disease. Many chōnaikai in Tokyo were organized to help out in the aftermath of the Great Kanto Earthquake of 1923. According to a 1936 survey, there were about 3,000 chōnaikai in Tokyo to which 90 per cent of the 1,050,000 households belonged. Nakamura says that the prewar chōnaikai had to assume a liaison function with health authorities, the police, and local government and public offices. As a result, the administration role of the chōnaikai was intensified and they were increasingly called on to get out the vote for local assembly elections.

2. RURAL SOCIETY

1. Irrigation and rural society in Japan -- Akira Tamaki
2. The development of irrigation technology -- Isao Hatate
3. Land improvement policies in modern Japan -- Naraomi Imamura
4. Land improvement projects and increase in productivity -- Keijuro Nagata
5. Creek irrigation system and the local society: case study -- Yoshito Jinnouchi
6. Irrigated farming in Hokkaido: case study -- Chosei Shichinohe
7. The development of market economy in rural society -- Takashi Tomosugi
8. The role of the state in irrigation development -- Shigemochi Hirashima

Well before the Meiji Restoration, Japanese rural society based on wet-rice agriculture was characterized by complex irrigation systems established to control local water resources. Tamaki's research points to the traditional institutionalized arrangements that existed between villages and between members of the same village to maintain water-control systems as one of the salient features of Japanese rural life. Japan never knew the great irrigation projects undertaken in China by a despotic centralized state. Rather, the shogunate and fief governments contributed indirectly to the support of irrigation systems by leaving the villages free to regulate water use locally as custom dictated while insuring the maintenance of the traditional social order.

The self-reliant system of water control that evolved in rural society was able to adapt naturally to the Meiji government's policy of state-led modernization. Traditional water-control practices were not destroyed, and this made possible the implementation of large-scale irrigation projects and the modernization of farm management.

At the heart of the irrigation system developed during the Tokugawa period was the common water users' league formed by villages as a constituent member. Water control was based on traditional water drawing

or use rights that gave priority to the oldest paddy fields. These rights served to minimize inter-village disputes arising over irrigation. Within a village, a water users' association promoted the intensification of agricultural production and contributed to the conservation of communal farm resources, such as irrigation facilities and forest and pasture lands.

The Meiji government established the principle of private ownership of land and levied a land tax on all landholders. With their property rights assured, landowners redoubled their efforts to improve production. Irrigation and land improvement associations, made up primarily of small and medium-sized landlords, actively undertook irrigation and land improvement projects on their own initiative.

The land reform that followed the end of the Second World War changed Japanese agriculture from a tenant- to an owner-farmer base. An agricultural co-operative system, in which membership was compulsory, was also established at this time and grew rapidly. Without destroying the base of highly-integrated peasant society, which firmly maintained the rural community relations, the agricultural co-operatives engineered major land improvement schemes. Farmers started investing extensively in machinery, chemical fertilizers, and pesticides. Today, however, the shortage of farm labour has led many part-time cultivators to rent their land out to full-time farmers on a contract basis. The effect of this new situation on irrigation practices remains an open question, according to Tamaki.

Hatate analyses the historical process by which Japanese irrigation developed. Under the early medieval manorial system (shoen), agriculturalists used local reservoirs, small rivers, and springs to irrigate their land. Major strides were made in irrigation technology after the sixteenth century. Water control techniques were developed enabling peasants to utilize the upstream as well as midstream of large waterways and the main currents of medium-sized rivers. As a result, large areas of land were reclaimed and turned into paddy fields. It is thought that new techniques entering Japan by way of China provided the impetus: feudal lords in those days undertook most of these projects, applying castle construction and mining techniques to local irrigation works.

Water management technology reached a new peak of development under the Tokugawa shogunate. The reclamation of paddyland, in particular, expanded rapidly as the principal method of water-control system developed from the Kanto school to the Kishu school. Unlike the Kanto technique (a type of inundation irrigation performed by building embankments at the bends of the serpentine course of a river), the Kishu school built banks that channelled the main currents of waterways in a straight line, utilizing the lowlands on both sides for new fields. The Kishu technique spurred the development of new paddy fields and enabled peasants to control water resources from a river's origin to its mouth. Unfortunately, the new method also raised the level of rivers and

increased the risk of serious flooding. Hatate tells us that compared with other rice-growing states in Asia at that time, the Kanto technique was on a par with other widely used technology; Kishu water-control technology, however, was in a class by itself and unique to Japan.

Imamura analyses the agricultural promotion policies pursued by the Meiji and subsequent governments, paying special attention to state investment in regional land improvement projects. After the First World War, the government for the first time started subsidizing a series of irrigation development projects designed to improve life in the farm villages, where poverty had given rise to the rice riots (1918) and to tenancy disputes. After the Second World War, the government continued to invest in land improvement projects to offset the critical food shortage of the early postwar years. After the 1960s, however, the over-production of rice, a shortage of farm labour, inflated land prices, and the pressure from abroad to liberalize farm product imports led to the first major changes in Japanese farming in modern times. The government responded to the farm crisis by turning its attention from irrigation projects to measures designed to raise farm productivity and promote mechanization. This shift in emphasis represents a major change in agricultural policy.

Nagata analyses increases in farm productivity through land improvement projects at the level of the farm household economy. The progress of land readjustment and development during Meiji, the rise in rice yields that resulted, the land improvement schemes undertaken by the government after the 1920s, and the spread of technical innovations in wet-rice agriculture all served to raise farm productivity dramatically. Nagata discusses the recent development of collective wet-rice cultivation by farm groups and considers the future of land improvement projects for upland fields.

Jinnouchi and Shichinohe take up concrete case studies. Jinnouchi studies a large-scale irrigation project involving the electrification of the creek irrigation system in the Saga plain. Shichinohe looks at the large-scale irrigation works, known as "Taisho canal" built by the government in Hokkaido where new land was being opened. He describes the problems of wet-rice technology in Hokkaido's cold northern climate and examines recent efforts to switch from rice to other crops.

Tomosugi finds that it is the human factor, the community consciousness and spirit of co-operation, as symbolized by collective water control, that gives Japanese rural society its special dynamism. He examines social customs and rituals in each of the four areas surveyed by this study group and relates these to the symbolism of water management. The four regions are the reservoir irrigation area of the Kako River plateau, the Chushindaira river irrigation area (Azusa River), the Saga creek irrigation area, and the Ishikari River irrigation area for newly developed land.

Irrigation methods and installations are different in each area, and Tomosugi describes the historical development of irrigation as represented by the order of the above four regions. He finds that social symbolism is expressed differently in each. Tomosugi shows that in the Ishikari region, being the last stage of development, money has become a more powerful symbol than water and notes that the most concrete expression of the penetration of the money economy into rural life, the agricultural co-operative, serves the function of creating stronger unity among local farmers.

Hirashima analyses the impact of irrigation projects on increasing agricultural production and equity in developing economies. Major development of irrigation works, he notes, is now being carried out by the public sector under the control of the central government in developing countries, where modern irrigation systems are replacing the traditional water-management practices of rural society. As a result, the role of the community in water control has been diminishing and the efficiency in water use has decreased accordingly.

Investment in irrigation projects almost never yields a return on the principal, making reinvestment difficult. Moreover, funds tend to be invested in fertile regions in order to raise productivity. This produces a widening gap in productivity and incomes between individuals and between regions.

Hirashima also points out that the development of underground water resources for irrigation purposes is going to play an important role in boosting agricultural production in the developing countries. But irrigation rights to this water are not clearly defined, and private capital is free to develop and use it as it sees fit.

One of the features that characterizes the development of irrigation in Japan is the fact that investment in irrigation projects has been made in a decentralized manner. Hirashima concludes that this factor has enabled village communities and local bodies to manage local water resources despite a strong centralized bureaucracy and also enabled them to prevent regional as well as inter-personal disparity from widening in the course of irrigation development.

3A. IRON AND STEEL

1. The origin and development of iron and steel technology -- Ken'ichi Iida
2. Japanese-run iron ore mines in prewar South-East Asia -- Bunji Nagura