
Fu Daiwie

[Fu Daiwie teaches at Tsing-Hua University of Taiwan. His current research is in two areas: Cultural history of science and biji-texts in Song China; Gender/sexuality in Taiwan's modern history of medicine.]

This is a very special and much needed collection of papers concerning "dialoguing with Needham" at the end of the 20th century. The collection has its origin in a conference organized jointly by India's National Institute of Science, Technology and Development Studies (NISTADS), the Delhi Science Forum, and the Maison de Sciences de l'Homme, Paris, held at New Delhi in September 1996. This indeed seems to be just the kind of cooperation and place for a conference that would have pleased Needham himself, while the conference itself, 'Science the Refreshing River,' according to the editors of this volume, "was conceived of as a homage to Joseph Needham and inspired by and reflecting Needham's lifelong engagement with crossing disciplinary and institutional boundaries..." (Preface, vii).

Basically, *Situating the History of Science* (*Situating* hereafter) consists of 13 essays in the following categories: introduction, the social epistemology of Needhamian historiography, historiography of the sciences, and the universality of science reconsidered. The contributors of these essays primarily come from France and India, with a few from Canada and the United Kingdom, and they are mostly historians, sociologists, theorists of science studies and development studies, as well as philosophers. Interestingly, there seems to be no contributor or participant from East Asia or China, whose history Needham and his collaborators spent most of their energy in studying.

What are the major issues which have been chosen for this collection of papers intended as a homage to Needham? At least two recur throughout *Situating*, and seem to be the focus of most papers, namely, the end of cold-war ideology and extreme内部ism in the history of science, and the so-called cultural turn in science studies, with its more extreme directions such as post-modernism and cultural studies. Indeed, I think that one special strength and attraction of this volume, with Needham and his legacy in mind, is that it provides the opportunity to learn what these scholars in science studies (specialised in Chinese and Indian sciences!) say about these hot topics, already so thoroughly discussed by "mainstream" Western intellectuals.

It is certainly interesting to see how the "cold-war ideology" (characterised by a neutral and apolitical stance, plus extreme internalistic orientation in history of science) is used by a number of papers to explain the decline of "the Needham spirit" during that era. Thus, according to Elzinga's paper, we saw in the cold-
war years the eclipse of the social history of science, or the abstraction of science from its social/political contexts, and presumably a decline of spirit of social responsibility among scientists. In a different way, in Raina & Habib's paper, we can perceive this problem in the non-emergence of a Needhamian history of sciences in post-war India. Although this is certainly not the place to discuss the launch of a full-scale attack on Thomas Kuhn in Steve Fuller's new book, some of Fuller's earlier mockings of Kuhn's popular "normal science" talks (supposedly used if not specially designed by cold-war ideology to suppress "critical rationalism"), or Fuller's "parable for postmodern times" (1992), were cited by Elzinga (p. 100) and highlighted in the Introduction (by Raina, p. 6) to underscore the problem and influence of cold-war ideology on the history of science in general. With the official close of the cold-war era, the historiography of the history of science therefore should be set free and granted a new departure, and with it, a revival of some of Needham's more sophisticated historical visions.

While very much applauding the recent scholarship on the history of cold-war science by Paul Forman and others, I am somewhat uneasy about this heavy attack on internalism and the supposed essential connection between it and cold-war ideology. To avoid throwing out the baby with the bath water, we should not ignore the better aspects achieved by the internalist historians of science in past decades. Moreover, dialectically speaking, without the challenges and developments in internalism during the cold-war era, the level of sophistication in social studies of science could not have reached the height we have now. Instead, we might still be stuck with the traditional "Bernalism, social class and the social function of science" (p. 99). The supposed essential connection between internalism and cold-war ideology is indeed an issue that is both revealing and problematic. Much more detailed studies are needed in order to better reveal the extent to which our academic identities and scholarship have been constructed by cold-war discourses. How strong was its hold, and who has been able to actually escape from it? But it is also problematic in the sense that it is easy to discern many challenges and developments in the cold-war era in both the history of science and the social activism of scientists—challenges that are in contradiction with dominant cold-war ideology. Social studies of science and sociology of scientific knowledge (SSK) had already emerged in the 1970's, and social awareness and activism among scientists has been developing again since World War II, most especially after the protests of the 1960's. Thus, the whole picture is certainly a good deal more complicated. Meanwhile, prompted by these post-cold-war reflections, I was also wondering about what our own communities in the history of Chinese science were doing during that era, both as historians and social intellectuals.

Besides the end of the cold-war, the end of the 20th century has also been characterised as the end of many other things in science studies, such as the end of objectivity, rationality, and universality, as some more radical trends of the general "cultural turn" of science studies would have it. Where is Needham's
heritage then to be situated in this cultural turn? For the sake of argument, I shall divide the issue of this cultural turn into two aspects in order to better engage in a dialogue with this volume under review; first, the positive theme of turning away from the traditional Eurocentric narrative of history of science under such guises as objectivity and universality, and secondly, the negative theme of stressing the culturally constructive and historically contingent nature of various scientific traditions to the extent of denying abstract rationality, embracing anthropological relativism, and finally treating discourses of objectivity and truth as forms of power strategies.

Let me first discuss the positive theme of turning away from Eurocentrism and affirming various non-European knowledge traditions. It is certainly on this score that Needham's heritage and his collective efforts acquire a firm position in the changing picture of the history of science and are highly regarded by contemporary feminist science studies activists, such as Sandra Harding and others. Thus Raina and Habib have aptly considered Needham's works as "the first de-centring" of the Eurocentric Old Big Picture of science (p. 284), well before the contemporary second de-centring in the cultural turn. The general collective achievement by Needham and others in this respect is endorsed by all contributors of this volume. More specifically, however, Needham's special theories and governing models in this first "decentring" are not without their problems. 1 For example, his cross-cultural diffusion theory of science and technology in history, important for his argument concerning the great Chinese contributions to modern science, has often been challenged by critics (see Blue's article, pp. 49-50). Although his diffusion theory has potential, as further considered and developed by Fuller and Paty's articles in this volume, much more elaboration is needed. I will come back to this later. As for his dominant model for the relationship between modern science and various ethnoscientific traditions (European included), nothing is more famous than his "rivers and sea" metaphor: "the older streams of science in different civilizations like rivers flowing into the ocean of modern science" (p. 220). However, as accurately pointed out by Chemla in her article, this model has serious limitations, most specifically that it often ignores knowledge traditions that had no chance to flow into the ocean (forming an "inland lake" instead), and by taking modern science as the "ocean," Needham often unwittingly privileged the European scientific tradition.

Moreover, there is the famous problem for Needham that he uses "modern scientific disciplinary categories to classify and analyse traditional Chinese

1 In Gregory Blue's article of this volume, "Science(s), Civilization(s), Historie(s)," p. 49, he cited Derk Bodde's book, and comments "[Bodde's] criticism of Needham's appreciation of Daoism may well be telling, and seems to be fairly widely shared, though Needham himself remained unrepentant." I would just like to indicate here a recent reevaluation of the relationship between science and Daoism by Alexei Volkov, who found merits in Needham's original formulation and questioned instead Sivin's later criticism of Needham's Daoist appreciation. See Volkov's "Science and Daoism: An Introduction," in Taiwanese Journal for Philosophy & History of Science no. 8 (1996-1997), pp.1-58.
thinking about nature” (p. 46). There is much that could be said about this problem—perhaps one of the most commonly made mistakes by historians of non-European knowledge traditions—but I must stop here in order to continue my review. These suspicious residuals of Eurocentrism, therefore, are still present in Needham's first decentring, and often pointed out by his critics in the second decentring, all of whom were actually standing on his shoulders in order to see further. Now, since the first decentring was incomplete, how about the second decentring?

Let us turn to the "negative theme" of the cultural turn. If we consider the negations proclaimed by the cultural turn from simple perspectives like rationalism or realism, it is easy to arrive at the conclusion that the notions of the objectivity and universality of science are under serious attack. The much feared relativism seems to be winning the day. However, the situation is, of course, much more subtle. In a certain sense, Elzinga's article argues that Needham's "ecumenical science" project is on the same side as Said's post-colonial "hybridity" in going against "Seyyed Hossein Nasr's gnosiss-oriented call for a resacralization of science" (p. 103), or any other "totalizing narratives, whether they come from East or West" (p. 104). It is impressive to read how Elzinga tries, very seriously, to situate Needham's vision and project within the difficult and philosophically demanding discourses of post-colonial hybridity and difference. This is indeed a dialogue of great effort. However, when Elzinga tries to criticise hyperreflexity and postmodern hybridity from a Needhamian perspective, it looks a bit too simple, and much more elaboration is really needed. Let me say a few more words on this point.

Against post-colonial difference and incommensurability, Elzinga poses Needhamian projects of cross-cultural comparative studies. And against the negation of universality of science, Paty poses cross-cultural transmission and diffusion of knowledge as a new form of universality (p. 317). From a strategic point of view, both Elzinga and Paty seem to have taken a clever position in overcoming the negations and reinstating modern science in a new ecumenical spirit. However, there are tremendous epistemological difficulties to overcome before a sophisticated theory of cross-cultural comparison can be established. Theories of post-colonial difference or Kuhnian incommensurability in history of science cannot simply be dismissed by the charge of hyperreflexivity. They are either to be refuted or we must live with them.2 It is one thing to listen to this Needhamian dialogue and its discontent: "How then do we get out of this blind alley in which cultural analysis of a hyperreflexivity kind leads to an infinite regress, disabling us from doing anything but comparison as a work of bric-a-brac juxtapositions?" (p. 111). But it is quite another to construct a social and epistemological theory of cross-cultural comparison or dialogue that can meet the

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challenges from incommensurability, or that can achieve deeper meaning, and thus go beyond the mere bric-a-brac juxtaposition kind of shallow comparison. However, so far as I can see in this volume, an adequate epistemology for cross-cultural comparison or dialogue has yet to be constructed and tested.

Despite a strategic angle that has been highlighted by Elzinga, Paty, and possibly Fuller in this volume, it seems to me that the real content is yet to be fleshed out. No wonder, perhaps, that Raina and Habib express uneasiness regarding the future of civilisation studies in the light of the second decentring. In a very interesting paper, "The Missing Picture," Raina and Habib finally bring us back to the issue of how to situate Needham's projects in the horizons of Asian people, historians and intellectuals, be they Indians, Chinese, or Taiwanese. It is a very pleasant experience to read how Raina and Habib explain the social and conceptual obstacles in the way of the non-emergence of a Needhamian history of sciences of India. So many factors concerning the development of history of science in various third world Asian countries are common! In the end, Raina and Habib have reflected to the point of asking not merely the non-emergence question, but also "why a Needhamian history of sciences of India" in the first place (p. 298). Indeed, besides the fact that Needham's voluminous works have enriched the history of Chinese science corpus, and the fact that he substantially contributed to the Western "recognition" of Chinese national achievements, how else should or would Needham's vision and project relate to the concerns of East Asian historians and scientists?

While receiving numerous exceptional plaudits from China, Needham seems to exert little influence on the historiography of science as evidenced in the case of mathematics, according to Jami's article in this volume. Therefore, Jami is tempted to conclude that "the main value of Needham's enterprise from the viewpoint dominant in China is that, as a distinguished member of the Western scientific establishment, he granted recognition and legitimacy to China's scientific tradition" (p. 272). Naturally, I do not believe that Needham's enterprise deserves only this much to the East Asian people. While post-colonialism intellectuals like Said were worrying about the power effect radiated from the imperial orientalist establishment, the career of Needham's SCC corpus in East Asia is a rather different story. We East Asian historians and intellectuals should instead worry about the "uses and abuses" of Needham's works by Asian powers and nationalistic technocrats. Indeed it is by no means uncommon that problems and shortcomings of Needham's projects viewed from the cultural turn (or from the second decentring), actually become virtues and axioms of many US-trained

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3 In a recent article on "crossing taxonomies and boundaries," I discuss the merits and problems of Needham's methodology of comparative histories of science with Dr. Christopher Cullen. I specifically wrote: "[SCC] is fruitful,...only in the beginning phases, and I must confess that, as a historian of Chinese science, I often feel [in East Asia] the historical burden of its greatness." See my "Crossing Taxonomies and Boundaries: A Critical Note on Comparative History of Science and Zhao Youqin's 'Optics'," Taiwanese Journal for Philosophy & History of Science no. 8 (1996-1997), p.110.
East Asian technocrats. It is an irony sometimes for me doing the history of Chinese science in East Asia, that, while admiring Needham's vision and spirit, I often need to criticize Needhamian products, especially those made in East Asia.