

Remarks on the Conference

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Some Common Themes

In trying to summarize the importance of the papers presented here it is good to go back to beginnings and to return to the keynote address by which Professor Nakaoka gave a start to the proceedings of the conference. The inspiration of this address really sprang, as he explained, from his being struck by the similarity between present day problems of economic development—a subject he taught in Mexico—and Japan's early take-off.

He set out presenting a sketch of what seemed to be two essences, that of the old precapitalist economies of Asia, on the one hand, and the European industrial economy on the other. He assumed, it seemed, that the two were incompatible, and that, if they encountered each other over what he termed a "frontier", a "dualistic", "hybrid" structure came into being in which at best a so-called "traditional" and a "modern" sector led a "parallel" existence. Later, Professor McLeod suggested this might be too simple a model. One remembers the Rudolphs showing how traditional culture sometimes has in store exactly the elements that modernity needs to respond to nineteenth and twentieth century challenges.¹ Perhaps all ancient living traditions are rich enough to provide starting points for "modernization" if they select, rediscover, or if need be reconstruct their immense heritages.

Towards the end of his paper, Professor Nakaoka had apparently largely overcome this dichotomy between traditional and modern. By then he was supporting a theory of proto-industrialization, which of course meant a shift of focus from the Meiji to the late Tokugawa period, i.e. before any proper industrial revolution could have taken place in Japan, and when there could have been no dualistic economy or any frontier between two modes of production. He did not, however, define the concept of proto-industrialization, but suggested a number of other questions, all of an economic-historical character.

¹ Lloyd I. Rudolph & Susanne Hoeber Rudolph *The Modernity of Tradition: Political Development in India* (Chicago & London 1967).

However, turning again to the main body of his paper in search of elements of Japan's early modern proto-industrialized social structure, one is struck by the degree to which the author stressed the role of the agents of Japan's development: the *han* (or clans), the samurai and the early bureaucrats and entrepreneurs. They educated themselves and took the lead to provide Japan with a modern infrastructure, materially as well as cognitively. It was the Japanese "traditional" elite which transferred science and technology to the country and which started a process of relentless learning and development. Modernity was not the opposite of tradition but largely emerged from it.

A crucial element, therefore, emerged here, right at the beginning of the conference: that of the Asian demand and its agency. Whereas in many other papers it would apparently be assumed that the transfer of science and technology was a subject naturally to be looked at from the Western, supply side, here non-Western initiative and selection was the crucial force. The process of learning moved forward unremittingly in Japan, trial and error playing an important part; the material and epistemological infrastructure of the country went on increasing, and in the process the distinction of what originally was Chinese, Western or "traditional" was soon lost, if such labels of origin ever had any meaning for the analysis of development, which is probably doubtful.

One wonders, however, whether not some more crucial elements should be added to the story of Tokugawa and Meiji technological and infrastructural growth. Why could the Japanese traditional and competitive elite achieve as much as it did? Dr. Zurndorfer talked about a Chinese public sphere of which the public spirit of the gentry was a central component. Such a "public spirited" gentry must also have been central in late feudalism in Japan. In the discussion about parks sparked off by Professor Shirahata's paper, the theme of a public sphere or space came up again, this time in a non-figurative sense. Figuratively speaking, the legal culture of feudalism with its relative predictability of relationships and emphasis on the importance of contracts and mutual expectations must have provided a public world characterized at once by perspicacity and a degree of security. Early modern Japan, in other words, seems to have had at its disposal the social or legal technology or epistemes that are absolutely necessary for agents to take risks, whether financial, contractual, commercial or otherwise. These features, I suggest, must also have been at the basis of Professor Nakaoka's proto-industrialization, and they must have been among the leading factors in the early stages of renewed economic growth. Moreover, they represented forces that survived the abolition of feudalism, strictly speaking. To the Japanese, the world around them must have been predictable to a larger degree than was the case elsewhere in Asia, including China; here, in Japan, it paid to invest in education and, more generally, in longer

term projects, which in its turn meant that science and technology was more easily acquired, preserved, transferred and applied with a reasonable expectancy of result. Just as economists speak of the degree of perspicacity of the market, one can think in terms of the perspicacity of social and legal relationships or of politics. Japan, from an early date, rated high on such a scale. In putting it like this, I realize that I have stretched the concept of the *transfer* of scientific knowledge and technological design to include their acquisition, preservation, teaching and application, but I think that doing so is in line with what emerged from the discussions during the conference.

As Professor Satofuka showed, the Japanese elite remained in firm control of the process, also ideologically, but at the same time the feeling of public responsibility and security filtered down to the level of the village community where initiatives to acquire and diffuse knowledge were also taken.

As Mr. Tsukahara's paper showed, there are many connections between knowledge and power, between science and technology on the one hand and the economy on the other. In this respect, the very precise analysis of Dr. Thee, though at first sight it was out of focus because it dealt with recent matters far beyond the time frame set for the conference, may well have provided a heuristic tool for the analysis of cases of such a nature as described by Mr. Wang and Mrs. Zhang for China. The distinctions Thee makes are subtle, it is true, but his concept of "technological capability"—the ability to make effective use of technology—might have raised some doubts about the ultimate success of the technology transfer in the early Fujian Ship Management Office as described by these authors. Dr. Thee drew attention to the importance of the intricacies of technological reception as well as to the falseness of a concept "transfer of technology" if understood out of context and as simple, one-sided supply.

Dr. Zurndorfer, in line with this, added to our consciousness of the complexity of the subject by showing the importance of analyzing each case in its specific local conditions, and by drawing attention to the interplay and mutual borrowings between old and new technologies. There will be no transfer, as was later reemphasized by Dr. Daniels, without a demand for, or a niche for, any technological innovation in any existing system. Even more important than the Ch'ing governments that get all the blame in the papers by Luo, Wang and Zhang, were the gentry, whose ingrained respect for a legally dependable public sphere seems comparable to the familiarity of the Japanese elite with a similar tradition, even though conditions were widely different in parts of China. The scope of such an analysis may be widened by taking in other—rising, risen, or threatened—gentries in Asia, though the cases of China and Japan seem especially to call for comparison, because of the apparently similar ideology that sustained the elites of

these countries of East Asia. There was a marvellous article by Cohen among the papers of the first conference that might have been of help here.²

Indeed, the history of the transfer of science and technology is an exercise in social as well as intellectual history. One of the issues to be taken up by future conferences could be the comparative role of gentries and the emergence of a civil elite society in China, Japan and the Ottoman empire. These empires seem to me to have tended for several decades, with very different results to be sure, towards the emergence of a relatively secure early modern public domain with all that this meant in terms of the public accountability of their leaderships and the legal technology indispensable for the investment in major physical technologies. Such an approach would fit in the category of issues that was characterized by Professor MacLeod, on a suggestion from Mr. De Moor, as the contextual, or software, infrastructural line of analysis. Professor Om Prakash also stressed the importance of historical context, as of course, did Dr. Zurndorfer stressing its local forms. One wonders whether Dr. Broeze, if such contacts would be analyzed more closely, would still stick to his argument that in 1880 very few predictions could have been ventured about the respective outcomes of Chinese and Japanese maritime efforts because "objectively" they must have looked very similar.

Another issue that could be treated by historians, emerged during the second day of the conference, when, very roughly speaking, the emphasis of the discussions shifted from development economics towards Asian and European access to technology. This was accompanied, sometimes perhaps rather loosely, sometimes in a more carefully considered way (as in the case of Professor Sonoda's remarks) by the observation that in the last analysis "it is all psychology and culture". In the same vein, Dr. Blussé called attention to culturally defined cognitive structures or "thought systems". This is a theme that is obviously crucial. During the first conference a marvellous paper by Professor Yoshida on the translation problems between the neo-confucian idea of *ch'i* and the natural philosophy of Europe had done justice to it.³ But what about the equivalent of *yogaku* in other parts of Asia and Africa? Such an approach could take up an issue touched upon by Dr. De Moor but left for further analysis by him. He explained the psychologically, i.e. cognitively, disconcerting effects of new weaponry in the nineteenth century on the profession of infantry officers and on cavalry men in the West. Yet one wonders about cultural or psychological effects on Indonesians who after having felt the impact of the new arms, used these same weapons against the

² H. Floris Cohen 'The Emergence of Early Modern Science in Europe', in W. G. J. Rummelink, ed. *Journal of the Japan-Netherlands Institute III* (Tokyo 1991) 9-31.

³ Yoshida Tadashi 'The Encounter of the *Ch'i* World View with Western Physical Sciences', in *idem*, 113-24.

Dutch. Did they cope better than their European adversaries? We are told, it is true, that the cause of ultimate Indonesian defeats must be sought in political fragmentation, but Dr. Davids in last year's conference had told us that, at least in Europe, political diversity must be considered to favour technological progress.⁴ My own research into wars in South Asia also suggests the radically increased indispensability of the unswerving loyalty of junior officers as a result of changing infantry arms and tactics. But it also suggests that this appeal could not be met by a society for which war was always about negotiated settlements and changing loyalties rather than fixed loyalties to firmly legitimate territorial states. South Asia, in this instance, presents a case of incompatible discourses or, if you wish, "thought systems", similar to the clash so bravely faced and in a way won by Shizuki Tadao, as described in Yoshida's *ch'i* paper just mentioned.

If any problem is central to the theme of transfer of science and technology, it is this epistemological one, because it concerns the translation issue in the widest sense of the word, as well as the question of the legitimacy of one idiom in terms of another. I should not leave off here without paying tribute again to Satofuka, who set out to describe how the Japanese ruling elite "consciously selected only those elements of Western management" that would carry sufficient Japanese legitimacy, thus maintaining its power against the onslaught of a foreign "thought system".

At first sight, other papers, presented during the third day of the conference, may seem to resume issues already touched upon by other authors. Ruskanda on the sugar industry in a way corroborated what Broeze had said about the shipyards of Hongkong and Singapore: that they were isolated cases of rather advanced technology in a sea of traditional methods and enterprise. The Java sugar industry, indeed, was typical of the dual technology of Indonesia at that time. Horio's paper on agricultural technology as instanced in the spread of the modern short-sole plough was again a case, not of a one-way transfer, but of a balanced interplay between challenges from outside and inventiveness on the part of indigenous producers, in this case agriculturalists. Shirahata's work raised many questions such as: what have Japanese gardeners, with their extreme emphasis on composure and order (though not in a geometrical sense) in common with the European classicist gardeners' abhorrence of chaos? If the European public parks can be seen as the upper classes' attempt to give a gust of fresh air to the common people and domesticate them in the process, should Japanese parks, also laid out during a period of the reassertion of elite power, be interpreted in a similar vein? The papers of Professor Deepak Kumar and Mrs. Zhang again called

4 Karel Davids 'Technological Change in Early Modern Europe (1500-1780)', in *idem*, 32-44.

attention to the channels through which science and technology came to India and China, whether these were an educational system or a shipyard. Both authors in the last analysis take a political view of what from its nature might have been approached as a cognitive exercise. The British colonial and the Ch'ing political thought systems, one might say, are held responsible for a failure to achieve what elsewhere is achieved by the synergy of a host of factors.

Yet, these papers, on second thought, do not simply resume issues already touched upon by others. They all wrestle with the question: "Who actually, in the different cases examined, is in control of the transfer of science and technology and of a changing educational system, financially, politically and intellectually?" Of course it is not always the metropolitan government in the case of the colonies; nor is it always the gentry and the commercial classes in non-occupied countries. The question of the infrastructure of, and control over, research, development and education in the fields of science and technology deserves more attention from a comparative angle. This is again a question of the context in which science and technology are acquired, preserved, transferred and put to use, and this is a third field of research that might well be central to historical enquiry in the future, together with the issues of the emergence of a civil elite society in which it made sense to the agents to act on expectations of the near and middle-range future, and the question of epistemological transfer and translation.