369–432, and Francesca Bray, Vera Dorofeeva-Lichtmann, and Georges Métailié, eds., *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft* (Leiden, 2007).

14. E.g., Xiaochun Sun and Jacob Kistemaker, *The Chinese Sky during the Han: Constellating Stars and Society* (Leiden, 1997); Randall A. Dodgen, *Controlling the Dragon: Confucian Engineers and the Yellow River in Late Imperial China* (Honolulu, 2001); Pierre-Étienne Will, "La Réglementation administrative et le code pénal mis en tableaux," *Études chinoises* 22 (2003): 93–157; and Nathan Sivin, *Granting the Seasons:*

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China today, of whom there are many, all acknowledge a profound debt to Needham's pioneering explorations of patterns and linkages of knowledge.

Let me now return to the Needham Question, which Winchester portrays as Needham's logical response at the time to a perceived historical rupture. He then goes on to argue that today's Chinese renaissance shows that the supposed rupture was just a short hiccup requiring no explanation. Needham himself had a love-hate relationship over the years with his dratted question and the teleologies it implied. When the grand plan for *SCC* was initially drawn up, Needham earmarked volume 7 as the overview that would provide contextual answers, laying out the differences in social background and historical circumstance that had shaped the distinctive trajectories of science in China and Europe. Some of the collaborators whom he signed up to work with him on the task struggled loyally to give coherence to Needham's many thoughts on these issues over the years.[15] Others thought it more productive to reframe the Needham Question in contemporary historical terms, and eventually it was decided to publish their studies elsewhere.[16]

So did the Needham Question indeed lack historical value? The counterfactual in fact unravels quite neatly, as Nathan Sivin noted in 1982, into another question, one that is properly historical, namely: Why did the Scientific Revolution take place in seventeenth-century Europe? Better still, why did that particular kind of scientific revolution—or (now that the concept of the scientific revolution is itself out of fashion) why did that particular kind of snowballing of natural knowledge, and of the technical practices that reproduced the truth of those knowledge claims—evolve in Europe in the seventeenth century?[17] The original Needham Question of why something *didn't* happen, namely "the" Scientific Revolution, usually gets mashed in with another counterfactual question, namely why late imperial China with its sophisticated and productive economy did not give rise to industrial capitalism. Winchester is not wrong to note that many historians have addressed these issues over the years. Those who take the Western historical experience to be the unique and inevitable path of progress treat alternative paths as failures—no surprise there. But increasingly historians propose comparisons that are more symmetrical, testing each society in the other's terms. They might weigh the successes and fail-

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The Chinese Astronomical Reform of 1280, with a Study of Its Many Dimensions and a Translation of Its Records (New York, 2009).

15. Joseph Needham, *SCC*, volume 7, part 2, *General Conclusions and Reflections*, ed. Kenneth Girdwood Robinson, with contributions by Ray Huang and introduction by Mark Elvin, 2004.

16. See the chapters by Timothy Brook, Gregory Blue, and Immanual Wallerstein in Timothy Brook and Gregory Blue, eds., *China and Historical Capitalism: Genealogies of Sinological Knowledge* (Cambridge, 1999), dedicated to Needham.

17. Nathan Sivin, "Why the Scientific Revolution Did Not Take Place in China—or Didn't It?" *Chinese Science* 5 (1982): 45–66.

ures of eighteenth-century European statecraft, for example, in terms of the goals and strategies of the Qing state, highlighting how differences in political philosophy translated into distinctive administrative and material technologies of governance.[18] They might investigate why iron production in China started on an industrial scale two thousand years ago but eventually ended up small-scale, whereas in Europe the historical trend was exactly the inverse.[19] Although comparison is not essential to such investigations, contrasts between societies help draw attention to the *significance* of technologies and technological choices in specific social contexts. Studies of this kind, which delve beneath the surface categorizations of technological activities to ask what broader cultural purposes they serve,[20] pave the way toward a more convincing incorporation of technology into world history. In other words, as Sivin notes, while the Needham Question is not a valid historical question in itself, as a heuristic it has certainly proven immensely fruitful.

Finally, in assessing how true *The Man Who Loved China* is to Needham's own goals and passions and to his legacy, we need to remember that for Needham and for the many people he influenced, the *SCC* project represented rather more than a love affair with China. Like many of his fellow scientists in Britain, Needham was a convinced (if unorthodox) Marxist. He mistrusted technocracy, and he believed that science should be made accessible to all citizens in a truly democratic society. Furthermore, he felt all scientists needed to understand the history and sociology of science if they were to work responsibly.[21] Several years before he became interested in Chinese history Needham had already begun writing critical history of science to challenge prevailing orthodoxies. The paper given by the Soviet physicist Boris Hessen on "The Socio-Economic Roots of Newton's *Principia*" at the Second International Congress of the History of Science and Technology, held in London in 1931, deeply impressed and influenced Needham, confirming his resolve to write critical, "externalist" history that would reveal the connections between scientific ideas and social structure.

Initially Needham published various essays on science and scientists in

18. R. Bin Wong, "The Search for European Differences and Domination in the Early Modern World: A View from Asia," *American Historical Review* 107 (2002): 447–69.

19. Donald B. Wagner, *The Traditional Chinese Iron Industry and Its Modern Fate* (Richmond, UK, 1997).

20. Nice examples are Lothar von Falkenhausen, *Suspended Music: Chime Bells in the Culture of Bronze Age China* (Berkeley, Calif., 1994); Lothar Ledderose, *Ten Thousand Things: Module and Mass Production in Chinese Art* (Princeton, N.J., 2001).

21. Needham belonged to a close-knit group of British scientists that included J. D. Bernal, J. B. S. Haldane, Lancelot Hogben, Hyman Levy, and Julian Huxley. All were active socialists, and all wrote historical or social analyses of science for the general reader; Bernal's *The Social Function of Science* (New York, 1939) is the outstanding example. For a full account of the radical impact of the group, as well as their limitations, see Gary Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s* (New York, 1979).

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early modern England. When Lu Gwei-Djen erupted into Needham's life he realized that Chinese history offered an even more radical opportunity. It would allow him to broaden his critique of scientific hierarchies beyond class analysis, and to develop arguments already nascent in his work that science was a universal human activity.[22] In other words, the story Needham set out to tell in *Science and Civilisation in China* was intensely political, and it was not just about China. Its premises radically challenged foundational beliefs about Western superiority and manifest destiny: modern science and technology, argued Needham, were not the products of uniquely rational Western minds but incorporated fundamental contributions from human societies around the world. This is why he referred to modern science not as "Western" but as "oecumenical." In documenting China's rich legacy of scientific ideas and technical achievements and its direct or indirect inputs into modern science, Needham also gave full recognition to the manifold contributions from India, West Asia, the Islamic world, Mongol invaders, and eventually Europe that helped shape the evolution of science and civilization in China over the course of its long history. Needham hoped not only to restore China's historical reputation but also to convince his readers that any science, anywhere, was always the product of intercultural flows and exchanges.

Needham's approach was designed to pave the way for a world history of science and technology. The nationalist zeal with which the Chinese (and Winchester with them) have cherry-picked Needham's findings to argue for intrinsic Chinese superiority is quite understandable, but not quite what Needham was after.[23] There is no doubt that Needham was a *Man Who Loved China*, but that alone would not explain the honor in which Needham is held today among historians of science, of technology, and of civilization in India, Mexico, or Japan.[24]

22. At just this period the anthropologist Bronislaw Malinowski was also developing iconoclastic arguments that "savages" like the Trobriand Islanders did science. In 1925 Needham edited a collection entitled *Science, Religion and Reality* (London) which contained an essay by Malinowski.

23. Although it would be wrong to claim that Needham was immune to the temptations of China-triumphalism.

24. See for example Habib and Raina (n. 5 above). For an assessment of the impact of Needham's work on world history, see Robert Finlay, "China, the West, and World History in Joseph Needham's *Science and Civilisation in China*," *Journal of World History* 11 (2000): 265–303.