

## The Importance of Case-Studies

There are many possible approaches to discussions of technology, and yet it must not be construed as an abstract subject. Technology is a concrete ingredient of daily life and must be dealt with in a concrete way. Therefore, the most meaningful dialogue on technology is initiated and developed in reference to actual cases.

In our own discussions we have encountered such ideas as “technology civilization” and the “nature of technology.” Our present study, however, has no direct bearing on these and similar notions. Our main theme is development and technology. The urgency of this subject is found in the torrent of many small but real problems that have gone unsolved and not in philosophical discussions of the nature of technology; we have been overwhelmed by the urgencies of real, everyday problems that must be successfully solved.

Rather than permanent solutions, we are interested in provisional solutions of smaller problems that exist now. Admittedly, however, even minor solutions cannot be expected immediately. Indeed, minor solutions, limited as they are, will surely generate new problems. We know that we may need to be satisfied with minor solutions to problems that can be anticipated when a question is raised, and we may even need to regard such solutions as final.

The methodological dialogue proposed by the United Nations University represents a challenge to the current situation in which problems of development have been confused and their solutions only groped for. The intention of a methodological dialogue is good, but the results have been modest, and a full appraisal remains to be reached. Furthermore, no grammar seems yet to have been established for methodological dialogue premised on the individuality and equality of the participants. We have already heard voices of disappointment, the reason for which is understandable. Certainly, methodological chaos has thus far dominated the dialogue. However, the disappointment characterizes the current situation of the development problem because, paradoxically, it expresses hope and expectation. There is no quick or

universal remedy that can be applied either to development or to methodological dialogue. Nevertheless, dialogue is meaningful because it promises an opportunity for all concerned to better understand the problems. This is the positive significance of dialogue.

We are in desperate need of detailed information on the problems of technology in developing countries in order to see the problems in their real context. Although there is no reason why the way in which we define a problem should be the same as or unified with all others, the factual information of case-studies must be provided for meaningful dialogue. Cases that cover a wide diversity of levels, ranging from factories to space technology, have been brought into our dialogue; however, we will confine ourselves first to problems at the level of the nation-state, inasmuch as the subject of development is the nation-state and development is a matter of its sovereignty. We then move to the level of the factory.

Although Japan early constituted a nation-state, conscious awareness of this on the part of the Japanese people came late. Until Japan was forced to open its doors in 1854, the average Japanese regarded his or her microcosmos as the universe. Although Japan had attained a high degree of social integration, unification as a national society came about only through industrialization, a process that began with the forced opening of the country. The 200 or more years that preceded the opening and the provincial mentality of this period, as well as the power structure established on the basis of this mentality, will be discussed in this section in the many diverse ways they apply to technology in the 1980s.

Japan moved from its feudal system, made complete with the closing of the country, to a state following the historical model formulated by European historians. In nominal terms, however, power and authority existed collaterally. The new government had achieved the unity of a nation-state, but in its tenth year (1877), the country was hit with a civil war. This furthered the economic confusion that had existed since the opening and confronted the newly born state with a threat to its existence.

Colonization was another serious threat. Foreign armed forces were permanently stationed at Yokohama; facilities were provided at the expense of the Japanese government, and extraterritoriality was granted. The new government even mortgaged the Yokohama Customs House to repay a loan it had inherited from the old shogunate government. As a result, there was no customs autonomy.

To maintain political independence, the new government had to repay its foreign debts. This made economic development essential, and the only available option was the introduction of European technology to incite an industrial revolution. Herein lies the relevance of the Japanese experience to development.

In Japanese academia, modern Japan has not been examined in terms of third-world development; it has been directly compared with only other advanced countries and not with those in Asia, Africa, and Latin America.

The conditions for international co-operation were not as well established when Japan began its development as they are today, and Japan had no neighbouring countries with which to co-operate. China's defeat in the Opium War frightened Japan's intellectual class; China had always been respected in Japan as a political and economic model, and this turn of events thus forced a reassessment.

Japan attempted negotiations with the Li dynasty of Korea so that it might cope in alliance with the new international environment, but Korea refused to open its doors. In an unexpected response, it even asked Japan to regard Korea as a superior nation, and the negotiations failed. Japan was thus isolated in the Far East and was put in the position of having to modernize on its own. Consequently, attempts at development were impetuous and met with a series of failures.

The technology transfers to Japan fell short of their goals because of short-sightedness and naivety. The lesson sorely learned was that future transfers had to be made selectively. So after several overly ambitious and optimistic experiments, technology transfer was re-initiated on a scale that was more realistic and rational.

Where technology was independent of control by the government and politicians, the five Ms were prepared and the question of technology settled. The five Ms and the establishment of technology were realized first in such light industries as textiles and food processing, later in the mining industry. Heavy industry existed only on a small scale, and it was not the leading sector.

Motivated by the needs of national defence, the Japanese government encouraged the manufacture of iron for shipbuilding and for producing arms and ammunition; the government also promoted the development of iron mines for iron manufacturing and the construction of railways and ports for iron-mine development. The process represented the reverse of that of modern Europe, though in overall industrialization, Japan trod the European path as it moved from light manufacturing to heavy industry.

But Japan accelerated and shortened the process. One factor in the acceleration was the government's policy of encouraging industry. This policy was co-ordinated by the national ministries regarding implementation, but, more significantly, it was implemented both for the central government and for the prefectural and village governments to assist on all levels in survival and development amid the serious economic upheaval they were experiencing. The name of a clothing manufacturer, Gunze, literally "district guideline," provides perhaps an amusing display of the strategy.

The policy of encouraging industry was not first formulated by the Meiji government; such a policy had been implemented by the feudal clans under the Tokugawa shogunate (for example, one by Yokoi Shonan [1809-1869] of the Fukui clan). However, the Meiji government developed the policy on a nation-wide scale.

In developing a military industry to meet state defence needs, the over-

whelming technological gap could not be narrowed by only the purchase of equipment and machinery. It was necessary to learn how to operate the equipment, and to manage its maintenance and repair.

But, before the needed equipment and machinery could be introduced, foreign currency was required, and for this, the technology for silk reeling was brought into government-operated plants to provide an export product for foreign markets. But in this we see a paradox: the promotion of agriculture was necessary first to make industrial technology possible.

In the mining industry, copper-mining developed favourably by using transferred technology until the end of the nineteenth century. As in coal-mining, the copper was not for domestic consumption but for export.

It is inevitable that late comers in industrialization will aim at increased production or development of agricultural products and raw materials for export. Only at a later stage can the agriculture of a country supply raw materials to its own manufacturing industry. Following this model, it is important that each agricultural division be looked at in terms of its stage of development and that an assessment be undertaken of what industrial technologies have been transferred and established in relation to other industrial divisions, in order to take action toward answering development needs.