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EDITED BY  
RONALD G. KNAPP

# CHINA'S ISLAND FRONTIER

STUDIES IN THE HISTORICAL  
GEOGRAPHY OF TAIWAN

CHINA'S ISLAND  
FRONTIER

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*Studies in the Historical  
Geography of Taiwan*

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# Introduction

Two contrasting frontiers have framed the Chinese ecumene since earliest times. Described by Owen Lattimore as “a frontier of exclusion” and “a frontier of inclusion,” the northern and southern frontiers respectively presented clearly different opportunities for Chinese peasants and the spread of Chinese social and economic patterns.<sup>1</sup> Along China’s northern semiarid/subhumid flank, a fluid zone of contact separated the steppe from the cultivated areas. Here the agrarian-based civilization of China alternated in its advance and retreat. The interaction of Chinese and so-called barbarian societies there has been a recurrent theme in Chinese economic, political, and social history. As a frontier of continuing contention, the Chinese polity set out to demarcate it. The Great Wall stands today as solid testimony to the notion of exclusion and definition which brought about the wall’s construction: the necessity of reducing vulnerability to barbarian attack from the north.

The southern frontier, Lattimore’s frontier of inclusion, at one time encompassed all of China south of the Yangtze River. From the Han period onward as Chinese civilization moved southward from its hearth in the loessial uplands of the Huang Ho, migrants encountered areas that offered agricultural advantages denied by the northern climate. These advantages brought half of China’s population to the Yangtze River basin and areas to its south by the middle of the eighth century. Herold J. Wiens has documented this southward penetration of the Chinese and their impact on the non-Han peoples they encountered, yet the historical geographic relevance of this frontier experience has not been thoroughly studied.<sup>2</sup> In the south, the frontier was “a wavering, shadowy fringe rather than a clear demarcation,” according to Edward H. Schafer, who has provided vivid literary portrayals of areas being absorbed by Chinese civilization.<sup>3</sup>

## Introduction

Taiwan does not figure in these studies of China's frontiers principally because of the island's belated inclusion as a component of the expanding southern frontier. Until the seventeenth century, Taiwan lay obscure 150 kilometers off the southeast coast of China. Populated by aboriginal groups whose prehistory is not yet firmly established, the island remained remote until thrust into the maelstrom of European commercial expansion in East Asia. Dutch, and to a lesser degree Spanish, interests set in gear a process that was to lead to the island's transformation into a social and economic extension of southeastern China. During the two centuries between the expulsion of the Dutch in 1662 by the Ming loyalist Cheng Ch'eng-kung and the Japanese occupation in 1895, Chinese peasant migrants to the island transformed the grasslands through arduous and intensive effort, providing evidence that "the Chinese landscape is a material expression of Chinese culture."<sup>4</sup> From 1895 to 1945, Japan occupied Taiwan as its first colony. During their fifty-year tenure, the Japanese completed the transformation of a fragmented subsistence-oriented economy and a fluid society into a colony that must have been the envy of other colonial powers. In the decades since Taiwan's retrocession to China at the end of World War II, substantial economic and social development has taken place on the island. Events of the 1970s have again placed Taiwan in a maelstrom, but this time it is a political one, the resolution of which is made uncertain because of economic realities and moral dilemmas. For thirty years, Taiwan has followed a path quite distinct from that pursued on the mainland across the straits. Whether conditions will permit the island to continue to go it alone or not is uncertain. If the Taiwan question is resolved by the island's "inclusion" into the People's Republic, Taiwan again will become a frontier area for the social and economic system of the mainland.<sup>5</sup>

This volume focuses on the patterns and processes of Taiwan's historical geography.<sup>6</sup> Most of the chapters are by geographers who have carried out field research in Taiwan. Their chapters are complemented by those of two historians and an anthropologist. Although it is not a comprehensive treatment of Taiwan's past geography, the volume brings together studies that illuminate the manner in which Chinese migrated to, settled, and developed a frontier area. Accompanying notes draw attention to the publications of other social scientists which deal with intersecting themes. Although the number of social scientists with an interest in Taiwan is not large, they are carrying out an increasing amount of supporting research.<sup>7</sup>

## Introduction

The book is divided into two sections, "Migration and Rural Settlement" and "Urbanization and Economic Integration," totaling eleven chapters. Wen-hsiung Hsu traces in Chapter 1 the development of Taiwan in the years before the island's incorporation into the Ch'ing empire in 1683. In so doing, he details the documentary history of China's contact with the island and sketches the nature of early mainland/island interaction. Focusing on the seventeenth century, which he terms "a time of radical change on Taiwan," Hsu discusses the impact of the Dutch, Spanish, and Cheng family interludes, especially their respective roles in inducing Chinese to migrate to the island. I-shou Wang covers some of the same chronology but lengthens it to the present. His chapter, however, is from the perspective of the indigenous groups whose settlements and culture have been uprooted by successive waves of alien influence. Wang provides a study of contact with outsiders often followed by the migration of aborigines—a study complicated by assimilation as well as recurrent annihilation.

Ronald G. Knapp and Cho-yun Hsu, in their two chapters, treat the settlement of two areas of northern Taiwan. Knapp's concern is with the factors which promoted a general pattern of dispersed rural settlement on the T'ao-yuan plain during the eighteenth century. Customary land tenure practices not only provided a mechanism for inducing peasants to migrate and guided the distribution of these peasants, but they also embodied elements which fostered the elaboration of Chinese social patterns. Cho-yun Hsu's concern is the I-lan plain and Chinese settlement there during the nineteenth century. His chapter chronicles the role that personal leadership played in the opening up of this remote corner of northeastern Taiwan. Moreover, he details I-lan's incorporation into other spheres of economic interaction.

Chinese social norms and the conditions of frontier life, Wenhsiong Hsu tells us, promoted the organization of peasant migrants along lines defined by common surnames and common ancestral homes. Voluntary segregation along these lines, however, intensified parochialism and often led to disorder. His chapter discusses the nature of voluntary associations and their specific relationship to communal strife.

Chiao-min Hsieh's chapter, "Sequent Occupance and Place Names," interprets many of Taiwan's place names that provide vignettes of the island's past. To a greater degree than in most other areas of China, Taiwan's place names reveal the imprint

## Introduction

of sequent occupance by groups as dissimilar as aborigines, Dutch, Spanish, Japanese, and Chinese. Hsieh's chapter concludes Part One.

"Urbanization and Economic Integration" is the theme under which the remaining chapters cluster. Tao-chang Chiang's contribution discusses walled cities and towns as outposts of imperial authority. Viewing the broader context of Taiwan's urbanization, he examines the origin and spread of walled centers on the island and identifies aspects of their site and distribution, size and shape, and function. His chapter is illustrated with numerous maps and photographs. Lu-kang, once Taiwan's premier entrepôt and home of wealthy merchants, is the subject of Donald R. DeGlopper's essay. DeGlopper suggests that pre-twentieth-century Taiwan "might be thought of not as a single island, but as an archipelago." In support of this notion, he presents and analyzes the rise and precipitous decline of Lu-kang as well as Lu-kang's role in three related but distinct trading systems.

The transformation of Taiwan from an aggregation of spatially discrete units to an increasingly integrated island-wide system is the subject of Yi-rong Ann Hsu, Clifton W. Pannell, and James O. Wheeler. Using a spatial analysis approach, these geographers focus on three aspects of the development and structure of transportation networks in Taiwan. First they describe the salient characteristics of transportation on the island from the 1600s to the present. Next they examine the connectivity of the highway and rail networks in this century with special concern for the relationship between network connectivity and the level of regional economic development. Finally, using graph theory, they analyze the accessibility and connectivity of Taiwan's urban centers, or nodes, on highway and rail networks in order to reveal the spatial relationships between nodes on a network and their level of economic growth. The role of a distinctive transport innovation, the push car railway, in Taiwan's development during the Japanese period is discussed by Ronald G. Knapp. Push car railways, Knapp suggests, were instrumental in articulating the insular economies inherited by the Japanese.

Jack F. Williams' concluding chapter is a study of the island's principal cash crop, sugar cane, a crop which he terms the "sweetener" in Taiwan's development. His chapter chronicles the growing of sugar cane and its processing from the Dutch occupation in the seventeenth century to the present. Sugar has not only been a source of extra income for Taiwan's peasants

## Introduction

and a major source of foreign exchange; it has also had a mixed impact on other elements of the economy and agrarian structure. The bulk of Williams' chapter treats the industry in the eighty years since 1895. In so doing, he gives evidence that the basic character of the sugar industry today was established during the Japanese period. Unlike any of the preceding authors, Williams looks ahead in assessing the role of sugar cane in Taiwan's future.

Over the period of two centuries, Taiwan was brought within the Chinese pale by the penetration and elaboration of Chinese agricultural practices and social patterns and without the force of imperial arms. The passage from a sparsely populated, undeveloped, and at times fugitive condition to relative economic and social stability was seldom smooth. Taiwan remained in some ways a raw frontier up until the Japanese occupation. As the authors in the eleven chapters indicate, the historical geography of Taiwan is an absorbing one that demands further study. The frontier experience on Taiwan was not uniform; nor can it be used as an analog for other frontiers on the mainland. Still, its study helps clarify the process by which Chinese entered, settled, and developed alien territory. Lattimore's description of the southern frontier as a frontier of inclusion is appropriate for Taiwan. The migration of Chinese peasants imprinted frontier Taiwan with social and economic patterns quite similar to those found along the coastal mainland of southeastern China.

### *A NOTE ON PLACE NAMES*

Except for Taipei, Taichung, Tainan, Keelung, and Kaohsiung, all of the place names mentioned in the text are romanized according to the modified Wade-Giles system. A Place Name Index at the back of the book includes an indication of map location for most of the places mentioned.

Part One  
MIGRATION AND RURAL  
SETTLEMENT



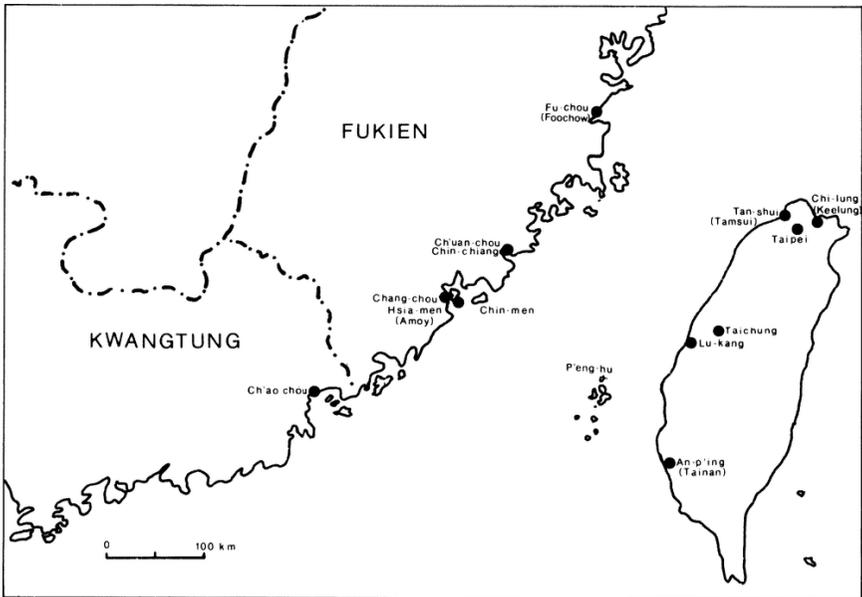
# 1

## From Aboriginal Island to Chinese Frontier: The Development of Taiwan before 1683

*WEN-HSIUNG HSU*

The Chinese colonization of Taiwan was essentially a process that occurred during the seventeenth through nineteenth centuries. In this three-century period what had been a remote and alien island was imprinted with social and economic patterns similar in many respects to those found along the southeast coast of China (Figure 1-1). Both Chinese and western civilization reached the island during the seventeenth century, a period of dramatic change. From 1624 to 1662 the Dutch maintained a trading presence along the island's southwestern coast; from 1626 to 1642 the Spanish occupied outposts in the north. But it was Chinese peasants who first came in large numbers under Dutch encouragement that extended Chinese agricultural practices and social patterns to the island and set the stage for incorporation into the Chinese ecumene. Chinese settlers also launched an anti-western uprising in 1652 in protest against Dutch exploitative mercantilism. Ten years later, the Ming loyalist Cheng Ch'eng-kung (Koxinga) expelled the Dutch and in the process facilitated Taiwan's passage from a foreign trading colony into a Chinese settlement frontier. This chapter traces Chinese awareness of Taiwan, as sketched in Chinese records, and chronicles the events and activities that led to the island's incorporation into Ch'ing China in 1683-1684. Above all, we will be examining frontier settlement and development during the seventeenth century.

## CHINA'S ISLAND FRONTIER



*Figure 1-1. Taiwan: general location map.*

### *BEFORE 1624*

Recent archaeological evidence alters the orthodox belief that Taiwan's original inhabitants were exclusively non-Chinese aboriginal groups whose roots may be traced to Southeast Asia. Nonetheless, the present-day ethnographic diversity of Taiwan's aboriginal inhabitants as well as the spatially and temporally varied archaeological evidence do not allow one to write with confidence about the island's prehistory.<sup>1</sup> For this and other reasons, the indigenous early history of Taiwan will not be dealt with here although an attempt will be made to extract pertinent comments from the Chinese records wherever they suggest the nature of the island before its colonization by large numbers of Chinese.

When the Chinese started to acquire some knowledge of Taiwan and to sail there is still open to interpretation. Modern historians assume that between the third century B.C. and the T'ang dynasty (A.D. 618-906) some twelve names were used to refer to the island. It is possible that some of these early names were used by the Chinese broadly and vaguely to refer to the whole series of islands found in the East China Sea—notably

## Chapter 1

the Ryukyus, P'eng-hu, and Taiwan. Before T'ang times, even though Chinese may have sailed to both the Ryukyus and Taiwan by accident, they appear to have been confused about the location of individual islands.

Of the twelve names, I-chou and Liu-ch'iu are the most commonly encountered in the historical records. I-chou was the island where expedition troops of the Wu ruler Sun Ch'üan (reign A.D. 222-252) came onshore in the spring of 230. After 80 to 90 percent of his soldiers had died of unknown diseases, those who survived managed to bring "several thousand" natives back to China.<sup>2</sup> The island may or may not have been Taiwan. The name Liu-ch'iu first appeared in the seventh century, when Emperor Yang (reign 605-616) of the Sui dynasty sent expeditions to that island in 607, 608, and 610; in addition to captives, the Chinese brought back cloth and armor.<sup>3</sup> Liu-ch'iu is described in the *Sui-shu* [History of the Sui dynasty] as located among the islands five days' sailing from Foochow. It had such domestic animals as pigs and chickens, but no cows, sheep, donkeys, or horses, and it produced little iron. With no writing system, taxation, or penal code, the island was ruled by a king under whom four or five commanders (*shuai*) governed. The natives used stone blades and the slash-and-burn method to grow rice, millet, sorghum, and beans. They fought each other. And not only did they use the bodies of their enemies for sacrificial purposes but, according to the *Sui-shu*, they ate the corpses of their acquaintances as well.<sup>4</sup> Historians generally believe that what is recorded in the *Sui-shu* as Liu-ch'iu is the present-day island of Taiwan. But the descriptions of the locations, products, farming, organizations, and social customs are closer to those of the Ryukyus than those of Taiwan.<sup>5</sup> It may be that the compilers of the *Sui-shu* give a composite account of both places.

Though separated from the mainland by no more than 200 kilometers, Taiwan could not be easily reached by the Chinese before Sung times (960-1279). Moreover, Fukien, the mainland area closest to Taiwan, was not well developed until after the Southern Sung period (1127-1279). Chinese seafarers, in sailing to either the Ryukyus or Japan, set out in summer in order to avail themselves of the southeast monsoon and the northeastward equatorial warm current (*kuroshio*).<sup>6</sup> Navigation was hazardous in the straits between the mainland and Taiwan because of shallows and strong currents. Unpredictable winter gales, the passage of fronts, violent summer typhoons—all com-

pounded the difficulties. Nineteenth-century recognition of such natural conditions is discussed in a later chapter by Donald DeGlopper.

Chinese started to avail themselves of the periodic northwest wind of winter to sail to the P'eng-hu archipelago and settle during the Sung dynasty. As evidenced by the discovery of two Northern Sung coins bearing the emblems of the Hsi-ning (1068-1077) and Cheng-ho (1111-1117) periods as well as many shards of Sung pottery and porcelain jars (both glazed and unglazed), Chinese migration to the P'eng-hus may have come as early as the late eleventh century.<sup>7</sup> Southern Fukienese fishermen, lured by the abundance of fish around the archipelago, eventually settled in P'eng-hu by 1171. In that year it was reported that the Visayan (Pisayan, P'i-she-yeh) from the Philippines attacked Chinese settlers in P'eng-hu.<sup>8</sup> The Visayans, who were "skillful in navigation and eager for war and raids for pillage and booty,"<sup>9</sup> took away millet, hemp, and wheat and captured some settlers as guides for plundering China's southeast coast. To guard against further raids by the Visayan people, Ch'uan-chou prefect Wang Ta-yü ordered some two thousand shacks built in P'eng-hu and stationed soldiers there for farming.<sup>10</sup>

Increased knowledge of the archipelago is revealed in the geographical work *Yu-ti chi-sheng* [Brief accounts of various places in the empire] by Wang Hsiang-chih (*chin-shih* 1195). Here P'eng-hu was described as "a group of thirty-six islets in great billows" in the "outlying region" (*wai-fu*) of Ch'uan-chou which could be reached in three days.<sup>11</sup> Chinese knowledge of the existence of more than half of the sixty-four islets in the archipelago suggests that they explored and probably inhabited some of them in the twelfth century. The southward movement of the Sung court to Hangchow, the encouragement of maritime activities by the government, the successful campaigns against piracy, the introduction of the mariner's compass, and the concurrent improvement in shipbuilding of the period all enhance the likelihood that Chinese braved the waves to sail beyond P'eng-hu to Taiwan during the thirteenth century.<sup>12</sup>

The seaport from which the Chinese most likely sailed to Taiwan during the thirteenth century was Ch'uan-chou, then a hub of international trade. Fifty-three countries maintained trade relationships there; merchant seamen from Arabia, Persia, Italy, India, the South Seas, and possibly Africa even formed a foreign quarter in its southern section.<sup>13</sup> From Ch'uan-chou Chinese emigrated to Korea, Japan, and Southeast Asia.<sup>14</sup>

## Chapter 1

It is also probable that from this seaport Chinese merchant seamen crossed the strait to barter with Taiwan aborigines, though no verifiable records of this encounter exist.<sup>15</sup>

In any case, Chinese migration to P'eng-hu continued during the Yuan dynasty (1280-1367). The great traveler Wang Ta-yuan visited the archipelago about 1347 and described Chinese life there as follows:

With a favoring wind they [thirty-six islets] can be reached from Ch'uan-chou in two days and nights. There is grass but no trees; the land is barren and not suited for growing grass. The weather is always warm. The customs [of the residents] are rustic. Many of the people are long-lived. Men and women both wear long cloth gowns girded with local cotton cloth. They boil sea [water] to get salt, and ferment millet to make liquor. They gather fish, shrimp, snails, and clams to supplement their staple of grain. They burn ox dung to cook fish fat for use as oil. The land produces sesame and green beans. The goats multiply into flocks of several tens of thousands. A family [which owns some goats] brands their hair and cuts their horns as marks of identification, but does not gather them in during the day or night, so that they all forage for themselves. Their workmen and merchants enjoy the profits of a flourishing trade.<sup>16</sup>

It appears that the Chinese settlers there were self-sufficient, though Wang Ta-yuan did not mention whether they raised such domestic animals as pigs, cows, ducks, and chickens. Nor did he comment on Chinese social organization and religious life. A poem written by the Yuan poet Hung Hsi-wen (1282-1366), however, reveals that the Chinese there already had temples to worship the sea goddess Ma-tsu in the second half of the fourteenth century.<sup>17</sup> The size of the Chinese population in P'eng-hu, though unknown, must have been large enough for the Yuan court to appoint a subprefect (*hsun-chien ssu*) there during the Chih-yuan period of Emperor Shih-tsu (1264-1294).<sup>18</sup> With this appointment, P'eng-hu was officially incorporated into the empire for the first time in Chinese history.

During the Yuan period, expeditions were sent to Liu-ch'iu in 1292 and 1297. The Liu-ch'iu reached by troops of the second expedition was said to be "close to Ch'uan-chou" and is likely to have been Taiwan.<sup>19</sup> Wang Ta-yuan followed his visit to P'eng-hu in 1347 with a visit to Taiwan in 1349, but he did not mention seeing any other Chinese. His observation that its inhabitants' customs were different from those of the P'eng-hu population

suggests that this Liu-ch'iu was not yet peopled by Chinese. Nevertheless, his reference to "pottery from Ch'u-hou" (the present Li-shui in Chekiang) implies the presence of Chinese merchants on the island by the 1340s.<sup>20</sup> At that time, Chinese seamen from Fukien and Chekiang apparently sailed to Taiwan only to barter with the natives; they had no intention of settling there.

In the second half of the fourteenth and the entire fifteenth centuries, southern Fukienese continued to migrate to P'eng-hu and both Chinese and foreign seamen also passed by Taiwan (then called Small Liu-ch'iu) in their voyages; but with the exception of traders and pirates, they rarely went ashore. It was not until after the second half of the sixteenth century that southern Fukienese fishermen and merchants sailed to Taiwan regularly and settled there. Throughout the Ming period (1368-1644), however, the imperial court never recognized the island as part of China.

Sometime after the founding of the Ming dynasty in 1368, the subprefect at P'eng-hu was recalled. With continuous southern Fukienese migration P'eng-hu nevertheless maintained its trade relationship with the mainland. Chinese settlers, most of whom "did not rear any wives or daughters," elected elders as their headmen and brought serious litigation cases to Ch'uan-chou for arbitration.<sup>21</sup> Still, in dealing with the threat of Japanese pirates along the coast, the Ming court ordered all settlers to return to the mainland in 1372, one year after a maritime prohibition policy went into effect.<sup>22</sup> Some of them may have defied the order by remaining in P'eng-hu; others might have sailed to the island of Taiwan.<sup>23</sup> In any case, southern Fukienese continued to sail to P'eng-hu; and, as a result, the Ming court in July 1404 dispatched officials there to call back the "wandering people" (*liu-min*), a euphemism for pirates, smugglers, fishermen, and merchants who transgressed the maritime prohibition.<sup>24</sup>

In order to evade the Ming authorities, the Fukienese who traded with Japan would stay clear of the mainland coast by sailing closer to Taiwan and the Ryukyus during the mid-sixteenth century. The Chinese who traded with Southeast Asia also started taking the East Sea Compass Course (*tung-yang chen-lu*), passing by southwestern and southern Taiwan.<sup>25</sup> Some of these merchant seamen sojourned on the island to barter with the aborigines. Though they established friendly relationships with these people, Chinese considered them "similar to beasts" and thought the island "uninhabitable."<sup>26</sup> In referring

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to the island, Chinese used two more names: Hsiao-tung tao ("little eastern island") and Ta-hui kuo ("the country of Ta-hui"), a corruption for the Tayouan tribe which lived on an islet near present-day Tainan.<sup>27</sup> Chinese called Taiwan "a little eastern island" because it was almost directly east of P'eng-hu; and under the impression that the place belonged to the Tayouan people, they also referred to it as "the country of Ta-hui." From Tayouan (sometimes spelled "Tai-ouan") or Ta-hui, Chinese derived the name Taiwan.

Besides fishermen and merchants, Chinese pirates also used P'eng-hu and Taiwan as a haven during the second half of the sixteenth century. Chinese and Japanese piracy was especially rampant during the reign of Chia-ting (1522-1566); of the 146 pirate raids on Fukien that were recorded from 1370 to 1616, some 131, or about 90 percent, took place during this period.<sup>28</sup> Among the Chinese pirates, the most famous were Lin Tao-ch'ien and Lin Feng (Limahong or Dim Mhon). Lin Tao-ch'ien, a Hakka pirate from Ch'ao-chou, after being chased out of Fukien by Ming naval forces under the command of Yü Ta-yu, retreated to Pei-kang in southwestern Taiwan about 1563. Aware of the danger in sailing off the island's southwest coast, Yü Ta-yu stayed in P'eng-hu where he built a fort at An-ao (Wen-ao) to keep close watch on the pirate.<sup>29</sup> Lin, however, did not stay long in Pei-kang; late in 1567 he again ravaged the mainland. He remained active on and off China's southeast coast for ten more years until 1578 when he went to Southeast Asia. Some of his followers later reportedly returned to Taiwan to live.<sup>30</sup>

Lin Feng, another pirate who was dubbed "the terror of China," moved his forces from P'eng-hu to Taiwan on 3 November 1574.<sup>31</sup> Upon debarking at Wang-kang (on Taiwan's southwest coast?), he was attacked by the aborigines and had to sail back to P'eng-hu. There, after seizing a Chinese junk returning from Manila, he decided to move on to the Philippines, possibly with the intention of colonization. With sixty-two ships carrying 2,000 men and 1,500 women, including a number of artisans, he arrived in Luzon on 29 November but returned to P'eng-hu in August of the following year.<sup>32</sup> From there he ravaged Fukien. On 27 December he retreated to Wang-kang on Taiwan for the second time. On 15 January 1576, when he again forayed along China's southeast coast, the Ming naval forces chased him across the straits and sank more than twenty of his ships.<sup>33</sup> Lin Feng then fled to Southeast Asia.

## CHINA'S ISLAND FRONTIER

In spite of the maritime prohibition and pirate depredation, southern Fukienese continued to sail to the P'eng-hu archipelago. From Chin-men, twenty Hung clansmen migrated to P'eng-hu in 1581.<sup>34</sup> On the west coast of Taiwan, the abundant supply of fish and the lucrative deer trade with the aborigines gradually attracted more Chinese fishermen and merchants there.<sup>35</sup> In 1589, among the eighty-eight ship licenses the Ming government granted to trade with Southeast Asia, four to eight were permitted to sail to Taiwan for fishing and trading; the number of such licensed junks increased to ten in 1593.<sup>36</sup> The ships that crossed the strait without licenses might have been even more numerous. Chinese merchants, most of them from Ch'uan-chou and Chang-chou, used agates, porcelain, cloth, salt, brass hairpins, and bracelets to barter with the natives for deer meat, skin, and horns. Some traders even knew the aborigines' languages.<sup>37</sup>

Southern Fukienese settlement of southwestern Taiwan had begun by the early 1590s. In 1596, when a Portuguese ship was becalmed for several days off the southwest coast, "several of those on board who had been shipwrecked there ... in 1582 noticed that there was now cultivated land and people who were working on it, presumably Chinese immigrants from Fukien."<sup>38</sup> The southern Fukienese settlers, however, were still very few, so few that the Ming scholar Ch'en Ti in 1603 did not notice any of them when he visited there.<sup>39</sup>

Europeans generally did not show interest in Taiwan until the seventeenth century. The Portuguese coasted along northwest Taiwan on a voyage to Japan from Malacca in the early 1540s (possibly 1542). Thrilled by the beauty of the hills of the island, they called it Ilha Formosa (Beautiful Island).<sup>40</sup> On a world map drawn by the Portuguese cartographer Lopo Homem in 1554, the name "I. fremozza" [*sic*] appears in a series of islands south of Japan.<sup>41</sup> To European navigators, however, Taiwan remained primarily *terra incognita* during the second half of the sixteenth century. Portuguese ships occasionally wrecked off the island's southwest coast, but they apparently never voluntarily landed on it.<sup>42</sup> Although some nineteenth-century writers have written that the Portuguese established a settlement in northeastern Taiwan at present-day Chi-lung (Keelung) in 1590, there seems to be no historical evidence to confirm such a claim.<sup>43</sup>

Among the governments of East Asian countries, only Japan showed interest in Taiwan during the late sixteenth and early seventeenth centuries. In 1593 Toyotomi Hideyoshi

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*TABLE 1-1*  
*Arrivals and Settlements in P'eng-hu and Taiwan before 1600*

Time	P'eng-hu	Taiwan
Before Sung	Chance arrival	Chance arrival
Sung (960-1259)	Chinese fishermen, merchants	Chinese merchants (?)
Yuan (1260-1367)	Chinese fishermen, farmers, merchants <sup>a</sup>	Chinese merchants, travelers
Ming (1368-1600)	Chinese fishermen, farmers, merchants; <sup>a</sup> Chinese and Japanese pirates; European seamen	Chinese fishermen, farmers, merchants; <sup>a</sup> Chinese and Japanese pirates; European seamen

<sup>a</sup> Some of these fishermen, farmers, and merchants also settled there.

(1536-1598) insisted that the “the ruler of Taiwan” pay tribute to Japan, but this demand was to no avail. The Tokugawa bakufu government also made two attempts at occupying Taiwan in 1609 and 1616. In the late 1620s Japanese merchants even took some Taiwan aborigines to Japan to offer “the sovereignty to the Emperor.”<sup>44</sup> But the enforcement of the *sakoku* (national isolation) policy in 1635 ended the Japanese government’s interest in the island during the two centuries that followed.

Chinese voyages and migration to P'eng-hu and Taiwan before 1600 are summarized in Table 1-1. Although Chinese may have occasionally reached Taiwan by accident in ancient and medieval times, they were confused about the location of the islands in the East China Sea. Despite the increase in their knowledge of overseas countries during the twelfth century, adverse sea currents and winds deterred the Chinese from sailing to Taiwan regularly until after the sixteenth century. Yet the first civilized people who declared occupation of the island were not Chinese but Dutch.

*THE ISLAND AS EMPORIUM*

The expansion of European mercantile interests in East Asia, coupled with the negligence of the declining Ming court, brought Dutch occupation to the southwestern section of Taiwan from 1624 to 1662 and Spanish occupation to portions of the north from 1626 to 1642. As part of their colonial policy, both the Dutch and the Spanish interacted with the aborigines, but it was the Dutch who encouraged Chinese migration and promoted agriculture.<sup>45</sup> The Dutch founded the United East India Company (Vereenigde Oost-Indische Compagnie) on 20 March 1602 to implement their mercantilism in Asia. They first reached P'eng-hu on 7 August 1604, when two of the company's ships commanded by Admiral Wybrank van Warwijk were drawn by a gale to the archipelago on their way to China. In 1618, with the ultimate goal of monopolizing the Asian trade, the Dutch established the company's Asian headquarters at Batavia (Jakarta) in Java. Four years later, on 10 April 1622, the company's governor-general, in the belief that "there is no people in the world who can serve us better than the Chinese,"<sup>46</sup> dispatched Cornelis Reijersen to command sixteen ships and two thousand soldiers to sail for China. They arrived at Ma-kung of P'eng-hu on 11 July.<sup>47</sup> On the morning of 27 July, guided by an experienced Chinese fisherman, Reijersen led two vessels toward the island of Taiwan; at noon they anchored two nautical miles off the islet of Tayouan, the present site of An-p'ing.<sup>48</sup> They then surveyed southwestern Taiwan for four days without landing anywhere and returned to P'eng-hu. There the Dutch started to build a fort at Feng-k'uei-wei in August 1622. They stayed in P'eng-hu for two years until 26 August 1624, when Chinese troops forced them to dismantle the fort and leave for Tayouan with thirteen ships.

On the islet of Tayouan, the Dutch constructed Fort Orange on a sand spit as the company's headquarters, which they later named Zeelandia.<sup>49</sup> On the main island of Taiwan, early in January 1625, the Dutch East India Company's first governor at Tayouan, Martinus Sonck, gave fifteen pieces of cangan cloth to the Sinkan aborigines in exchange for a tract of land.<sup>50</sup> The Dutch called the place Sakam (Ch'ih-k'an in Chinese). It was to develop into the city of Tainan in the following two and a half centuries (Figure 1-2).

Spanish interest in Taiwan can be traced back to 1598 when a typhoon forced the aborting of an expedition from Luzon, but no subsequent colonization efforts were made until the

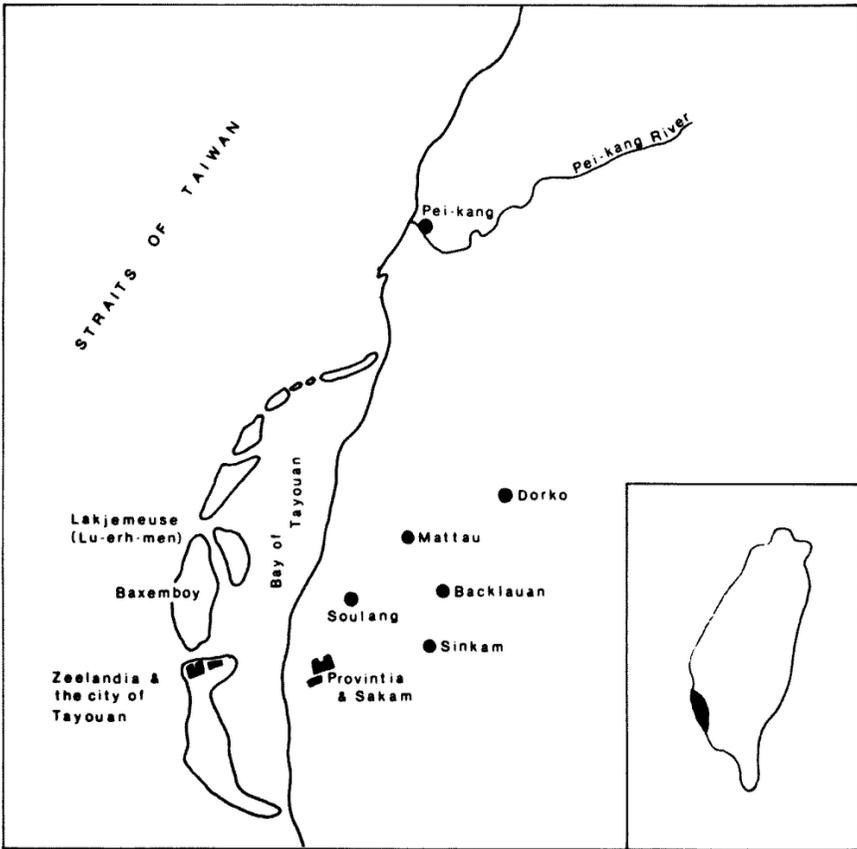


Figure 1-2. Taiwan during the Dutch period.

Dutch occupation of southwestern Taiwan was seen as a potential threat to Spanish security in the Philippines.<sup>51</sup> Prudent in pursuit of their objectives, the Spanish decided in 1626 to take northern Taiwan in order to keep an eye on the Dutch. Moreover, the Spanish planned to attract Chinese merchants to northern Taiwan, to reestablish with the Japanese the trade that had been broken off a year earlier, and to use Taiwan as a stepping-stone for their missionary work in both China and Japan.<sup>52</sup> Though they stayed in Taiwan for sixteen years, the Spanish failed in these pursuits.

On 5 May 1626 a fleet of fourteen Spanish vessels carrying three hundred soldiers and commanded by Antonio Carrendo de Valdes left Cagayan for Taiwan. Five days later, the Spanish

anchored off a headland on northeastern Taiwan which they named Santiago (San-tiao-chiao as corrupted into Chinese). After reaching Chi-lung (San-tissima Trinidad) on 12 May, they constructed Castle San Salvadore on the present She-liao-tao. On 16 May, the Spanish, without the consent of the natives, declared that part of Taiwan the property of their king, Don Philippe, and collected tree branches, sand, and some exotic objects as evidence of their occupation.<sup>53</sup>

The Spanish reached Tan-shui (Tamsui) in 1628 where they built Fort Santo Domingo; in March 1632, they sailed up the Tan-shui River and entered the Taipei basin.<sup>54</sup> The inhospitability of the natural environment and the lack of funds, however, vitiated the Spanish colonization of northern Taiwan. During their occupation the Spanish population in any given year never exceeded five hundred; they were on good terms with only eight aboriginal tribes. When the natives at Tan-shui revolted in 1636, Spanish colonial interest in the island began to languish. The Dutch defeated the Spanish on 26 August 1642, and nine days later drove them out of northern Taiwan.<sup>55</sup>

In contrast to the Spanish, the Dutch made gains in Taiwan. Of the United East India Company's twenty factories throughout the world, the Tayouan factory was the second most profitable, after those in Hirade (1609-1641) and Deshima (1641-1855) in Japan. Dutch revenues in Taiwan were drawn from various taxes and triangle trade, increasingly profitable especially after the Portuguese were ousted from Japan in 1639.<sup>56</sup> The company exported Taiwan's dried venison, sugar, and rattan to China; deerskins and sugar were sent to Japan as well as other countries. Between 1634 and 1661, the island produced an annual average of about 68,000 deerskins, 50,000 of which were shipped to Japan.<sup>57</sup> After 1645, Taiwan annually produced 9,000 piculs of sugar, and after 1657, 17,000 piculs, which was sold as far away as Persia.<sup>58</sup> From China the Dutch imported porcelain, silk, and gold and then shipped them to Japan, Batavia, the Netherlands, and other European countries. It has been estimated that between 1602 and 1657 the company shipped more than 3 million pieces of Chinese porcelain to Europe, mostly by way of Taiwan.<sup>59</sup> From Batavia the company imported marine products, pepper, linen, spice, amber, lead, tin, and opium and then sold them to China.<sup>60</sup>

The company's revenue was also enriched by a variety of onerous taxes imposed upon the Chinese for fishing, trading, growing rice, hunting deer, and butchering pigs in Taiwan. Though drawing a handsome revenue from both trade and

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taxes, the Dutch spent only half of it on operating the Tayouan factory, salaries of soldiers, construction of forts, and maintenance of ships.<sup>61</sup> Apparently little was done directly for the benefit of the island; private involvement of the company's employees in the trade further tended to exacerbate Dutch exploitation.<sup>62</sup>

In exercising their colonial control, the Dutch used both religion and force—the first to appease the aborigines and the second to subdue them.<sup>63</sup> The first Dutch minister, George Candidius (1597-1647), arrived in Taiwan on 4 May 1627. The following year, on 27 December, he reported from Sinkan that there were 128 natives “who knew the Prayers and were able to explain in the most satisfactory manner the principal ankles of the Christian faith; but who for certain reasons have not yet been baptized.”<sup>64</sup> In 1656, among the native population of 10,109 in the twenty tribes, some 6,078, or 60 percent, “could answer questions concerning Christian doctrines.”<sup>65</sup> The company, which did not attempt to evangelize the Chinese, used force when religion did not serve their purposes. The company's soldiers made up half of the Dutch population, which never exceeded two thousand.<sup>66</sup> In 1636 the Dutch pacified the plains aborigines at Mattau and Soulang near Sakam, at Lungkiau in the southern tip, and in other parts of the island.<sup>67</sup> The Dutch achieved this ruthlessly. In the Hsiao-liu-ch'iu islet, they set fire to aboriginal settlements, slaughtered three hundred of those who escaped the fire, and condemned the survivors to hard labor.<sup>68</sup>

In protest against Dutch exploitation, some fifteen thousand Chinese men led by Kuo Huai-i (Fayet or Faiet, a headman of a village near Sakam) revolted on the evening of 7 September 1652—an action that became the first Chinese antiwestern uprising in modern history. The rebels, constituting the majority of the Chinese settlers, were mostly peasants who “thought themselves too much oppressed by the company” and “longed for liberty.”<sup>69</sup> Most of them, however, carried bamboo sticks and few were armed. With the aid of two thousand aborigines, the Dutch put down the uprising in fifteen days. Approximately four thousand Chinese men as well as five thousand women and children were reportedly captured or killed during and after the revolt.<sup>70</sup>

After the uprising, fewer Chinese migrants and traders went to Taiwan, especially after 1656, when the Manchus enforced maritime prohibition and Cheng Ch'eng-kung laid an embargo against the Dutch. And to take precaution against Chinese

attack, the Dutch started constructing Fort Provintia at Sakam, where most Chinese lived. The fort, completed the following year, was not as well built as Zeelandia and never ensured Dutch control of the island.

### *DEVELOPMENT UNDER THE DUTCH AND SPANISH*

In spite of their exploitation, the Dutch contributed to the development of Taiwan through their recruitment of Chinese, promotion of agriculture, and education of the aborigines. The Spanish succeeded only in the evangelization of small numbers of natives in the north.

The Dutch did not intend to evolve a European-style agricultural system on Taiwan, but instead encouraged migrants from southeastern China to come to the island to reclaim land and gather deerskins. Disregarding the restrictive maritime policy of the Ming court, the Dutch occasionally used trading ships to carry Chinese to the island free of charge. In 1632 some Dutch vessels carried 170 southern Fukienese to Taiwan; reportedly a thousand more asked to come aboard, but, laden with merchandise, the Dutch had no more room.<sup>71</sup> To expedite the recruitment of Chinese immigrants from 1636 to 1638, Su Ming-kang (Bencon, d. 1644), a southern Fukienese who had served as Chinese captain for the company at Batavia, was brought to Taiwan.<sup>72</sup> Other Chinese merchants and pirates such as Cheng Chih-lung (d. 1662, Cheng Ch'eng-kung's father) were also possibly entrusted by the Dutch to arrange Chinese migration. In fact, Cheng Chih-lung himself once took the initiative in arranging Chinese migration to Taiwan. According to Chinese sources, sometime between 1628 and 1631 when Fukien was afflicted by a drought, he shipped "several tens of thousand of people" to Taiwan. Every three migrants shared one ox and each received 3 taels of silver.<sup>73</sup> The number of migrants and oxen, however, may be overestimated; it does not seem likely that so many oxen could be found during a time of famine.

Although the ships owned by the Dutch and Cheng Chih-lung carried southern Fukienese to Taiwan, most emigrants went there aboard Chinese fishing and trading junks. An estimated 100 to 400 Chinese ships left the mainland for the island annually after 1625. After 1636, more junks arrived as a result of the efforts of Su Ming-kang, the peace in the straits, and the subjugation of the aborigines near Tainan. The Chinese

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ships sailing to Taiwan in 1637, for example, numbered 491 (188 trading junks and 303 fishing boats).<sup>74</sup> Not all Chinese came directly from the southeast coast of China; some sailed from Luzon. In 1639-1640, when the Spanish massacred 23,000 Chinese in Luzon, those who managed to flee either returned to China or emigrated to Taiwan.<sup>75</sup> In 1642, despite the company's complaint that its trade with China was declining and Chinese fishing activities were slackening, approximately two hundred Fukienese fishing boats still sailed to the island.<sup>76</sup> Six years later, some seven or eight thousand famine-stricken Chinese on the coast of Fukien went to Taiwan, but most of them returned after the famine was over.<sup>77</sup> After Kuo Huai-i's revolt in 1652, however, fewer Chinese arrived.

It is not known how many Chinese settled in Taiwan during the Dutch occupation. I estimate that the Chinese population reached around forty or fifty thousand toward the end of Dutch rule. In determining the size of the Chinese population, two main difficulties are encountered. First, most of the southern Fukienese fishermen and merchants did not settle permanently there, and many farmers were merely seasonal migrants. Second, only a portion of the Chinese population was actually under Dutch control. When the Dutch arrived in 1624, the number of Chinese living in Taiwan was estimated to have been 25,000.<sup>78</sup> This number reappears frequently as an estimate of Taiwan's population at various times and cannot be corroborated as accurate at the onset of Dutch settlement. In 1640, 3,568 Chinese settlers paid poll taxes as did 11,000 in 1650, but the Chinese population was obviously greater; otherwise it would have been impossible for Kuo Huai-i to lead 15,000 men in revolt two years later.<sup>79</sup> From 1653 to 1655 a serious famine, which resulted from a locust attack, claimed 8,000 Chinese lives.<sup>80</sup> In 1661, famine struck the island again, yet Governor Frederick Coyett estimated the Chinese population to be "about 25,000 armed men, besides women and children."<sup>81</sup> Considering that the Chinese population was mainly composed of men, its size at the end of the Dutch occupation was most likely to have been 40,000 to 50,000, almost double that of Coyett's estimate.

Chinese residents were concentrated primarily in Tayouan and Sakam. They had already lived in and near the aboriginal villages of Soulang and Mattau before the arrival of the Dutch, but it appears that they did not establish any distinct settlements.<sup>82</sup> After Fort Zeelandia was built at Tayouan in 1624, they immediately set up residence on its east side and even-

tually founded the unwalled Chinese quarter.<sup>83</sup> The following year some hundred Chinese junks sailed to Tayouan to fish and purchase dried venison and deerskins.<sup>84</sup> The Spanish estimate in 1626 that 5,000 Chinese and 160 Japanese lived in Tayouan, though exaggerated, suggests that in two years Tayouan had become a populated islet.<sup>85</sup> Chinese merchants and farmers also moved to Sakam in 1625 after the Dutch acquired it from the aborigines; by October of that year they had built thirty or forty huts there. The following year the Chinese settlement was damaged by both fire and epidemic, but it soon was rebuilt.<sup>86</sup>

Chinese settlers were mostly men: fishermen, merchants, farmers, hunters, craftsmen, peddlers, coolies.<sup>87</sup> Although Table 1-2 cannot reflect the general trend of Chinese migration to Taiwan, it does indicate that female passengers made up a small proportion of the total number of Chinese sailing to the island.

After 1630, in order to encourage the Chinese to engage in farming, the company let them claim land, lent money to them, provided them with seeds, farm implements, and oxen, helped them to dig irrigation ponds, protected them from aborigine attack, and promised to buy foodstuffs from them.<sup>88</sup> These Chinese peasants were, in a sense, the tenants of the Dutch "crown fields," for all landownership was ultimately vested in the name of the Dutch monarch. In 1640 the company raised 1,200 to 1,300 head of oxen, most of which were shipped to Taiwan from China's southeast coast, P'eng-hu, Batavia, and India.<sup>89</sup> During the Dutch period, the land developed by Chinese settlers covered approximately the present Tainan area and the northern section of Kaohsiung *hsien* to the south. In this region the Dutch promoted the cultivation of rice, sugar cane, tea, hemp, wheat, and indigo, but they succeeded only in the growing of rice and sugar cane. They also introduced some vegetables and fruits to Taiwan, such as peppers, Dutch beans, coarse greens, parsley, tobacco, tomatoes, breadfruit, custard apples, jackfruits, lemons, mangoes, and watermelons, all of which became common only in later times.

The Dutch made five maritime explorations to eastern Taiwan in search of gold from 1636 to 1642. To their disappointment, the aborigines obstructed them from mining any gold, and their interest in the east also subsided after the Spanish left the north. In 1644 the Dutch planned to survey the island from the northern tip to Tayouan and then make a detailed map.<sup>90</sup> The survey was never seriously undertaken, however, and only a few sketchy maps were drawn (Figure 1-3).

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TABLE 1-2  
*Chinese Sailing to Taiwan: March 1655–February 1658*

Date	Number of Chinese Ships Sailing to Taiwan	Number of Passengers <sup>a</sup>	Average Number of Passengers per Ship	Number of Female Passengers	Percentage of Female Passengers
Mar.-Dec. 1655	173	6,937	40	623	9
Jan.-Dec. 1656	169	5,079	30	921	12
Jan. 1657–Feb. 1658	131	5,792	44	223	4

<sup>a</sup> Only a portion of these passengers permanently settled in Taiwan.

*SOURCE: Nakamura Takashi, "I.V.K.B. yaku kokusenya Taiwan koryaku ki ni tsuite" [A study on I.V.K.B.'s book concerning Cheng Ch'eng-kung's attack of Taiwan in 1661], in Kanada hakushi kanreki-kinen shōshigaku ronsō [Collected papers on bibliography in honor of Dr. Kanada's sixty-first birthday] (Tokyo: Heibonsha, 1957), p. 749.*

Before their expulsion by the Dutch, the Spanish did little to develop northern Taiwan. Their sole achievement was to propagate Catholicism among the indigenous people. About thirty Dominican and Franciscan priests did missionary work, establishing churches at five places and converting some four thousand aborigines.<sup>91</sup> Missionaries did not come again until the late nineteenth century.

During their occupation of Taiwan, the Dutch and the Spanish intended to use the island to sustain their hopes of European domination in East Asia. The Dutch, by virtue of their longer stay, not only succeeded in their efforts at colonial mercantilism but also proselytized Protestantism among the aborigines and taught many of them to read. The Dutch efforts to promote Chinese migration and farming eventually came to serve more the interests of Chinese peasants than their Dutch masters. After the 1652 uprising, mainland events also came

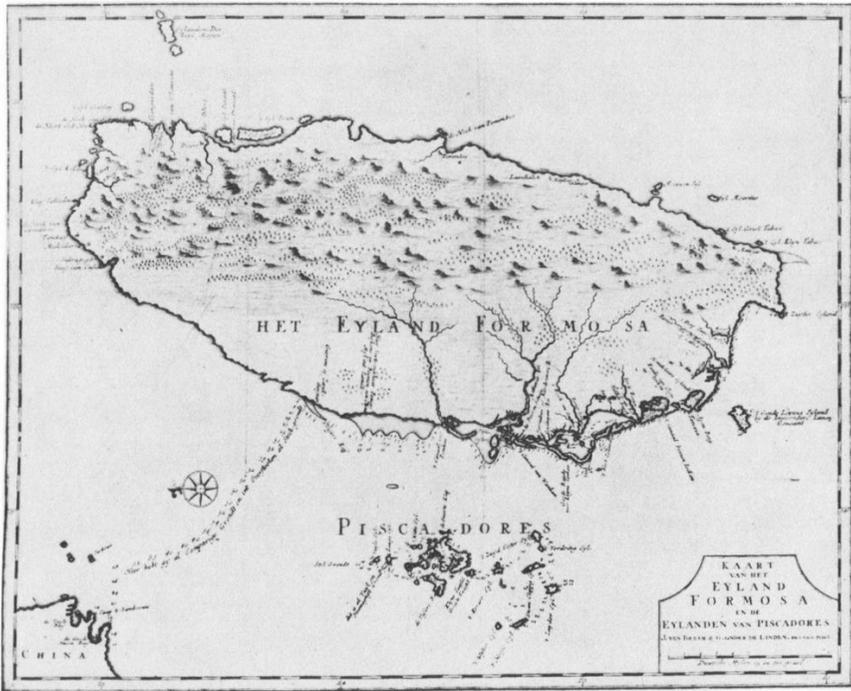
to be linked with conditions developing on the island. In 1656, in an attempt to deal with Ming loyalists, the Ch'ing authorities proclaimed a prohibition on migration across the straits. Soon after, the celebrated Ming loyalist Cheng Ch'eng-kung (Koxinga) enforced an embargo against the Dutch East India Company.<sup>92</sup>

### *THE CHENG PERIOD*

Cheng Ch'eng-kung expelled the Dutch and began Chinese rule of Taiwan on 10 February 1662. He had come a long way to reach his decision to take Taiwan. On 6 January 1647, Cheng Ch'eng-kung, at the age of twenty-four, made a pledge of brotherhood together with ninety men at Lie-hsu, located between Hsia-men (Amoy) and Chin-men (Quemoy), and launched their cause "Oppose the Ch'ing and restore the Ming."<sup>93</sup> Thereafter he was constantly plagued with a scarcity of provisions and desperately needed a suitable base for his operations. In 1659-1660, after twelve years of fighting the Manchus, Cheng's debacle at Nanking forced him to retreat to Chin-men and Hsia-men, where his sources of supply were further reduced and his search for a large base to quarter his disaffected soldiers was reactivated.

Two places suited Cheng's purposes, Luzon and Taiwan. In January 1660, he determined to take Taiwan to "settle his generals and soldiers and their families."<sup>94</sup> Over the objections of other Ming loyalists, Cheng Ch'eng-kung, a stubborn man who had experienced nineteen triumphs and eight defeats, made up his mind to wrest the island from the Dutch. His decision became firmer after October 1660, when the Manchus ordered the residents of Hai-ch'eng and T'ung-an of southern Fukien to move inland in an attempt to cut off Ch'eng's source of manpower.<sup>95</sup>

On 23 April 1661, Cheng Ch'eng-kung's fleet, consisting of some 200 vessels and 25,000 men (including two companies of Negroes), set sail from Liao-lo for Taiwan. They arrived in P'eng-hu the following day, leaving there on 28 April.<sup>96</sup> Two days later, in dense dawn fog, Cheng's fleet reached Wai-sha-hsien off the present city of Tainan. Assisted by "25,000 Chinese settlers," a "few thousand" Cheng soldiers landed at Lu-erh-men in less than two hours.<sup>97</sup> The Dutch in Fort Zeelandia (totaling about 1,140 persons), with only two vessels, 3,000 pounds of gunpowder, and a limited supply of other ammu-



*Figure 1-3. Seventeenth-century Dutch map of Taiwan (Eyland Formosa).*

nition, watched the Chinese troops advance.<sup>98</sup> Becoming what they themselves had ridiculed as “melancholy spectators,” the Dutch offered little resistance. On Cheng’s part, hampered by problems of feeding his tired and hungry soldiers, he chose to give priority to quartering them rather than attacking the Dutch. It was not until 10 February 1662, nine months after his siege, that about nine hundred Dutch formally surrendered.<sup>99</sup> With the Dutch gone, Cheng attempted to extend his influence to the Philippines but never realized his plan. He died on 23 June 1662 at the age of thirty-nine. His son, Ching, and grandson, K’o-shuang, continued to govern Taiwan for twenty years until their surrender to the Manchus in 1683.

The Cheng rule on Taiwan, as a British merchant witnessed, was “very severe.”<sup>100</sup> The government was mostly militarized; throughout the entire Cheng period there were at least 338 military officers, but only 56 civil officials.<sup>101</sup> The island was virtually governed by martial law. Stealing was punished as se-

verely as murder. People who surreptitiously felled a bamboo were decapitated if identified. As a result, it was said that nobody dared to steal and no stables were necessary for cattle.<sup>102</sup> Among the Chinese population, *pao-chia* machinery of mutual policing was implemented.<sup>103</sup> The Cheng family levied various taxes on people who owned land, houses, boats, ponds, fishing nets, cattle, mills, and other property. After 1674 adult males between sixteen and sixty years of age also paid a monthly poll tax. The taxes were so onerous that people sold even their daughters to pay.<sup>104</sup> Yet the control over the Chinese was apparently effective. Although there were aboriginal uprisings in 1661, 1665, and 1682, the Chinese themselves never revolted.<sup>105</sup>

Popular support of the Cheng regime eroded during the final years of the family's rule. In 1680 Cheng officials conscripted three thousand Chinese adult males into the army and had merchants and settlers provide other services. The following year, when the Cheng family planned to extend house taxes from the capital at Tainan to the countryside, 30 percent of the villagers reportedly destroyed their huts. Their protest finally compelled the Cheng family to drop the proposal. In the spring of 1683 many settlers starved when famine visited the island. The Manchu court took advantage of this opportunity to attack Taiwan.<sup>106</sup>

### *DEVELOPMENT UNDER THE CHENG*

During the two decades of Cheng family rule, more migrants sailed to Taiwan, doubling its Chinese population. Besides encouraging farmers to reclaim the wilderness, the Cheng family adopted a military colonization system to settle soldiers and also continued international trade to increase revenue. Furthermore, with the assistance of Ming intellectual refugees, they reestablished Chinese political institutions and set up schools for both the Chinese and aborigines, thus introducing Chinese high culture to Taiwan.

The exact number of Chinese in Taiwan during this period is not known. My conservative estimate of the island's Chinese population at the end of Cheng rule is 100,000—twice what it was during Dutch times. It was again migration that mainly accounted for the population growth. The two largest immigrant groups were soldiers (and their families) and peasants. In 1661-1662 Cheng Ch'eng-kung led about 25,000 soldiers to

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Taiwan, and in 1664 Cheng Ching brought 4,000 more.<sup>107</sup> Although the Chengs ordered their lieutenants and soldiers to bring their families, not all of them complied; in the 1670s about half were still without families.<sup>108</sup> Most of the immigrants, however, were peasants of Fukien who went to Taiwan in defiance of the Manchu policies of maritime prohibition (1656-1684) and coastal population removal (1660-1681).

The Manchu policy of removing the coastal population, first enforced in Hai-ch'eng and T'ung-an in October 1660, was later extended to include other areas of Fukien, Kwangtung, Kiangnan, Chekiang, and Shantung. The people of Fukien and Kwangtung suffered the most under this policy because of their support of the Chengs. Kwangtung residents in some counties were thrice ordered to move to the area about 50 *li* from the coast—20 *li* more than the normally required distance. In Fukien, even if people moved inland the taxes remained, and the yamen runners followed to collect them.<sup>109</sup> With fields deserted, many peasants could not find food and subsequently starved. Those who could acquire foodstuffs did not necessarily survive, for they were sometimes killed by bandits or eaten by tigers.<sup>110</sup> In the long run, the draconian Ch'ing policy compelled some people on the southeast coast of China to migrate to Taiwan.

The Ch'ing court repealed the policy of removing the coastal population in 1681 while planning to attack Taiwan. But the fear of Manchu brutality during their preparation for the expedition only intensified the returning farmers' frustration in changing wasteland into fields; many of them left their homes for good. According to Chinese traders at Nagasaki, an unknown number of people from China's southeast coast migrated to Taiwan in the early 1680s.<sup>111</sup> In April 1682 the journal register of the British Tongking Factory noted that in the South China Sea 206 Chinese junks "were cruising about to get a place where they may provide rice" and added that they were "all forced to fly their country to save their lives."<sup>112</sup> At that time, it was apparently safer to live in Taiwan than along China's southeast coast, where the Ch'ing policy had driven many to banditry.<sup>113</sup> Taiwan was labeled a "paradise" in 1669 because of the conscientious efforts of such Cheng advisors as Ch'eng Yung-hua (1633-1681).<sup>114</sup> Two years later the island produced a bumper harvest, news that eventually reached the destitute population on the coastal mainland.<sup>115</sup> Furthermore, with Cheng Ching's forces occasionally occupying coastal areas in southern Fukien and northern Kwangtung between 1676 and 1680, the improved

communications between the southeast coast and Taiwan prompted the refugees to change their unfavorable image of the island.

Not all the refugees went to Taiwan of their own volition. Cheng Ching provided ships for some Ming imperial clansmen, such as Chu Shu-kuei, and scholars, like Li Man-ch'un, to sail to the island. A number of able-bodied men were drafted under duress by Cheng Ching into his army and were later shipped to Taiwan.<sup>116</sup> After 1675, Cheng Ching banished three categories of people to Tan-shui in the north and Lang-ch'iao on the southern cape: the relatives of Chinese officials who had defected to the Manchus; scholars who defied him; and common people who refused to pay him taxes or duties.<sup>117</sup> The pirates also seized women on the southeast coast of China and sold them in Taiwan.<sup>118</sup>

The Cheng family encouraged reclamation of the wilderness—with special emphasis on the benefit of officials and soldiers at the expense of the economic well-being of common people. Though changing the name of the Dutch East India Company's "crown fields" to "government fields," the Chengs had the tenant peasants till the same fields and lead the same rough life.<sup>119</sup> Except for the fields that were already claimed by proprietors or cultivated by farmers, all civil and military officials could enclose land as their permanent possessions and lease it to the common people. Moreover, these officials could establish other estates and engage in commerce and fishing. The Cheng regime also urged Chinese proprietors to apply for permits and open up new land.<sup>120</sup> Yet no special efforts were made to ameliorate peasant life.

The most extensive and systematic mode of land reclamation at that time was military colonization. Twenty-one days after coming ashore, on 22 May 1661, Cheng Ch'eng-kung spread out half his soldiers for farming. After the Dutch surrendered, he garrisoned An-p'ing and Ch'eng-t'ien (Tainan) with two brigades and sent out the others to open up new land. In August 1664 Cheng Ching also dispersed one-third of his own troops over the western coast to farm.<sup>121</sup> By 1670, military colonization had become institutionalized. For the first three years the soldiers were paid and provided with cattle and supplies; thereafter they were supposed to become self-sufficient from their farming. The number of military colonizers increased during the 1670s. In 1680, when the two pirates Chiang Sheng and Ch'iu Hui joined Cheng Ching, they too dispersed their followers for military colonization.<sup>122</sup> In 1683, while twenty thousand soldiers were sent

## Chapter 1

to defend P'eng-hu against Manchu attack, there remained on Taiwan an equal number engaged in farming.<sup>123</sup> Many had been well settled and some even married native women.<sup>124</sup>

The areas developed by the Chinese in Taiwan during the Cheng period were more extensive than before, though still concentrated in the southwestern part. Of the areas reclaimed under the military colonization system, thirty-seven sites are identified in Table 1-3. The table shows that thirty-two of the thirty-seven sites, or 90 percent, are in the present Tainan and Kaohsiung areas. This distribution also roughly reflects the pattern of the Chinese population and cultivated fields.<sup>125</sup> The Cheng regime, however, never formulated any specific plan for the development of northern Taiwan, letting it remain a region of "birds' nests and beasts' caves."<sup>126</sup> Though Chinese soldiers encamped at northern outposts, planned exploration for gold and future development there were nevertheless frustrated by the early defeat of the Cheng forces.<sup>127</sup>

Most of the island remained in the hands of the aborigines, whose agriculture and life remained distinct from that of the Chinese. Only the aborigines in the vicinity of Tainan used sickles, plows, hoes, or rakes. In September 1661, Yang Ying, a Cheng advisor, recommended that each tribe be given a plow, a rake, and a cow and that a Chinese peasant be assigned to it in order to teach the aborigines farming. No historical evidence, however, indicates that Yang's proposal was ever adopted or that such a methodical sinicization of aboriginal agriculture occurred.<sup>128</sup>

The Chengs established salt farms and promoted the cultivation of rice but deemphasized that of sugar as a means to solve the food supply problem.<sup>129</sup> Even so, each year Taiwan still produced an average of 10,000 piculs of sugar.<sup>130</sup> They also continued to trade with Japan, Korea, and Southeast Asia to enrich their treasury. Cheng Ching even invited all countries except Ch'ing China to trade with Taiwan.<sup>131</sup> He let the British maintain a commercial factory at Tainan (1673-1683) to facilitate acquisition of ammunition from them.<sup>132</sup> Such international trade ended in 1683 with the Ch'ing occupation of the island.

Chinese learning was introduced to Taiwan with the establishment of Chinese educational institutions and instruction by Ming refugee intellectuals. In September 1665, Ch'en Yung-hua proposed building a Confucian temple at Tainan; the temple was completed the following February. After April 1666, the Cheng family set up schools in the Chinese-populated areas

## CHINA'S ISLAND FRONTIER

TABLE 1-3  
*Military Colonization Sites: 1662-1683*

Region and County	Number of Sites
<i>North</i>	
Hsin-chu	1
<i>Central</i>	
Nan-t'ou	1
Yun-lin	1
<i>South</i>	
Chia-i	1
Tainan	16
Kaohsiung	16
P'ing-tung	1
TOTAL	37

*SOURCES: "Tainan-ken ka imin no enkaku" [History of Chinese migration to Taiwan county], Taiwankanshū kiji [Studies in Taiwan history and customs], 2(5)(1902):340; Taiwan shihō [Private laws of Taiwan] (Kobe: 1910), vol. 1. pt. 1, pp. 68-70; Lien Heng, T'ai-wan t'ung-shih [General history of Taiwan] (Taipei: 1955), pp. 353-355.*

as well as in the aboriginal villages near Tainan. Regulations for the civil service examination were formulated and in 1670 a national learning academy (*kuo-hsueh*) was established at the capital.<sup>133</sup> Ming refugee scholars also helped propagate Chinese culture on the island. Of them, the greatest was Shen Kuang-wen (1612-1691?), acclaimed as the first person to introduce a literary tradition there. Shen, a Chekiang native, once served as subdirector of the Ming Imperial Stud (T'ai-p'ü Szu). Around 1652 he drifted to Taiwan from Quemoy: "I said I merely came here temporarily. Yet for long I have despondently stayed." For approximately two decades he lived among the aborigines at Backlavan, where "the quietude of hills could

## Chapter 1

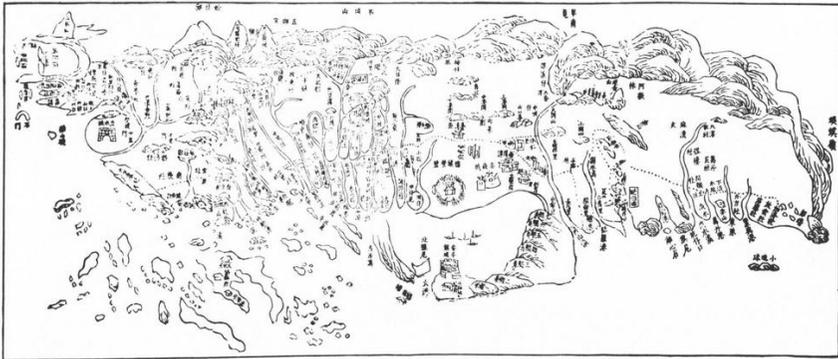
reside" in him. He composed poems to express his regret for being "hungry but alive," and late at night he "listened to the moon and shut the door to take in the mountain."<sup>134</sup> The Ming refugees, while "listening to the moon" (a poetic omen of Ming restorationism), transmitted Chinese political institutions and literary traditions to Taiwan.

### CONCLUSION

Taiwan was largely ignored by outsiders before the sixteenth century. Chinese first inhabited the P'eng-hu archipelago in the mid-twelfth century and incorporated it into the empire toward the end of the thirteenth. Even though Chinese seamen also had reached the main island of Taiwan by accident before the twelfth century, they were probably confused about the identity of the islands in the East China Sea. In fact, unfavorable winds and ocean currents prevented the southern Fukienese from sailing to Taiwan regularly in medieval times. Starting with the fourteenth century, however, Chinese merchants nevertheless braved the waves to reach southwestern Taiwan and barter with the indigenous people. Both southern Fukienese fishermen and pirates occasionally found shelter on the southwest coast of the island but did not form permanent settlements there until the end of the sixteenth century. The Portuguese, who gave Taiwan the name Formosa in the early 1540s, as well as other European navigators, passed by the island, yet none made an effort to settle there until the seventeenth century.

Taiwan is the only Chinese area that has been colonized by three foreign powers: the Dutch (1624-1662), the Spanish (1626-1642), and the Japanese (1895-1945). Taking Taiwan primarily for their mercantile and religious interests, the Dutch and Spanish had only limited success in the evangelization and education of the natives. Although the Dutch encouraged Chinese migration by carrying the immigrants and providing them with agricultural necessities, most migrants took Chinese junks to cross the strait. About 40,000 to 50,000 Chinese had settled on Taiwan by 1652; some of them apparently had survived Dutch persecution after their earlier uprising against colonial exploitation had failed a decade before. The Dutch also promoted the cultivation of rice and sugar cane, and they introduced new vegetables and fruits as well as commercial crops.

## CHINA'S ISLAND FRONTIER



*Figure 1-4. Late seventeenth-century Chinese map of Taiwan.*

The Dutch encouragement of farming not only prompted the Chinese to expand arable fields but also demonstrated that the island was agriculturally productive.

The Cheng family transformed the island from a foreign trading colony into a Chinese frontier. More migrants from southeast China sailed to Taiwan in defiance of Manchu maritime prohibitions and coastal population policies. Besides peasants, Cheng soldiers also reclaimed the wilderness under the military colonization system. Toward the end of Cheng rule in 1683, an estimated 100,000 Chinese settlers congregated principally in the southwestern region, although small settlements existed elsewhere on the island (Figure 1-4).

An ardent nationalist, Cheng Ch'eng-kung nevertheless disregarded the livelihood of both aborigines and Chinese peasants. The Cheng regime, like the Dutch before it, levied various onerous taxes on the settlers, yet effective military control obviated Chinese revolts. Culturally, however, some of Cheng's sagacious advisors championed traditional learning by setting up schools for both the aborigines and Chinese settlers. The Ming loyalists, who sealed their political fate on the island, introduced Chinese high culture to Taiwan, in contrast to the folk culture which had been transplanted there by peasant pioneers.

## 2

# Cultural Contact and the Migration of Taiwan's Aborigines: A Historical Perspective

*I-SHOU WANG*

The changing circumstances of the aborigines in Taiwan is one of absorbing interest. For here is an island once exclusively inhabited by aborigines who for the most part spoke Malayo-Polynesian tongues and showed strong cultural affinities with peoples in the Philippines, Indonesia, and Malaysia. Whatever links they may have had with the people on the China mainland, they were certainly decisively different from the Han Chinese.<sup>1</sup> And now, like many other indigenous people in China and elsewhere in a culturally changing world, they are being assimilated into a more populous and more technologically advanced society. At present there is no fear that they will be quickly eliminated. There are still some 250,000 of them, mostly in the rugged mountain ranges of central and eastern Taiwan, and their cultural heritage is still notably distinct. Furthermore, the process of cultural change and assimilation has been a long one, starting not with the Han Chinese but with the Dutch, and then continuing with each successive occupation: Chinese, Japanese, and Chinese again. So their current situation—a steady assimilation into the life of modern Taiwan—is but a phase of a long and varied history.

It is the encounter between these Malayo-Polynesian aborigines and each of the intrusive culture groups—and the consequent evolution of the present situation—which forms the focus of this study. First we will establish, from historical and archaeological records, the distribution of the aboriginal settlements prior to the first contact with the Dutch in the seventeenth century. Then we will examine the acculturation, the aboriginal responses, and the change in aboriginal settlement patterns

during each of the successive periods of political rule: Dutch (1624-1662), Chinese (1662-1895), Japanese (1895-1945), and Chinese (1945 to present).

### *ORIGINAL SETTLEMENT PATTERNS*

The origin of the Formosan aborigines is not yet clear, but recent archaeological findings indicate that they have lived in Taiwan for a long period of time and inhabited both the lowlands and the highlands.<sup>2</sup> They were horticulturists, producing millet, rice, tubers, and beans, and engaged in hunting and gathering. Culturally the groups were diversified and occupied different regions of the island. Little information is available in regard to the number of settlements and the size of population.

Based on their general areas of habitation, the aborigines can be divided into two major groups: the lowland aborigines and the mountain aborigines. The former inhabited the western and northern lowlands while the latter occupied the central mountain region and eastern Taiwan. Since these two terms also tend to indicate the time and duration of their contacts with the invading cultures, with lowlanders having an earlier exposure to external contacts, they will be used throughout the chapter.

The lowland aborigines can be divided into fourteen groups based on ethnographic traits and geographical distribution.<sup>3</sup> Their inhabited areas are shown in Figure 2-1. In the north, Ke-tanglan and Lui-lang inhabited the coastal area and the Taipei basin while the Kavalan occupied the I-lan delta. In central Taiwan, the Taokas and Papora resided along the coast while the Pazeh, Babuza, Sau, and Hoanya lived inland in the Taichung basin, Chang-hua plain, P'u-li basin, and Nan-t'ou area respectively. In the south the Siraya, Makatau, Taivoan, Pangsola-Dolatok, and Lungkiau spread out on the southwestern lowlands from the Chia-i area to the Heng-ch'un peninsula.

The mountain aborigines can be divided into nine major groups.<sup>4</sup> In the mountain region, the Atayal and Saisiat occupied the north, the Bunun and Tsou settled in the middle, and the Paiwan and Rukai inhabited the south (Figure 2-2). The eastern rift valley and the eastern coastal area were the home of the Ami, but it was the Puyama who occupied the southern end of the rift valley. The Yami were on the island of Lan-yu.



Figure 2-1. Areas originally inhabited by the lowland aborigines.

In the early seventeenth century, Chinese pirates occupied Pei-kang near the southwestern coast and assisted some three thousand peasants of Chang-chou to cross the sea to settle in the Pei-kang area.<sup>5</sup> Although they did come into contact with some lowland aborigines, their number was small and the pirates' main interest was maritime; their effect on the life of the aborigines was therefore minimal. Up to that encounter, the aborigines had been free of external interference and lived the life their ancestors had lived for centuries.

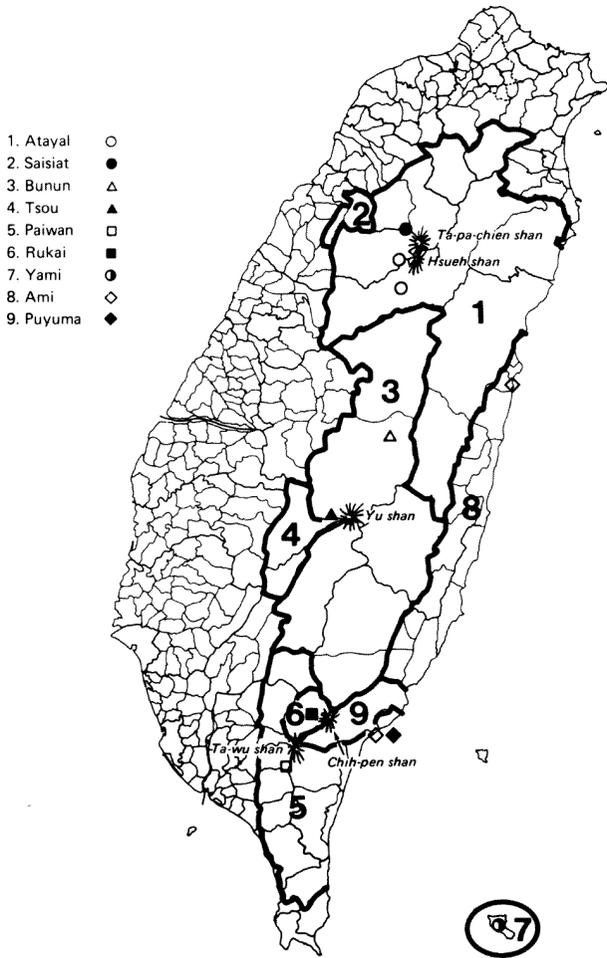


Figure 2-2. Legendary sites of original settlements and present dominant areas of the mountain aborigines.

### THE DUTCH PERIOD (1624-1662)

Dutch rule in Taiwan marked the beginning of external impact on the life of the aborigines. The Dutch came into direct contact only with the southwestern lowland aborigines—namely, the Siraya, Taivoan, Makatau, Pangsola-Dolatok, and Lungkiau. They engaged in trade, missionary work, and education, appointed chieftains in the aboriginal villages, regulated the abo-

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rigines' use of land, imposed various taxes, restricted their movements, and encouraged the in-migration of Chinese laborers to cultivate the land. As a result, the life of the southwestern lowland aborigines underwent substantial change.<sup>6</sup>

The occupation of the Taiwan coastal area in 1624 by the Dutch brought them into direct contact with the Siraya, with whom they immediately engaged in trade. They also sent missionary workers into Siraya settlements and sought to extend control and expand trade by sending delegates to the villages of Taivoan, Makatau, Pangsola-Dolatok, and Lungkiau and appointed chieftains in some of the villages which lacked formal leadership.<sup>7</sup> By 1636 most of the villages on the southwestern plain had been brought under Dutch rule, and in February of that year the Europeans convened a conference of local chieftains from twenty-eight villages in Sinkong near present-day Tainan.<sup>8</sup> Although the Dutch sphere of influence covered the southwestern plain, only the Siraya of the Taiwan plain had intimate and intensive contact with them. There was only limited and indirect Dutch contact with the mountain aborigines of southern Taiwan through the lowland aborigines.

To tighten their control and increase their revenue, the Dutch prohibited the Siraya from moving freely between villages and regulated and taxed their use of land. Moreover, a head tax, an export tax, and even hunting and fishing taxes were imposed. Though this regime seemed oppressive, most of the Siraya accepted it however unwillingly, but some fled inland to settle among the Taivoanians.<sup>9</sup> This flight marked the first known incidence of externally induced aboriginal migration on the island.

Other changes resulted from the interlocking factors of land use and migration. The aborigines were shifting cultivators and, in Dutch eyes, did not use the land efficiently. To utilize the fertile lowland and increase agricultural production, the Dutch encouraged the in-migration of Chinese laborers by providing them with land, draft animals, tools, seeds, and some cash as described by Wen-hsiung Hsu in Chapter 1. At that time, as the political situation in China happened to be chaotic and population pressure in the Fukien area was intense, individuals and some households from the Chang-chou area of Fukien migrated across the straits. As a result, some 10,000 hectares of land were brought under intensive cultivation and the Chinese settlements spread out from Fort Zeelandia and Fort Provintia

## CHINA'S ISLAND FRONTIER

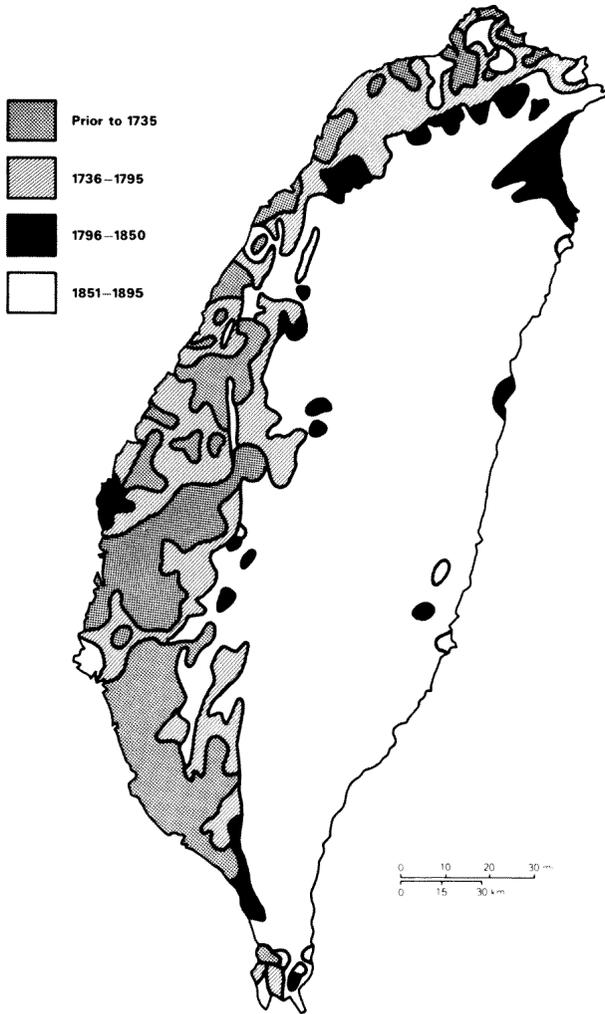
northward to Pei-kang, eastward to Hsin-hua, and southward to Kong-shan (see Figure 2-3). In the mid-seventeenth century, the Chinese population in Taiwan may have reached fifty thousand.

The extensive missionary work carried out by the Dutch, particularly in the Siraya villages, exposed the aborigines to different religious beliefs, and by 1650 many Siraya were at least nominally converted to Christianity.<sup>10</sup> The Dutch also established community schools in the aboriginal villages and introduced formal education; under their rule, moreover, several surveys of population and household were conducted. Although the areal coverage and accuracy of the surveys are difficult to assess, their reports give at least general ideas about the size of the villages and the population within their respective spheres of influence. The population of the five principal Siraya villages in 1639, for example, was reported to range from 1,000 to 3,000 (Table 2-1) and the total number of aborigines was reported to be 68,567 in 1650 (Table 2-2).

Most of the Dutch in Taiwan resided in or near Fort Zeelandia and Fort Provintia, both within the present-day boundaries of the city of Tainan. They were predominantly military personnel along with employees of the Dutch East India Company, merchants, missionaries, and schoolteachers. The total Dutch population in Taiwan at its peak was reported at 2,800, of whom 2,200 were soldiers.

During the Dutch period between 1624 and 1662, both the Dutch and the Chinese advanced into the habitats of the southwestern lowland aborigines, initiated changes in the aboriginal way of life, and reduced their living and action space. Because the Dutch were few in numbers and mostly resided in the fort areas, the influence of their direct individual contact was small. But they did possess political and economic power, and their effect on aboriginal life was mediated not so much from individual contact as through the institutional structure and implementation of policy. Directly or indirectly, the Dutch increased the aborigines' dependence on trade, imposed taxes and chief-tains on them, introduced church and school to them, and encouraged a large number of Chinese to immigrate and live in their midst. As these Chinese outnumbered both the Dutch and the aborigines and lived in the countryside, they tended to have greater personal contact with the latter in terms of both frequency and duration than did the Dutch.

In 1661, with the assistance of the Siraya and the local Chinese, Cheng Ch'eng-kung and his troops attacked the island and after a lengthy siege drove out the Dutch. Thus ended



*Figure 2-3. Expansion of Chinese settlement.  
[After C. S. Chen, 1950.]*

Dutch rule on Taiwan. Whatever effects it may have had on aboriginal life were soon submerged under the intruding tide of Chinese immigration.

## CHINA'S ISLAND FRONTIER

TABLE 2-1  
*Population of the Siraya Villages: 1639*

Village	Population
Sinkan	1,047
Mattau	3,000
Soulang	2,600
Bakloan	1,000
Tavakan	1,000

*SOURCE: Raleigh Ferrell, "Aboriginal Peoples of the Southwestern Taiwan Plain," Bulletin of the Institute of Ethnology, Academia Sinica 32(Autumn 1971):218.*

TABLE 2-2.  
*Population of Taiwan's Aborigines: 1647-1655*

Year	Villages	Households	Population
1647	246	13,619	62,849
1648	251	13,955	63,861
1650	315	15,249	68,567
1654	271	14,262	49,324+
1655	233	11,029	39,223+

*SOURCE: Wang Jen-ying, Population Change of Formosan Aborigines, Institute of Ethnology, Academia Sinica, Monograph 11 (Nankang, Taipei: 1967), p. 40,*

### *THE CHINESE PERIOD (1662-1895)*

The Chinese ruled Taiwan continuously for over two centuries from 1662 to 1895; the first 21 years were under Cheng and his descendants, and the last 212 years were under the Ch'ing dynasty. The Chinese were primarily interested in colonizing the lowlands, and during this period their settlements expanded from the southwestern coast to cover most of the western and

northern lowlands. The lowland aborigines, surrounded by the ever-increasing numbers of Chinese, were either assimilated or forced to seek refuge in the hills and in the remote areas of eastern Taiwan. The Chinese did come into contact with the mountain aborigines but because of the difficult terrain and strong resistance they did not invade aboriginal territory until the late nineteenth century. The mountain aborigines were thus enabled to maintain their way of life well into the twentieth century without much external interference.

Soon after Cheng and his troops arrived in Taiwan in the early 1660s, Chinese settlements spread out rapidly in the southwestern plain. They immediately put pressure on the southwestern lowland aborigines. Responding to this pressure, a group of Siraya migrated first to the Tso-cheng district in eastern Tainan county and then to Ch'i-shan in Kaohsiung county (Figure 2-4).<sup>11</sup> Cheng established several military outposts in central and northern Taiwan, and new Chinese settlements developed alongside these—a situation which resulted in further confrontations with the lowland aborigines. During Cheng's rule (1662-1683) three aboriginal uprisings were recorded.<sup>12</sup>

Cheng's rule was short-lived and in 1684 Taiwan was officially brought within the Ch'ing administrative system. Because of this change, the Chinese settlements in the south continued to expand, forcing some lowland aborigines to migrate (Figure 2-4). In the early eighteenth century, some Siraya people moved eastward to join the Taivoan in the hills near Yu-ching. Pressured by the incoming Siraya and the Chinese, the Taivoan yielded their homeland in the 1740s and moved further inland to the valleys of the Lao-nun Ch'i (river) and the Nan-tze-hsien Ch'i. Chinese pressure was also felt by the Makatau, a majority of whom retreated into the hilly area to the east of the P'ing-tung plain, though a small number chose to migrate southward to the Heng-ch'un peninsula.<sup>13</sup> Those who remained became intermixed with the Chinese and were subsequently sinicized.

In central Taiwan, the Chinese settlements extended from the nuclei established earlier at the expense of the aboriginal land. In some areas, such as Nan-t'ou and Chia-i, the Chinese came into direct contact with the fierce mountain aborigines. As the Chinese invaded their territory, the aborigines retaliated by killing the invaders and even raiding nearby Chinese settlements. Some of the more serious conflicts resulted in aboriginal

# CHINA'S ISLAND FRONTIER

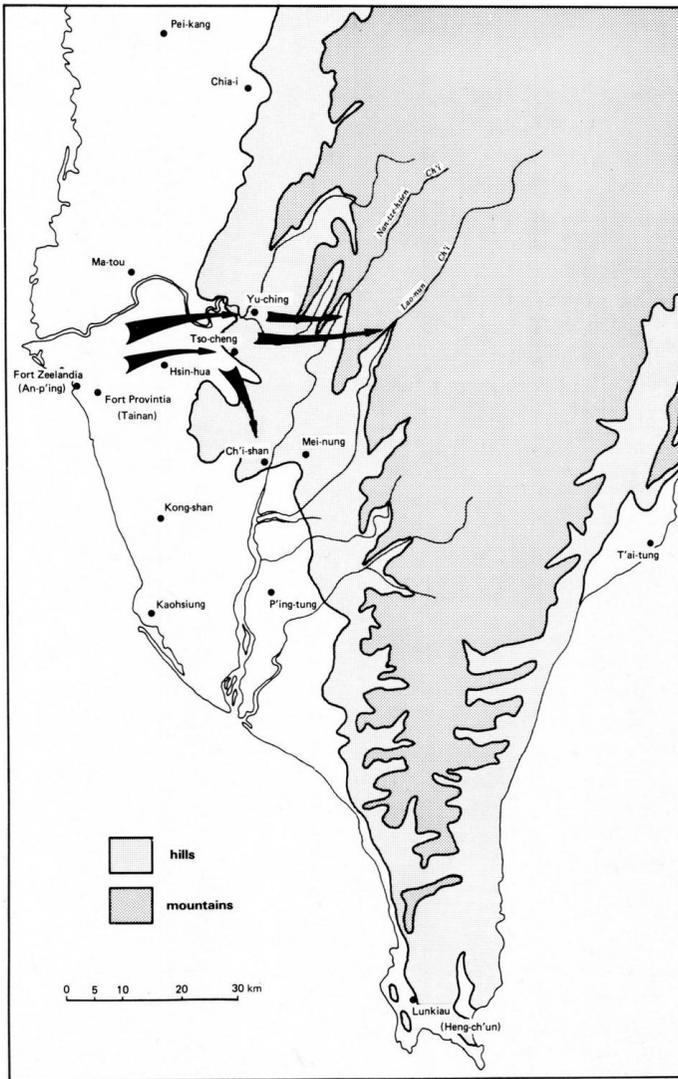


Figure 2-4. Migration routes in southern Taiwan.

uprisings, and during the early part of the eighteenth century, five major revolts were reported: two in Nan-t'ou, two in P'ing-tung, and one in Chia-i.<sup>14</sup>

As Chinese settlement expanded, the conflicts between the Chinese and the aborigines intensified. Since the Ch'ing government was not interested in colonizing the mountain area and

## Chapter 2

wished to reduce the level of conflict and protect the Chinese villages, it established a boundary between the lowland and the mountain regions to separate the Chinese from the mountain aborigines and set up military posts on the major routes leading to the aboriginal territory.<sup>15</sup> In 1739 the Ch'ing government formally prohibited the Chinese from entering the territory of the mountain aborigines. From then until the removal of the decree in 1875, no uprisings were recorded, though this of course does not necessarily mean that conflicts or confrontations were entirely absent during this period.

Since taking control of Taiwan in 1683, the Ch'ing government had restricted immigration to Taiwan; but in 1760 these restrictions were completely lifted. A rapid increase of Chinese followed: a survey taken in 1811 indicates a total Chinese population of over 2 million. As the Chinese population increased, the pressure on the lowland aborigines mounted, setting off a series of migrations.

The Chinese colonization of the I-lan delta during the 1796-1820 period forced the local Kavalan people to migrate (Figure 2-5). Some retreated to the mountains to the north of the delta while others moved first to the area south of Lo-tung in the delta and later, in the 1840s, to Pei-fang-ao by land or to Hua-lien by sea.<sup>16</sup> In the early nineteenth century, a thousand or so lowland aborigines of central Taiwan migrated across the central mountains to Wu-wei in the I-lan delta. Unfortunately for the aborigines, the Chinese were then colonizing the delta (as Cho-yun Hsu will describe in a later chapter) and were hostile to the immigrants. As a result, many of the latter returned to their original homeland, though some did settle in the hills nearby.

In 1823, a group of aborigines from Wan-tou-liu in central Taiwan migrated inland to the P'u-li basin. They were well received by the local native inhabitants, and many more aborigines from the Tachia, Taichung, Chang-hua, and Nan-t'ou areas followed.

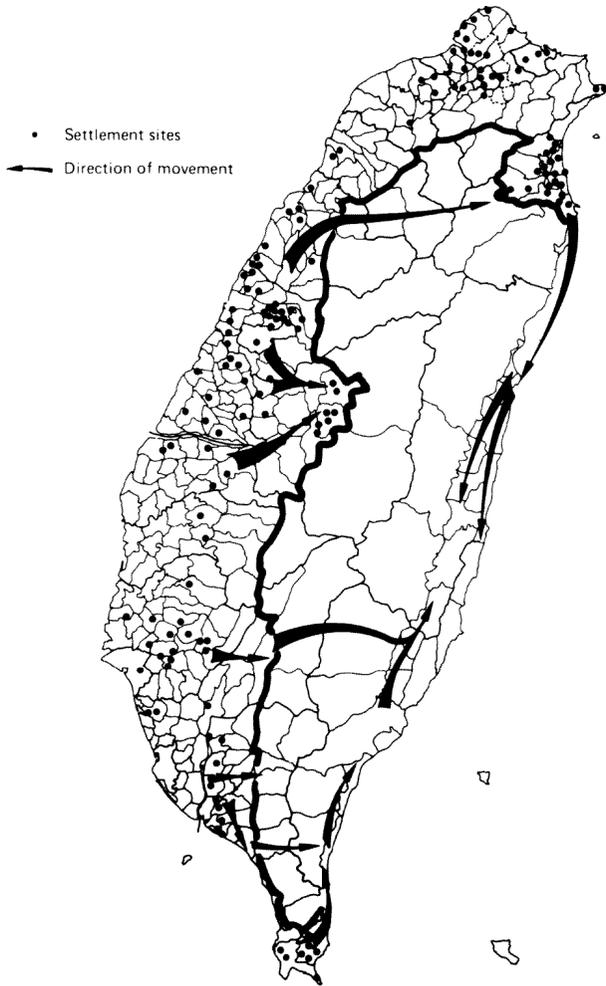
The continuing expansion of Chinese settlements in the south forced the Siraya and others already in the hills to migrate further across the central mountain range to eastern Taiwan by three routes, two of which crossed the mountains and one of which skirted the southern ranges. The northern route, following the valleys of the Lao-nun Ch'i and the Hsin-wu-li Ch'i to the east, passed through the territory of the Bunun and required their assistance and cooperation; and when this aid was replaced by Bunun hostility, the route was abandoned. The second route, by way of Fang-liao, crossed the Ta-wu Shan

and then followed the coast northward to the eastern rift valley, a long trench extending north-south. It was used by the majority of the aboriginal migrants, particularly after the abandonment of the northern route. The southern route was used mainly by the Lungkiau of the Heng-ch'un peninsula. Those who migrated to the eastern rift valley settled in the area between the Hsiuku-luan Ch'i in the north and the Li-lung in the south while those who settled along the coast in the area between Ta-king-k'ou and Ch'en-kuan-ao intermixed with those Kavalan who had retreated from the I-lan delta.

Many of the lowland aborigines, however, did not migrate and were largely sinicized. They are commonly referred to in the Chinese literature as *shu-fan* (ripened aborigines) as opposed to the *sheng-fan* (raw or uncivilized aborigines). The *shu-fan* or sinicized aborigines are frequently referred to as *Pepohoan*, a corruption of the Chinese *p'ing-p'u-fan* (plains aborigines). The major factor in the acculturation and assimilation was the long contact between the aborigines and the Han Chinese. The establishment of educational institutions by the Chinese facilitated the assimilation.

After more than two centuries of colonization by the Chinese, most of the western lowland was brought under intensive cultivation. Meanwhile the Chinese population increased greatly from about 100,000 in 1684 to over 3 million in 1887. To relieve population pressure, the Ch'ing government in 1875 lifted the ban of 1739 and allowed Chinese to enter the mountain region. Chinese settlers quickly invaded the lands of the mountain aborigines. The Chinese government also attempted to open up mountain land for colonization. The strong resistance of the aborigines to the new incursions was evidenced by twenty major uprisings between 1875 and 1895. Most of these were caused by governmental attempts to colonize mountain land or governmental response to the aboriginal killing of the invading Chinese settlers.<sup>17</sup>

The mountain aborigines, particularly the Atayal and the Paiwan, resisted strongly. Of the twenty uprisings, seventeen involved the mountain aborigines. The Atayal, with ten uprisings, led all the groups; the Paiwan followed with four. The lowland aborigines involved in the uprisings were the Kavalan who were forced out of the Man delta earlier in the 1840s. To protect their newly established homeland in eastern Taiwan, they had to resist the Chinese intrusions and revolted three times. Two areas—eastern Taiwan and the mountain area of T'ao-yuan and



*Figure 2-5. Settlement sites and migration routes of the lowland aborigines. [After C. S. Chen, 1959.]*

Hsin-chu in northern Taiwan—accounted for fifteen of the twenty uprisings. There were three uprisings in the southern tip of the island and two in central Taiwan.

In 1895, Taiwan was ceded to Japan, temporarily ending Chinese rule of the island. During the preceding two centuries of Chinese dominion, Chinese settlements had spread throughout the western and northern lowlands, and the former

hunting grounds of the lowland aborigines were transformed into agricultural fields. The original inhabitants of the lowlands lived in a sea of Chinese culture and through long and intensive contact they were mostly sinicized. Those who migrated to the hills or to eastern Taiwan lived among the mountain aborigines and were able to maintain some of their cultural heritage. Although the Chinese came into contact with the mountain aborigines, the latter, aided by rugged terrain and their own strong resistance, managed to protect their living space and preserve their way of life, at least for a longer while.

### *THE JAPANESE PERIOD (1895-1945)*

The Japanese occupation marked the beginning of the planned intrusion of external culture into the territory of the mountain aborigines. Interest in the exploitation of Taiwan's natural resources led the Japanese to colonize eastern Taiwan and encroach upon the land of the mountain aborigines with force. To establish firm control over the aborigines, the Japanese penetrated the mountain region by setting up police stations and schools in aboriginal villages, and this control was further facilitated when the aborigines of remote areas were forced to resettle in the more accessible regions of the mountain zone.

During the first years of their occupation, the Japanese were so busy pacifying the Han Chinese that they were able to establish only a few police guard stations in key places leading into the aboriginal territory.<sup>18</sup> In 1897, in response to several incidents involving the killing of lumber and camphor workers in the Hsin-chu and I-lan areas, a defensive guardline system was established to protect Chinese districts. Guardlines were cleared zones that stretched across the ranges. In addition to guard posts located at strategic points, electrically charged wire entanglements and mines were used. Telephone lines linked the guard posts and other areas under Japanese control.<sup>19</sup> Continuing exploitation of forest products at the margin of Atayal territory resulted in an increase of killing and property damage by the aborigines. The Japanese countered by augmenting the number of guards and extending the guardline to protect the camphor and timber workers. By 1900 a guardline enclosing Atayal territory was completed. At this time the guardline was maintained simply to defend the border district, but after the Japanese had attained full control over the Chinese in 1902, the guardline became the offensive front. Be-

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tween 1903 and 1908, the guardline was advanced into Atayal territory seventy-five times, and on eighteen of these occasions fierce resistance was encountered. In 1907 a new guardline was established in the northern end of the eastern rift valley near Hua-lien and was subsequently extended mainly in the north and northwest of Atayal territory. The location of guardlines and the major guard stations along the line are shown in Figure 2-6.

Moreover, the Japanese attempted to pacify the mountain aborigines with force. Between 1898 and 1909 the Japanese sent eleven punitive expeditions against the aborigines, mostly against the Atayal. The successful expeditions typically resulted in destruction of the aboriginal villages, killing of the aborigines, the flight of survivors inland, and the advance of the guardline. The cost of this conflict was high: during this period 4,127 persons were recorded as killed and 1,545 wounded by the aborigines. Ninety percent of these casualties were Taiwanese; the remainder were Japanese. The number of killed and wounded aborigines is not known.

In southern Taiwan no guardline was established. Instead, police stations were set up in aboriginal villages to regulate activities. By the end of 1909, there were 123 police stations in the mountain aboriginal territory. The distribution of the police stations in southern Taiwan is shown in Figure 2-7. The Japanese also established seventeen schools in aboriginal villages, all in the lowland area.<sup>20</sup>

There was some trade between the aborigines and the lowland people, but this activity was permitted only in areas where the aborigines observed Japanese law. There a trading station would be attached to the guard or police station and the aborigines would bring various forest products and game to trade for lowland goods. From time to time, agricultural implements and seeds were offered to them. In some of the stations medicines were kept and oftentimes were given to the sick. The Japanese authorities encouraged the docile aborigines to migrate inside the guardline or near the guard stations. By 1913 some four thousand Atayal had moved to the areas along the guardline.<sup>21</sup>

In the 1920s a system of aboriginal reservations—Chinese entry was forbidden—was established in the highlands and the guardline was eliminated. Meanwhile the Japanese began to organize the resettlement of the highland aborigines and a sense of oppression roused the mountaineers. In 1930, the Atayal attacked a Japanese police station at Wu-she and killed over a hundred policemen and their families. As a result of this in-

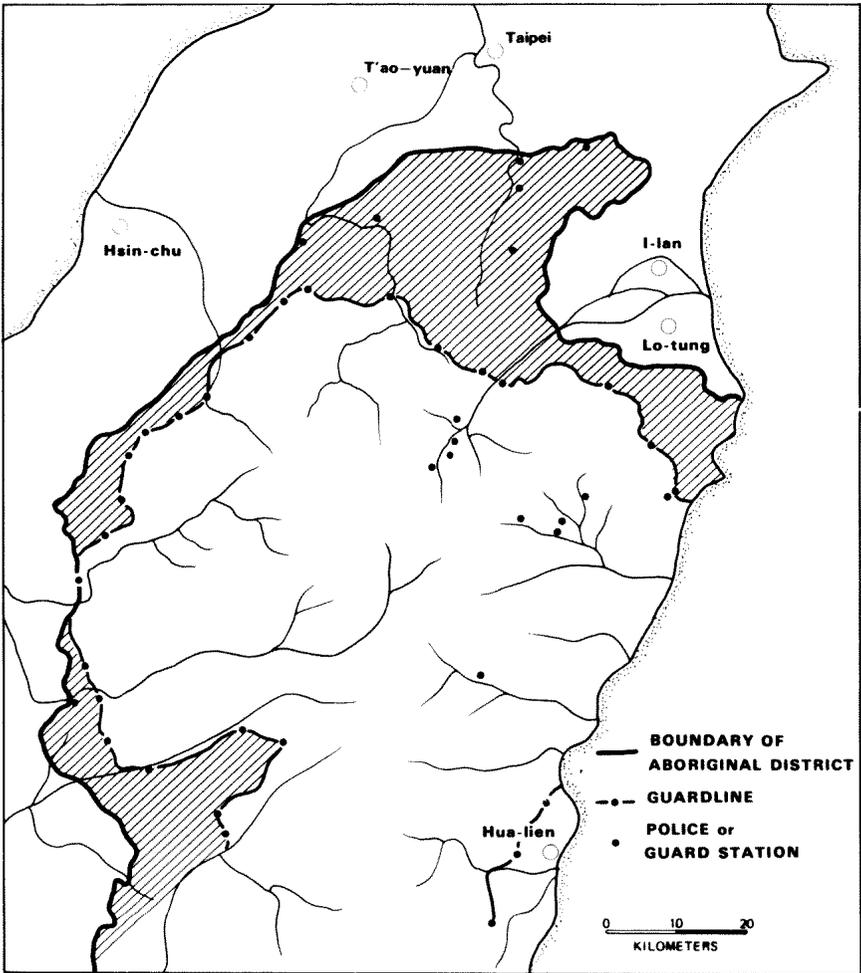
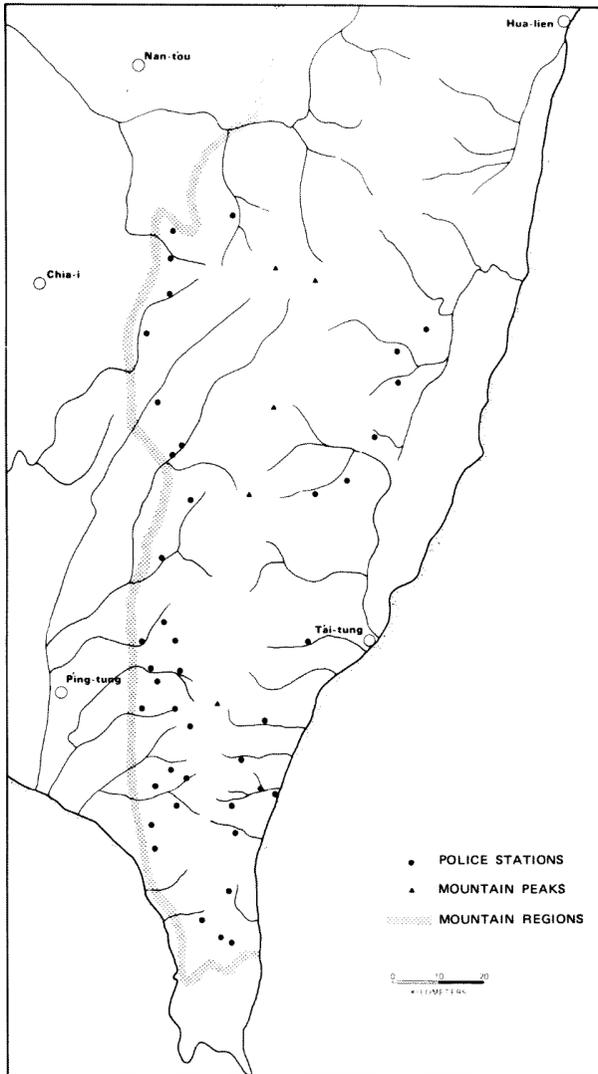


Figure 2-6. Advancement of the guardline in northern Taiwan: 1909.

cident, the Japanese intensified their forced migration program in order to gain greater control over the aboriginal settlements. In the Wu-she area alone, some five thousand aborigines from thirty-eight villages were resettled.<sup>22</sup> Elsewhere many small villages in remote areas were consolidated into larger settlements in the more accessible foothills. The extent of the forced resettlement can be seen in the declining number of settlements between 1920 and 1935. The Atayal settlements were reduced by

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*Figure 2-7. Distribution of police stations in the aboriginal districts of southern Taiwan.*

86 from 267 in 1920 to 181 in 1935. The number of Bunun settlements decreased by 39 from 124 to 85. More than 30 other aboriginal settlements were eliminated.<sup>23</sup>

## CHINA'S ISLAND FRONTIER

The number of individuals involved in the migration was substantial. Prior to 1930 a total of 14,145 aborigines were reported to have resettled. In the decade after the Wu-she incident an additional 21,642 aborigines were officially resettled. Half of these were Bunun and 39 percent Atayal. The dislocation of the former was substantial, for the relocated individuals constituted 62 percent of the entire Bunun population in 1929.<sup>24</sup>

After the Wu-she incident, the Japanese adopted a gradual pacification policy. Apart from moving the highland aborigines to more accessible areas, they expanded the construction of roads and bridges in the mountain region, extended the public school system into that area, reduced the threat of malaria and other environmental diseases, and introduced new crops. As peace and stability were restored, the aboriginal population increased. In 1906 there were 113,163 mountain aborigines. By 1940 their population had grown to 158,321. The rate of increase was highest during the 1930s: 12.6 percent for the decade.<sup>25</sup>

The colonization of the eastern rift valley and the Pacific littoral during the Japanese period brought both Chinese and Japanese into contact with the mountain aborigines of eastern Taiwan (Figure 2-8). Although the Chinese had attempted to colonize eastern Taiwan in the late nineteenth century, they had had but limited success: in 1896, there were only 3,300 Han Chinese there.<sup>26</sup> Beginning in the 1910s, the Japanese encouraged the migration of both Chinese and Japanese to the area. Despite heavy government subsidies, the early results were far below expectations. Nonetheless, by 1935, the Chinese population of eastern Taiwan increased to some 70,000. Together with 20,000 Japanese, their combined total approximately equaled that of the aborigines in the area. Thus, by comparison, the aborigines of eastern Taiwan had far more opportunity for contact with the Chinese or the Japanese than had those in the central mountain region. The Japanese also engaged in resettling mountain aborigines from the eastern slope of the central mountain region into the eastern rift valley; by 1938, some 1,859 households with a total of 10,850 aborigines had been resettled in the valley.<sup>27</sup>

Thus the fifty years of Japanese rule greatly altered the settlement pattern of the aborigines and brought about substantial changes in their dealings with outsiders. In addition to encroaching upon Atayal land in the north, the Japanese encouraged the migration of Chinese and Japanese to eastern Taiwan, consolidated the highland aboriginal settlements into



*Figure 2-8. Colonization during the Japanese period. [After C. S. Chen, 1950.]*

the more accessible areas, and moved many of the aborigines of the eastern slope of the mountain region into the eastern rift valley. They also established police stations and schools in the aboriginal villages. They did continue to prohibit the Chinese from entering the mountain region, however, thus preserving the mountain areas, in the main, for the highland aborigines.

## CHINA'S ISLAND FRONTIER

Japanese rule over Taiwan ended with their defeat in World War II, and in 1945 the island was returned to China. But in the meantime China itself had changed from an imperial dynasty to a republic, and this change was to bring different attitudes and policies to Taiwan in the postwar era.

### *THE POSTWAR ERA*

Under the new Chinese government, the aborigines became citizens of China with the same legal rights as the Han Chinese. They can by law, for example, move freely and participate in the political process. To protect them from exploitation, the Chinese government continues to maintain the reserve system in the mountain region, forbidding Chinese to enter without a permit but leaving the aborigines free to depart or enter. Such Chinese as do live in the mountain region are typically policemen, schoolteachers, and shopkeepers. The Chinese interest in exploiting mountain resources has led them to build roads, dams, and powerlines, a development which has brought many transient Chinese workers into the region.<sup>28</sup> The construction of roads has improved the accessibility of these areas and increased the interaction between mountain aborigines and lowland people, while the completion of the east-west highway in central Taiwan has brought tens of thousands of tourists in annual transit through this region. Moreover, the Chinese government resettled thousands of retired soldiers in the mountains. So, despite governmental restrictions, the Chinese presence in the region is on the rise and the highland aborigines are constantly exposed to the Chinese way of life.

Many highland aboriginal youths have descended to the lowland for education or military service. Since there is no high school or college in the mountains, those pursuing education beyond the elementary level have to come down to the lowlands. Meanwhile, as citizens of the Republic of China, the young male adults have an obligation to serve in the armed forces and many are drafted into the military for two or three years. As the students and draftees live among the Chinese in the lowland, their exposure to the Chinese way of life is intensified. As a result, many of them choose to stay there after completing their education or military service. Those who return bring information back to their villages whence it is diffused throughout the mountain region.

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The increasing presence of the Chinese in the mountain region and the growing interaction between upland aborigines and lowland people have intensified the acculturation process. Meanwhile, the increasing awareness of better economic opportunities and a more appealing life in the Chinese-dominated lowlands has encouraged aborigines to migrate there. As the mountain aborigines in eastern Taiwan have had greater contacts with the Chinese than have the highland aborigines, and as the Chinese colonization of eastern Taiwan has intensified, many more aborigines have migrated from eastern Taiwan to the western lowlands than from the highlands.

The migration of individual aborigines into the western lowlands is indicated by the rapid increase of the aboriginal population in that area in recent years. Between 1962 and 1971, the aboriginal population in the western lowlands more than doubled from 5,575 to 12,773.<sup>29</sup> The migrants are predominantly Ami, Atayal, and Paiwan. In 1966, for example, there were 8,453 aborigines in the western lowlands: 3,054 Ami, 2,108 Paiwan, and 1,855 Atayal. These three groups comprised over 80 percent of the aborigines in the western lowlands. Most of them resided in the major urbanized areas or in the townships adjacent to their homelands.<sup>30</sup>

Apart from individual migration, there have been numerous voluntary resettlements, mostly within the mountain region and eastern rift valley. A survey taken in 1966 shows that a total of 111 movements were recorded, including 31 cases of resettling whole villages and 80 cases of resettling some village members (Table 2-3). The resettlement of whole villages involved mainly the Paiwan; the partial resettlements mainly affected the Atayal, the Tsou, the Paiwan, and the Ami. The Saisiat and the Puyuma were not involved. The resettlement of the Paiwan was from the mountain slopes to the lower foothills (Figure 2-9). The moving of the Atayal village was necessitated by the construction of Shih-men Dam, but the general direction of Atayal movement, which involved only some members of some villages, was southward into the areas settled by the Bunun and the Ami. The movements of the Ami were from the eastern coastal range down into the rift valley and from the northern end of the rift valley southward. Most of the movements were from small villages into large settlements. But the movements of the Tsou were from large villages into the uninhabited land within their territory and generally involved only

## CHINA'S ISLAND FRONTIER

TABLE 2-3  
*Number of Postwar Resettlements: 1945-1966*

Tribal Group	Whole Villages Resettled	Partial Villages Resettled	Total
Atayal	2	29	31
Bunun	1	4	5
Tsou	0	22	22
Rukai	1	4	5
Paiwan	21	11	32
Ami	6	10	16
TOTAL	31	80	111

*SOURCE: Compiled by the author from Wei Hwei-lin and Wang Jen-ying, A Survey of Population Growth and Migration Patterns among Formosan Aborigines, Occasional Papers of the Department of Archaeology and Anthropology, National Taiwan University, no. 3 (Taiwan: 1966).*

three to five households—a migration which seemed to be consequent to growing population pressure in the villages of the Tsou.<sup>31</sup>

Although all these movements were voluntary, the Chinese government played a decisive role. Many of the shifts, particularly those from inaccessible highland areas and those involving large numbers of aborigines, were financed by the government. Nineteen of the Paiwan's thirty-two movements, for example, were into new government-constructed communities.<sup>32</sup> Up to 1964, the Chinese government had spent over NT\$3 million to assist forty-three movements of ten households or more involving 14,269 aborigines.<sup>33</sup>

Since the resettlements were from highlands to the more accessible foothills, they tended to heighten contact between the aborigines and the Han Chinese and exposure to the Chinese way of life. The migration of the aborigines into the western lowlands has increased the flow of information between the Chinese-dominated lowlands and the aboriginal homelands. As the trend continues, there will be more individual aborigines

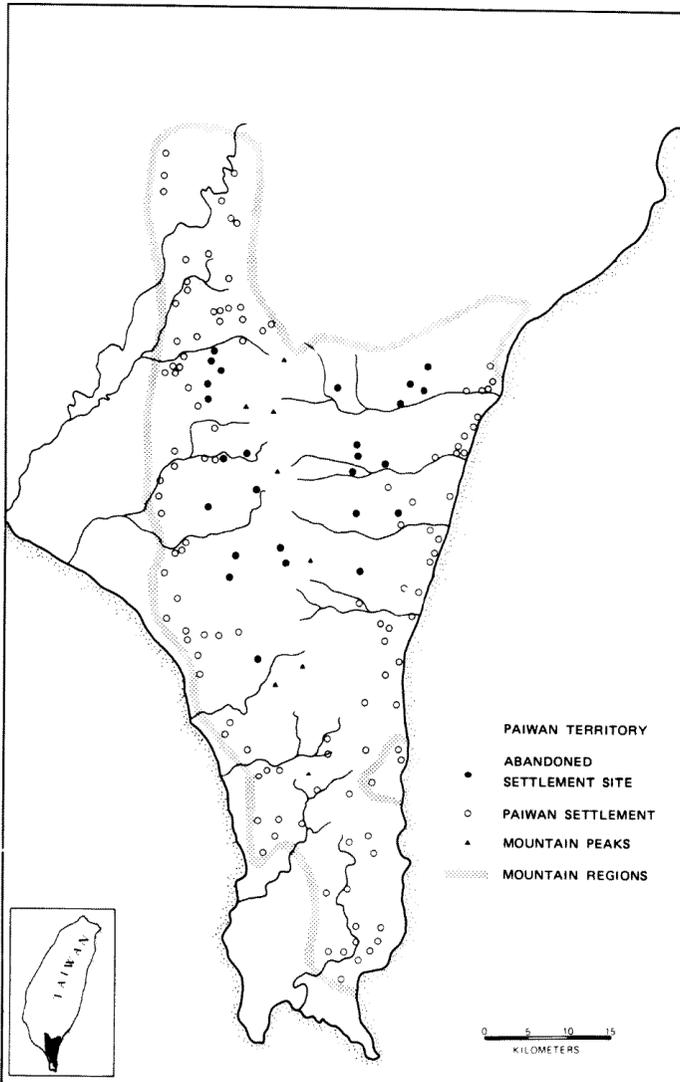


Figure 2-9. Resettlement of the Taiwan aborigines.  
[After Wei and Wang, 1966.]

living among the Chinese and acculturation will likely intensify. Meanwhile, the increasing interest in exploiting mountain resources will send more Chinese into the mountain region and accelerate the acculturation process in the aboriginal homelands as well.

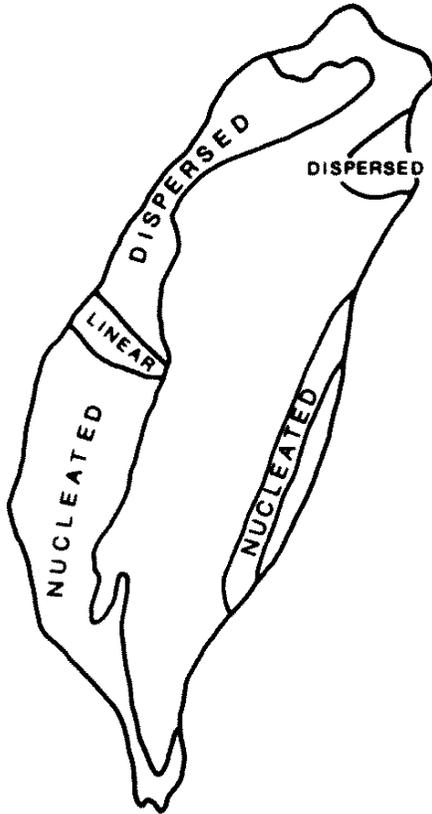
# 3

## Settlement and Frontier Land Tenure

RONALD G. KNAPP

A striking contrast between the nucleated settlement patterns of southern Taiwan and the dispersed patterns found in the northern half of the western coastal plain has been noted by geographers and others (Figure 3-1). This twofold typology has been repeated so often that it is sometimes forgotten that the complexity of the colonization process and accompanying agricultural development in fact produced a mosaic of rural settlement forms that is as noteworthy for the variety of representative components as it is for its seemingly regional sameness. Not only has no comprehensive island-wide study of existing settlement patterns been carried out but there has been only limited examination of the origins and alternations of any one particular pattern. It is unreasonable to assume that certain factors *compelled* a nucleated or a dispersed pattern which, once established, endured and replicated itself.

This chapter makes no pretense of systematically dealing with settlement throughout the island of Taiwan. Rather, it focuses on the settlement history of several areas found on the 900-square-kilometer T'ao-yuan alluvial fan of northern Taiwan. Chinese migrants came to this area in numbers only at the end of the seventeenth century. By 1841, as many as fifty thousand pioneers were transforming the grasslands through arduous and intensive effort. Over the past two and a half centuries this region has become not only a highly productive agricultural area with increasing rural densities but, more recently, an area of significant urban and suburban development. An early intent of my research was to treat the genesis of settlement and the intensification of settlement forms as population increased and agriculture developed. Intent, unfortunately, has been compromised by reality. The materials for such a sequential study are not abundant, and those that are available are uneven and se-



*Figure 3-1. General patterns of rural settlement.*

lective. Notwithstanding such shortcomings, I shall attempt to treat the origin and spread of selected rural settlement patterns and identify the factors which brought them about.

Like other areas north of the Cho-shui River, the T'ao-yuan alluvial fan has been described as having a dispersed or scattered rural settlement in contrast to the predominant compact or nucleated type found in the southern half of the island. Several authors have examined the physical and cultural factors that most likely operated to bring about such distinctively different patterns.<sup>1</sup> These factors may be summarized as:

1. The availability of water (measured usually in terms of rainfall but also including groundwater)
2. The nature of the vegetative cover

3. The degree to which there was a threat from the aboriginal inhabitants
4. Land tenure practices

In discussions concerning the earliest stages of settlement one gets the impression that natural factors played a compelling role. I contend, however, that the physical factors were less limiting than has been suggested and that land tenure practices carried from southeastern China proved crucial in initiating a dispersed pattern of settlement, especially on the T'ao-yuan plain.

Taiwan straddles the Tropic of Cancer and although there are differences in the temperature regimes of the northern and southern halves of the island, a very long—if not year-round—growing season based on temperature was available to migrants anywhere on the coastal plain. The seasonality of rainfall, however, did present distinct north-south differences, and it is this factor that some see as contributing significantly to the adoption of one settlement form or another. Ch'en Cheng-hsiang, for example, states that "in the northern part of Formosa where there is a fair amount of rain in every month throughout the year people are free to select their abodes. But in the south where the dry season lasts as long as half a year through the winter season when often there will be not a drop of rain for several months, water supply is a serious problem for the inhabitants." Ch'en goes on to suggest that natural vegetation, a correlate of available water, was "chiefly responsible" for the regionally dissimilar settlement patterns. Citing an easily debatable "general rule of human geography," he states that the forested areas of the north brought forth scattered settlement while the prairie of the south spawned compact rural settlements.<sup>2</sup> This relationship between forests and dispersed settlement on the one hand, and grasslands and compact villages on the other, has been reiterated in the English-language literature by Chiao-min Hsieh and Yu-chin Kang, among others.<sup>3</sup>

That these natural factors were major influences, let alone determinants of a given pattern, is doubtful in spite of the fact that contrasting precipitation patterns in northern and southern Taiwan do exist. On the T'ao-yuan alluvial plain, rainfall is fairly abundant, with at least 1,500 millimeters per year. A summer maximum is common, yet moderate amounts fall as well during the winter months. Settlers there certainly did have more site options than did pioneers in southern Taiwan and, consequently,

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could have chosen to live in nucleated settlements on the T'ao-yuan plain if they had wanted to. They were hardly compelled to live apart in isolated households because of the ubiquity of water. The natural vegetation argument, likewise, seems to lose value under further examination. Casting aside any attempt to justify a causal connection between wooded areas and dispersed settlement, there is no real evidence that the T'ao-yuan area was wooded when first settled by Chinese. A Chinese traveler who traversed the plain in 1697 on the eve of Chinese settlement records that he encountered not even a tree on the lower T'ao-yuan plain.<sup>4</sup> Eighteenth-century Chinese gazetteer maps give no indication of any obstructing natural vegetation. Only in the eastern foothills were woodlands found. The 1717 Chu-lo *hsien* gazetteer, in fact, compared the T'ao-yuan plain to the richer areas of Chang-chou and Ch'uan-chou in Fukien, stating that Chinese pioneers "could easily transform it into several thousand parcels of rich and fertile fields."<sup>5</sup>

The early eighteenth-century migrants to the T'ao-yuan plain were not confronted with hostility from aborigines as other pioneers had experienced in southwestern Taiwan. Only four distinct and separate aboriginal villages (*she*), each a compact settlement encircled by a bamboo thicket, were found on the plain. Land was abundant for the game the natives hunted. Moreover, interaction between the new arrivals and the indigenous groups occurred as a result of small-scale trade, cooperation in agriculture, and even limited intermarriage. Chinese migrants built a nucleated settlement immediately adjacent to Nan-k'an *she*. In time, the aborigines were displaced and the site was occupied by Chinese. Chinese settlement near the K'eng-tzu *she* was dispersed and has remained that way to the present. In 1741, as a result of cooperative effort, the Hsiao-li canal system was begun in what is today the southern portion of Pa-te *hsiang* to bring water to six dispersed villages occupied by Chinese and aboriginal settlers. There was, in short, no immediate threat to the Chinese presence. Chinese settlers, as a result, formed nucleated as well as dispersed rural settlements. Just as insecurity does not always lead to agglomeration, the absence of an aboriginal threat need not lead to dispersion.

The settlers who reached the T'ao-yuan area came directly from the coastal areas of southeastern China or by way of southern Taiwan where nucleated settlements had been the norm.<sup>6</sup> It does not seem unreasonable to assume that they would have chosen, if that is the appropriate word, to reconstitute a familiar settlement form: the nucleated type. That this

did not usually occur on the T'ao-yuan plain, even when allowed because of the availability of water and the lack of an aboriginal threat, is intriguing. In southeastern China, nucleated settlements were frequently distinguishable on the basis of lineage characteristics. Migration to the T'ao-yuan plain and settlement there, on the other hand, was seldom accomplished by kinsmen. There were exceptions, however, as in the case of the migration of members of the Sung family who built a compact settlement in 1745 in what is today a part of P'ing-chen *hsiang*. It is not surprising that these arrivals were K'o-chia (Hakka) and originated from Chia-ying district of northeastern Kwangtung. Known for their clannishness, K'o-chia migrants formed other compact settlements in the rugged uplands of T'ao-yuan and adjacent areas of Hsin-chu and Miao-li *hsien*.<sup>7</sup>

Customary land tenure patterns associated with frontier reclamation, it seems, were more crucial than any of the factors cited above in bringing about a dispersed pattern of settlement in the T'ao-yuan area. That these specific land tenure practices did not operate early in southern Taiwan reflects the unusual circumstances of early Chinese settlement there under the aegis of the Dutch and the Cheng family. During the period of Dutch rule, as discussed by Wen-hsiung Hsu in Chapter 1, all land was vested in the name of the monarch. This *wang-t'ien* ("crown fields") system arranged Chinese settlers into compact villages. Deep wells were dug under Dutch supervision to mitigate water shortages. Agriculture in Taiwan during the Dutch occupation improved through the importation of 1,200 to 1,300 head of draft cattle and the industry of Chinese peasant pioneers. Development during the Dutch interlude demonstrated the productive potential of Taiwan. When the Dutch were expelled in February 1662, by the forces of the anti-Ch'ing Ming loyalist Cheng Ch'eng-kung (Koxinga), southwestern Taiwan had numerous nucleated settlements along the coastal plain around Fort Zeelandia. Cheng Ch'eng-kung's occupation of the island brought an interlude of Chinese military colonization that denied private ownership of land. Recalcitrant aborigines and the hardships of frontier life took a heavy toll on the settlers, comprised not only of soldiers but of Chinese peasants. The peasants migrated to Taiwan in violation of imperial decrees against maritime activities between 1656-1684 and evaded the policy of forced removal during 1660-1681 whose purpose it was to remove the coastal population of the mainland to areas 10 miles or so from the coast. Military discipline and the dictates of unsettled conditions nurtured the formation of clus-

tered reclamation and farming camps in southern Taiwan. In 1683 Ch'ing forces finally subjugated the remnants of the Cheng family's army and navy, and in the process brought Taiwan under direct Chinese suzerainty for the first time. Because early imperial control was in fact illusory, being more cartographic than real, clandestine peasant migration brought unknown numbers of Chinese to the virgin areas of central and northern Taiwan where customary rather than officially sanctioned practices often guided reclamation and settlement.

Authority pursued the Chinese pioneers into the frontier. In 1684 when Taiwan was formally incorporated into the empire as a *fu* (prefecture) of Fukien province, the island was divided into three *hsien* (districts or counties). The accoutrements of administration for all three lay close to the densely populated southwestern coastal area which had been held by the Dutch. The virgin land of Chu-lo *hsien* stretched northward across half of the coastal plain. In response to clandestine settlement, the use of a small port at the mouth of the Tan-shui River, which itself gave entrance to the yet-to-be developed Taipei basin, and especially because of a violent insurrection in 1721 which demonstrated the ineffectiveness of Ch'ing authority, an administrative reorganization took place.<sup>8</sup> Chu-lo *hsien* was subdivided into Chang-hua *hsien* and Tan-shui *t'ing*. This administrative subdivision was accompanied not only by systematic reclamation of the Taipei basin but also by efforts to open up the T'ao-yuan plain.

### THE PATENT SYSTEM

Settlement on the T'ao-yuan plain occurred principally as a result of imperial consent.<sup>9</sup> Organizationally, reclamation and settlement differed significantly from that carried out earlier in southwestern Taiwan. Reclamation of land was not only regarded as a criterion of merit for local officials; it was also an easy way for prominent individuals to acquire wealth. Inasmuch as all land on Taiwan belonged in principle to the emperor, the land could be legitimately acquired only by complying with defined procedures set down by the Board of Revenue, whose ultimate responsibility was the collection of land tax. Peasant pioneers, in some cases, negotiated with the aborigines for the right to cultivate a parcel of land. Either the parcel was obtained for a single payment or periodic rent was to be paid (*fan-tsu*). Where there was no aboriginal presence to contend

with, settlers sometimes assumed squatter's rights to virgin territory.<sup>10</sup> More likely, however, an expanse of land would be acquired by petitioning the provincial authorities. Approval would be accompanied by a patent or estate certificate (*k'en chao* or *chih-chao*) which granted the recipient perpetual "ownership" of an ill-defined tract if he could bring the land under cultivation. Such a reclamation effort could not be accomplished in a short period of time because of the nature of wet-rice agriculture. Recognizing that a regulated and interconnected water supply necessitated an arduous and labor-intensive resculpting of the land, a ten-year reclamation period was allowed until 1723 when the period was reduced to six years for paddy fields.<sup>11</sup> An added inducement to quick reclamation was a three-year reprieve from the land tax. Whenever the reclamation effort did not proceed according to schedule, the patentee's rights to unreclaimed land could be assigned to another petitioner.

It was this patent system which guided the distribution of the immigrant peasant population and brought about a general pattern of dispersed rural settlement on the T'ao-yuan plain that has continued down to the present. Scattered among the isolated farmsteads that are characteristic of dispersed settlement were a number of nucleated settlements whose existence curiously owes much to the same range of factors which brought about dispersed patterns. This simultaneous, yet necessarily complementary, evolution of disparate settlement patterns has been ignored by those who suggest a twofold and mutually exclusive typology of rural settlement for Taiwan. There is no denying that dispersed settlements were most common on the T'ao-yuan plain, but it is being argued here that nucleated settlements emerged under the same conditions which prompted dispersed settlement.

Before tracing the settlement and reclamation of several areas of the T'ao-yuan plain that will give evidence of the dual formation of both types of settlement, it should be useful to sketch the general outlines of the complex land tenure practices which brought about this development. In the first place, the patent holder (*k'en-shou* or *yeh-hu*) normally did not carry out the reclamation of the tract obtained from the government. A regulated and interconnected water supply demanded a resculpting of the land, an effort of sufficient magnitude that the labor and capital requirements could not be shouldered easily by a single patent holder. Moreover, the time limitations imposed by the patent certificate forced prompt reclamation. To

## Chapter 3

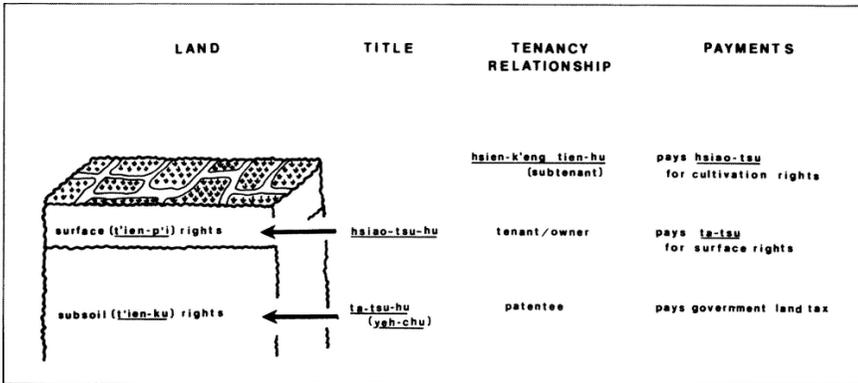


Figure 3-2. The *i-t'ien liang-chu* land tenure system.

accomplish this, peasants were recruited from the already congested areas of southern Taiwan or directly from the coastal areas of Fukien and Kwangtung. This mobilization of landless peasants introduced land tenure practices that had been common in Fukien province and proved especially suitable in facilitating frontier reclamation.<sup>12</sup>

Known as the *i-t'ien liang-chu* ("one field, two owners") system, this land tenure practice was at least a two-tiered and usually a three-tiered arrangement in which the so-called recruited tenant was granted certain rights of ownership not normally associated with tenancy (Figure 3-2).<sup>13</sup> In exchange for an annual rent payment, the patentee transferred land surface (*t'ien-pi*) rights to the tenant while retaining proprietary title to the subsoil (*t'ien-ku*).<sup>14</sup> The tenant's rights were extraordinary to the extent that he had the prerogative of leasing or even selling his surface rights. Surface and subsurface rights were independent of one another and one could be alienated without affecting the other.

Annual rent paid by the tenant was either a fixed amount or a percentage of the grain crop. Fixed rent was more desirable for the peasant tenant, as it provided him with a concrete incentive to invest labor in capital improvements and exercise careful tillage. The fruits of increased productivity accrued to him alone and not to the patentee. Usually the patentee was absent and even unaware of the exact location and size of reclaimed parcels. In this way, the individual peasant could manipulate the patentee and maximize his opportunity for gain. The

annual rent payment was called *ta-tsu* ("the big rent") and the patent holder became known as *ta-tsu-hu* ("big rent keeper"). Out of this payment the patentee was obligated to pay the government land tax on the basis of reported cultivable acreage within his patent. The remoteness of the imperial bureaucracy allowed him also the opportunity to evade his revenue obligations.

Many tenant entrepreneurs, in fact, recruited still other peasant migrants to carry out reclamation work. Such subtenant cultivators (*hsien-keng tien-hu*) were bound in an especially unfavorable way to the original tenant, for whom they labored to resculpt the plain and to whom they paid as much as 60 percent of their grain crop once reclamation was completed. The subtenant's "landlord," called the *hsiao-tsu-hu* ("little rent keeper"), enjoyed the highly satisfactory middle position in this three-tiered pyramid.

Available land documents define patents and subdivided tracts only as to the general point-to-point dimensions without specifying the bounds. No cadastral survey was carried out. Size, it seems, only took on significance after land was reclaimed and taxes could be assessed. When subtenants, usually single males, were recruited and mobilized to bring about reclamation, each would be provided with a simple thatched hut on a parcel of land. The multiplication of tenants and subtenants led to the proliferation of isolated farm cottages—the prototypical image of the dispersed village. Patent organization and social norms as well brought about a number of nucleated settlements, in some ways anchors in a sea of isolated farmsteads. Moreover, a small number of nucleated settlements developed independently of the patent system.

Reclamation contracts usually stated that it was the responsibility of the tenant to irrigate his own tract. Gazetteers give prominence to the cooperative water conservancy facilities (*shui-li*) built through the efforts or sponsorship of peasants, tenants, officials, or wealthy individuals. For the most part, piecemeal and minor acts of landscape modification characterized the earliest efforts. On the T'ao-yuan plain "the fields depended upon the heavens" (*k'au t'ien t'ien*) and few wells were sunk for irrigation purposes. This practice was allowed because of the relative abundance of annual rainfall and the lack of a pronounced dry season. On the other hand, year-to-year variability militated against a sole reliance on nature. The construction of ponds (*p'i*) was an important means of water control here. Although uncommon in southern Taiwan or on the south-

eastern mainland, they served well on the alluvial plain to catch and retain rainwater or stream overflow. Ponds could be constructed with a modicum of labor. An area would be excavated and the removed materials used to bank the rim. In many cases, excavated materials were piled on an adjacent site and, when thoroughly packed, served as the foundation for permanent dwellings. The contemporary spatial association of ponds and dwellings and their ubiquity reflects a further stimulus to the development of a dispersed rural settlement pattern. Canal networks articulated some of these ponds but generally the shallow ponds serviced only nearby areas. By the twentieth century some eight thousand ponds of various sizes covered 9 percent of the alluvial plain.<sup>15</sup>

### *SPECIFIC SETTLEMENT HISTORY*

From a practical point of view it is usually easier to trace the history of a nucleated village than a dispersed one. In the case of a named nucleated village, a few dwellings are contiguous and occupy a common site that expands in size as the number of dwellings increases. The peasants' fields surround the joint settlement. This was the common form which emerged in southern Taiwan, where today upward of twenty-five clustered farmhouses make up a settlement.<sup>16</sup> When documents refer to such a settlement by name, there is no difficulty in applying the information to a specific site and even locating it on an extant historical map. Moreover, although early records often deal with the origin and development of a corporate village they seldom tell the location of individual dwellings which constitute the village. Only since a land survey was conducted between 1898 and 1905 has it been possible to deal with individual dwelling sites on maps.<sup>17</sup>

Earlier sections of this chapter have introduced several circumstances that led to nucleated villages on the T'ao-yuan plain. It is now time to turn to the origin of the dispersed villages. Patent settlement on the plain began with the granting of a *k'en-chao* to Kuo Kuang-t'ien in 1729. Kuo recruited 106 former soldiers, each of whom obtained a parcel of land for reclamation. They were joined by other soldiers who had served in the campaigns to pacify the Taipei basin. An additional extensive tract was obtained by Kuo from the Pa-li-fen aborigines to satisfy the needs of new migrants. The area which they developed covered much of today's Ta-yuan and Lu-chu *hsiang* as

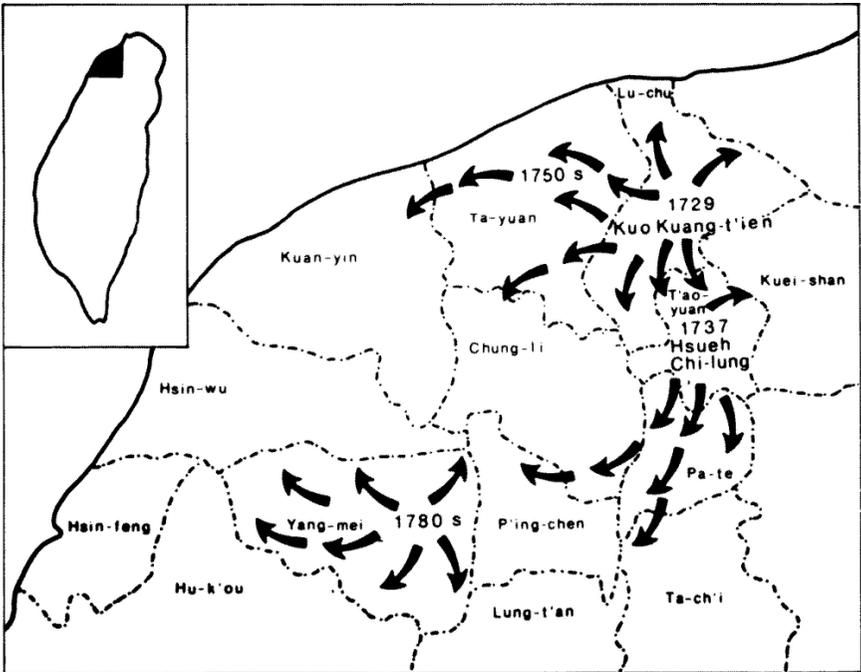


Figure 3-3. The spread of selected patent settlements.

well as portions of Kuan-yin and Kuei-shan *hsiang* and Chung-li *chen* (Figure 3-3). Altogether twenty-four *chuang* or corporate villages were established.<sup>18</sup> Each of these corporate villages comprised an unspecified number of isolated farmsteads, many of them named. Most of these *chuang* have survived to the present as *ts'un* (administrative villages). Among several nucleated village centers were Hsu-ts'o *chuang* and Ta-chiu-yuan *chuang*. Virtually all the early settlers under Kuo's patent were, like him, from Chang-chou prefecture in Fukien province. Kuo Kuang-t'ien and his descendants retained the *ta-tsu* rights in recognition of the original patent, but the names of the *hsiao-tsu* holders are now obscure.

It may be appropriate here to elaborate on the fact that settlement on the T'ao-yuan plain was distinguished clearly on the basis of the native place of the migrants. In a later chapter on frontier social organization, Wen-hsiung Hsu underscores the significance of *t'ung-hsiang* (common ancestral home on the mainland) and *t'ung-hsing* (common surname) as elements

which fostered cohesion and at the same time exacerbated tension. At this point, it is only necessary to clarify some of the spatial manifestations of these bonds and the degree to which settlement was guided by them. The territorial exclusivity of early settlement endured over the years and is made vivid in the results of a 1926 Japanese survey.<sup>19</sup> Ten of the fifteen townships on the plain had more than 90 percent of their population of either Fukien or Kwangtung origin; several had 100 percent. As mapped elsewhere, the alluvial plain was split apex to base by a line separating Fukien-originating settlement from Kwangtung-originating settlement.<sup>20</sup> Exclusivity takes on added meaning when one reviews districts (*fu* or *chou*) of origin and discovers that every township on the plain had in 1926 a clear majority of its population from a specific mainland *fu* or *chou*; several exceeded 90 percent. These townships ranged in size from 33 to 105 square kilometers and consisted of eleven to twenty-three villages. Although the 1926 survey did not present the patterns of origin on a village by village or compound by compound basis, information gathered by the author in 1966 indicates that many dispersed villages in four of the townships contained a high percentage of residents whose ancestors came from the same mainland *hsiang* (rural township).<sup>21</sup> Indeed, the *t'ung-hsiang* or "common locality" bond was an important guiding force in early reclamation and settlement.

A second stimulus to settlement came about as a result of a patent granted Hsueh Ch'i-lung in 1737. His was to the east of that granted Kuo Kuang-t'ien. Hsueh, himself of Kwangtung origin, journeyed overland from the An-p'ing area of southern Taiwan with several hundred ex-soldiers; some of them had their native place in Kwangtung but the majority came from Chang-chou and Ch'uan-chou in Fukien. In carrying out reclamation these groups did not cooperate. Instead, those of Fukien origin stayed in the eastern part of the patent adjacent to the Fukien settlers in Kuo Kuang-t'ien's patent. Those of Kwangtung origin spread to the south and west. In 1744, Sung Lai-kao, a *hsiao-tsu* holder and a Hakka of Kwangtung origin, opened up portions of Pa-te *hsiang* and then moved to establish Sung-wu-chuang (the Sung family village) in what is now P'ing-chen *hsiang*. Today at least 25 percent of the households in this area have the Sung surname. Almost all these settlements were of the dispersed type. A notable exception was the settlement at Hu-yu-chuang, which in addition to being a nucleated village

had a small market as well. Later it was renamed T'ao-tzu-yuan, reportedly because of the presence of a grove of peach trees. Today it is the site of the important city of T'ao-yuan.

To the south and west of these two large patents similar reclamation went on, although almost exclusively by migrants of Hakka origin. In the 1780s, a patent was granted to three individuals for the opening of the rugged area in what is known today as Yang-mei township. Up to that time the area had been occupied only by a military encampment directed at the aborigines. Many nucleated rural settlements were founded here. One of these had nearly fifty households, most of whom were engaged in agriculture although several were reported to have managed small businesses. Today it is the site of the town of Yang-mei. Most of the other settlements were dispersed, even those in the hills.

### SUMMARY

The *i-t'ien liang-chu* land tenure system spurred the clearing and reclamation of land. Not only was it a positive factor in inducing poor peasants to migrate from the mainland, but it also guided the distribution of the immigrant population and played a major role in defining the patterns of dispersed rural settlement. Each subtenant was provided with a simple farm hut on a parcel of land. His initial efforts were probably solitary as he burned the grass and began tilling with only the simplest of tools. The first crops were most likely dry crops such as millet and vegetables. In resculpting the fields for wet-rice farming, greater and certainly more coordinated efforts were required.<sup>22</sup> Where necessary, land was leveled so that the flooded field would have uniform depth. Ponds were excavated and supporting drainage and irrigation methods were employed. Undoubtedly, yields were influenced greatly by these efforts.

One clear result of this complex land tenure arrangement was a high degree of tenancy. Tenants may have made up more than 75 percent of the households.<sup>23</sup> Ownership, moreover, was masked by the manifold interrelationships linking the *ta-tsu-hu* ("big rent keeper"), *hsiao-tsu-hu* ("little rent keeper"), and *keng-ting* ("subtenant cultivator"). Contracts were usually oral and thus open to controversy, especially upon the death of one of the principals. Except where tea fields were opened, the average cultivable area for a household was about 1 hectare, an amount approximating the minimum for subsistence. The orig-

### Chapter 3

inally contiguous parcels granted to subtenants in time were subdivided so that fragmentation of parcels and a greater degree of dispersed settlement occurred.<sup>24</sup>

Settlement and agricultural development are indeed complex phenomena not easily explained on the basis of one or two factors. Furthermore, once identified, a set of factors should not be viewed, as so often is done, as compelling settlement patterns that are exclusively nucleated or dispersed. Certainly neither limited supplies of water nor an aboriginal threat led to nucleated settlement on the T'ao-yuan plain as had been the case earlier in southwestern Taiwan. A broader range of choices was available. Reclamation organization, as represented by the *i-t'ien liang-chu* system, did promote dispersed rural settlement with individual farmsteads acting as focal points for intensive and articulated wet-rice agriculture; but it brought nucleated settlements to the plain as well. An aggregate of settlements, whether dispersed or nucleated, came to be identified as communities through the presence of a web of social and economic relations that were derivative of the land tenure system. Through the penetration and extension of Chinese agricultural practices and social norms, and without the force of imperial arms, T'ao-yuan and other areas of frontier Taiwan were brought within the Chinese pale.

## 4

# The Chinese Settlement of the I-lan Plain

*CHO-YUN HSU*

Factors stimulating the initial settlement and subsequent development of the plains and basins of Taiwan differed according to area and period. Although such a statement may appear strikingly obvious, it is a fact whose dimensions only have become clear as researchers have probed the specifics of local or regional history on the island. The preceding chapter discusses patent-derived development of an area of north-western Taiwan, indicating that customary land tenure practices brought from the mainland guided the emergence of specific rural settlement patterns. On the I-lan plain of north-eastern Taiwan, however, such practices did not operate.

I-lan, roughly a triangular-shaped 320-square-kilometer plain rimmed on one side by the sea and on the others by ridges extending above 1,000 meters, persisted as an isolated fragment remote from Chinese colonization throughout most of the seventeenth and eighteenth centuries (Figure 4-1). Accessible by land only after three days' journey from the Taipei area, the plain was not settled and developed in full force until the nineteenth century.<sup>1</sup> A special character of its development was the leadership role of several entrepreneurs in initiating pioneer settlement and bringing I-lan within the pale of Chinese administrative control. This essay chronicles this special character. Moreover, using information from gazetteers and other sources, we shall examine the waxing and waning of rural development in terms of population and land use changes during the nineteenth century. Finally, the nature of kinship and household organization are sketched to the degree that they reflect frontier development.

Although Ch'ing authorities had received tribute from the local tribes in the I-lan area, then known as Ko-ma-lan, as early as 1695, the earliest attempts to colonize it did not take place until a Taipei landlord named Lin Han-sheng led a group of

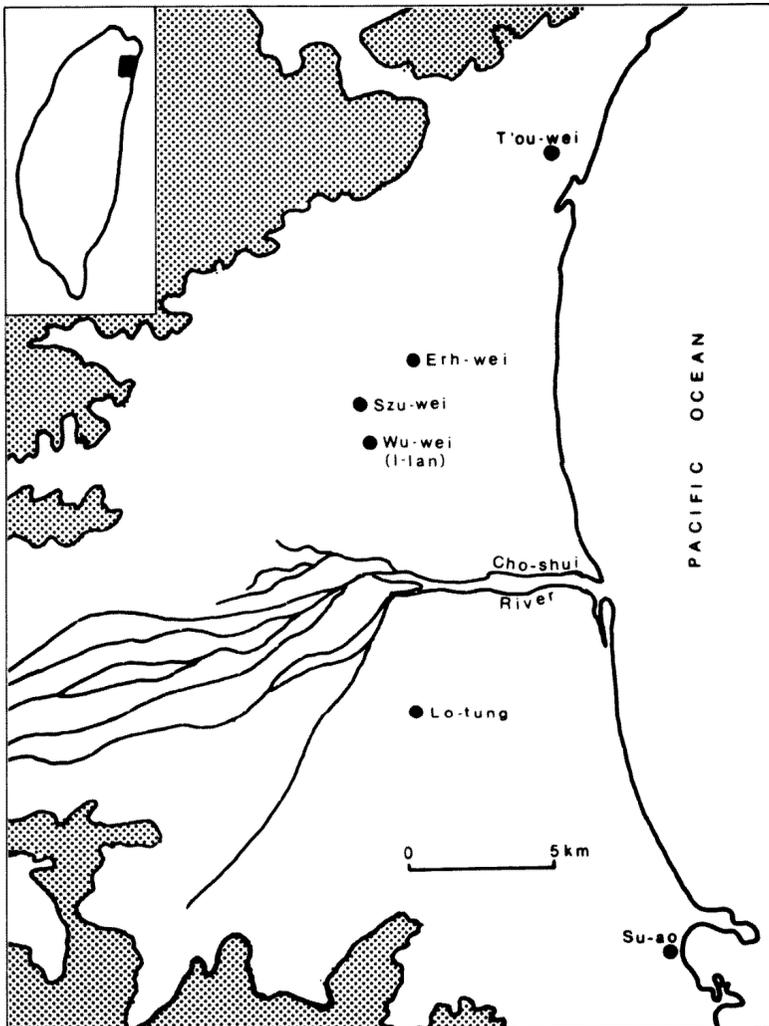


Figure 4-1. General map of the I-lan plain. (Areas above 1,000 meters are shaded.)

peasants into the area in 1770. Lin and his men faced resistance from the aborigines who, quite rightly, suspected the intentions of the intruders. Lin was killed, and no serious attempts were made by Chinese peasant pioneers for another twenty years.<sup>2</sup>

Wu Sha was responsible for the eventual Han colonization of Ko-ma-lan, but only after two decades of personally directed reclamation in a less endowed nearby area of northeastern Taiwan. Wu Sha, according to his family record, was born in 1731 in a small village of Chang-pu, Fukien, and at the age of forty-three joined other Fukienese sailing across the straits.<sup>3</sup> In Taiwan he first made a living as a servant, although it is not clear whether he was a domestic servant or a helper in some business establishment.<sup>4</sup> Apparently frustrated, Wu left the city to settle in a remote corner of Taiwan at San-tiao-chiao (Cape Santiago, as the Spanish called it). An ambiguous phrase in his biography—*jen-hsia*—indicates that Wu Sha possibly managed to establish leadership among lower-class members of the local community; whether this indicates a secret society connection is not clear. One of his means for living was trading salt and clothing with the aborigines who were scattered throughout the San-tiao-chiao area. It appears that the tribal people trusted him but the reasons are not clear. It may be that the salt smuggling he controlled, in contravention of the government monopoly, provided a means for gaining local influence.

With this advantage, Wu hosted a great number of those who had found little luck elsewhere. Wu Sha provided all newcomers with an ax and a peck of rice and then sent them into the hills to sustain themselves by cutting wood and collecting ivy tissues. Wu and his followers gradually converted portions of the nearby hills into cropland. The aborigines, who depended on hunting and fishing for their livelihood, did not attempt to intervene.<sup>5</sup> By 1787, more and more migrants from Chang-chou and Ch'uan-chou of Fukien and Ch'ao-chou of Kwangtung had come to join Wu Sha, and in the process he gained their loyalty.

In the fall of 1796, with the financial assistance of some Taipei friends and after consulting several others who traded with the aborigines, Wu Sha led more than a thousand Fukienese migrants into the Ko-ma-lan plain to initiate Chinese reclamation. Among them were two hundred armed militia and twenty-three interpreters able to speak the tribal languages. The settlers built a fortified earthen settlement in the northeastern corner of the plain and named it T'ou-wei ("First Fortification"). The astonished aborigines resisted strongly and the militia suffered heavy casualties. Among the dead was Wu Sha's younger brother, Wu Li. Wu Sha's friend and fellow trader in the salt smuggling business, Hsu T'ien-sung, persuaded the pioneers to halt their advance. Wu Sha and his men temporarily retreated to San-tiao-chiao. In the following year smallpox spread

among the aborigines. It is claimed that Wu Sha saved two hundred lives by providing free medicine, and as a result the grateful aborigines agreed on a truce and yielded part of their land to Wu Sha and his men.<sup>6</sup> Wu Sha then built two more fortified bases named Erh-wei ("Second Fortification") and San-wei ("Third Fortification"). Wu Sha applied for and was granted a charter of reclamation from the Taipei magistrate so that he could have a free hand to carry on his pioneering activity. An official seal was issued to him which recognized his position as I-shou (militia captain).

With both aboriginal cooperation and Taipei yamen authorization, Wu Sha recruited more "tenants." Each farm of 5 *chia* (almost 5 hectares) was required to pay twenty silver dollars for the maintenance of the militia who were stationed at eleven strategic positions to protect travelers along the newly opened roads through the wooded hills. More newcomers swarmed to I-lan to stay. Wu Sha not only expanded the settled area but also instituted a community covenant which was signed in the villages.<sup>7</sup> At the end of the year Wu Sha died. His nephew, Wu Hwa, replaced Wu Sha's son as successor to his leadership. In 1798 Han settlers penetrated deeper into the river delta, and more fortifications were established. The population consisted of three groups: those of Chang-chou origin, comprising more than 90 percent; those of Ch'uan-chou origin, a small minority; and the K'o-chia (Hakka), exclusively militia men.

In 1802 nine leaders—seven Chang-chou men, one Ch'uan-chou, and one Hakka—led nine detachments with a total of 1,812 able-bodied men. They invaded and occupied the center of the river valley where they built Wu-wei ("Fifth Fortification"), the site of today's I-lan city. Lots were drawn to distribute the newly acquired land among these three groups. Again the Chang-chou group obtained the lion's share. The three groups, suspicious of each other as well as of the aborigines, were always alert even while working in the fields. Wu Hwa, however, remained the acknowledged leader of the entire I-lan area.

In 1804, more than a thousand aborigines under the pressure of Chinese settlement migrated from central Taiwan to the southern half of the I-lan plain. The situation became more complicated when the two minority Han groups challenged the dominance of the Chang-chou group by making alliances with the aborigines. An armed feud went on for more than two years before the Chang-chou group was able to defeat

the Ch'uan-chou and Hakka contenders. No sooner was a truce achieved than I-lan faced an invasion of pirates who intended to establish a permanent base at an I-lan harbor and from this area outside Ch'ing jurisdiction prey upon the prosperous settlements along Taiwan's western coastal plain. Wu Hwa and his followers managed to resist these efforts by blocking the entrance to the waterway. In the next year, the pirates came again. A community leader of Wu-wei, Ch'en Tien-pan, requested the Chinese government to send in armed forces. Meanwhile, Wu Hwa and other militia captains joined forces with the government navy and defeated the pirates.<sup>8</sup>

As a result of these events local leaders pleaded with the Fukien authorities to extend civil and military administration to the Ko-ma-lan area. An official was dispatched to the region and in 1810 a memorial recommended the incorporation of Ko-ma-lan into the Ch'ing administrative structure.<sup>9</sup> Accordingly a ring of willow trees was planted around the proposed administrative center on the site of the Wu-wei settlement (Figure 4-2). Harry Lamley has described in detail the local and official reasons which prompted the building of the walled city here.<sup>10</sup> Pertinent are the following comments:

Leaders among the Chinese settlers scattered over the Ko-ma-lan plain also were anxious to have an administrative center built and government instituted in the region. The rise of a walled city representing imperial authority promised security from internal strife and external attacks that their enclosed villages were unable to provide. No one settlement or group, they realized, could offer its members adequate protection or curtail the destructive "armed conflicts" rampant among the local Chinese in-groups.

The chaotic situation in the Ko-ma-lan region lent a sense of urgency to the building of I-lan. Early in 1813, the occupants of the Wu-wei village site were moved elsewhere and work on the moats and enclosures was promptly begun. This construction was divided into five sections. The predominant Chang-chou settlers provided the labor for three of the sections, and the smaller Ch'uan-chou and Hakka communities were each held responsible for building one section. Local heads from various groups were placed in charge of the work undertaken in their respective sections. According to an official account, the inhabitants labored diligently under this arrangement without thought of material reward. Within nine months the moats had been dug and an earthen and bamboo enclosure erected....

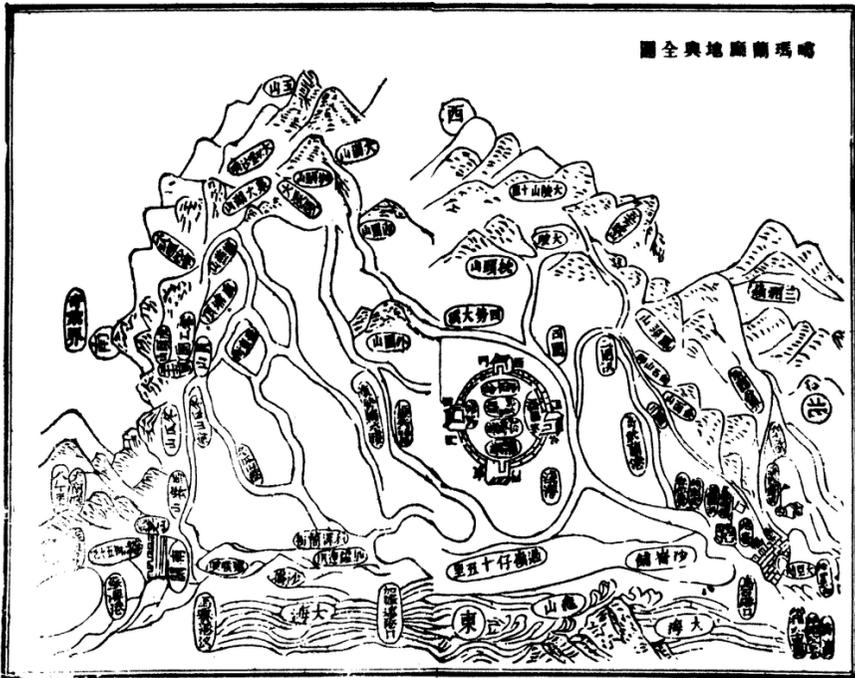


Figure 4-2. Gazetteer map of Ko-ma-lan. [From *Ko-ma-lan t'ing-chih*.]

Nevertheless, I-lan was still by no means a defensive bastion. Local protection continued to stem mainly from the small military force stationed within the city, whereas defense against outside attack was provided by coastal garrisons and distant mountain guard posts....

The construction of a number of officially sponsored temples and shrines at the outset indicates that this new seat of government was expected to play a civilizing role in the Ko-ma-lan region.<sup>11</sup>

Following the official installation of government, more migrants poured into the region. The new subprefecture (*t'ing*) faced manifold problems. Judging from discussions among local magistrates recorded in the I-lan gazetteers, it seems that the most urgent problems were regulation of the tax rate, continuous reclamation of land by newcomers, and construction of

office buildings, jails, and roads. The reclamation of land naturally provoked two related problems: reservation land for the aborigines and tax exemption for new fields.<sup>12</sup>

Ko-ma-lan remained a subprefecture until 1874 when the Japanese made their first attempt to invade Taiwan. In the same year, the last frontier of I-lan, its southeast corner, was also completely cultivated by the joint effort of Han Chinese and sinicized aborigines. Taxation recording, a topic examined later in this chapter, was then established. With a resolution to strengthen the defense of the island, the Chinese government reorganized the administration of Taiwan. Ko-ma-lan was elevated to the status of a full-fledged county in 1875 and renamed I-lan.

### POPULATION AND DEVELOPMENT

Ch'en Shao-hsing, using population figures from gazetteers, compiled a table which is useful for examining the region's nineteenth-century demographic history.<sup>13</sup> A brief glance at Table 4-1 suggests some problems in its use, however. For example, the number of households is shown as not having changed for several years. Furthermore there is no way to determine the validity of the numbers; no year-to-year census was taken. Ping-ti Ho, in fact, has cautioned about the use of population data found in gazetteers. Inadequate registration procedures, evasion, and official peculation are but some of the problems that confounded the accurate reporting of valid numbers. Moreover, because the *ting* or adult male was the taxation unit used during the Ming and Ch'ing periods, the numbers available do not constitute a census in the strict sense of the word. This indeed is true of many gazetteers.<sup>14</sup> But I believe the I-lan case is an exception in spite of questions raised by the numbers. Since the *ting* quotas had been frozen by a decree in 1712, all local *ting* taxation units subsequently were fixed on the basis of the 1711 *ting* returns. Ko-ma-lan, a newly annexed territory, therefore had no previous record as a base to set the *ting* taxation. Moreover, since there was no longer a poll tax, neither local people nor local officials had any reason to make false reports.<sup>15</sup> The figures given for 1815 are also in agreement with the figures offered by Yang T'ing-li in his poetry.<sup>16</sup> A further consideration is the Japanese census enumeration of 1899, which gave I-lan's population as 98,524, considerably less than the 106,713 of 1851.<sup>17</sup> It is probable

that, during the first years of Japanese occupation, social disturbances and instability caused a decrease in population—especially among relative newcomers who might have tended to pack up and return to their former homes during the chaos and uncertainty of the takeover. Comparing the upper limits with the lower limits, we may say that the gazetteer data, although far from precise, are useful guides to trends of change and patterns of distribution. Ch'en Shao-hsing draws the conclusion that the average annual growth rates for the period 1822 through 1851 most likely resulted from natural growth rather than immigration.<sup>18</sup>

The immigrants to I-lan were for the most part attracted to the cultivated land which was generally confined to the 300-square-kilometer alluvial plain. Reclamation activities, it appears, were directly related to this finite amount of land. Such activities were restrained once the population density per unit of arable land reached its maximum. Density figures, arrived at by dividing the population by the amount of arable land in *chia* (almost a hectare), are presented in Table 4-2.<sup>19</sup> In 1810, a large number of settlers began to enter the plain. While arable land was yet available to be cultivated, the density of population per *chia* remained high. After 1814, the more land that was cultivated the lower the ratio. It then began to rise again when the inflow of immigrants exceeded increases in available cultivable land. From Table 4-2, it appears that saturation occurred somewhere between 1822 and 1829, during which time the density ratio rose after having reached bottom in 1822. In the same period, according to the data, there was an unexplained decrease in the amount of arable land.

The fluctuations of these density ratios, however, should be adjusted to include considerations of the productivity of the land. It is likely that fertile land was cultivated first and less productive land later. In the I-lan case, the river delta which embraced the best land was first inhabited; tidal land, low valley lands, sandy banks, and other less advantageous places were not tilled until the former had been reclaimed. Yang T'ing-li, the first magistrate, took note of this differentiation of potential productivity in classifying the land into three grades: upper, middle and lower. Although the records available to us do not yield details of the proportions of these grades, it is possible to use tax information to suggest productivity. If we assume that each *shih* of grain submitted to the government represented a unit of productivity (which we do not know in precise terms), the man-per-unit rate would be 2.31 in 1822, 2.07 in 1829, and 3.00 in

CHINA'S ISLAND FRONTIER

TABLE 4-1  
*Population of the I-lan Plain: 1810-1831*

Year	Households	Individuals	Growth Rate %	Household Size
1810	14,452	42,904	—	2.97
1814	6,011	62,243	—	10.35
1815	6,011	62,967	1.16	10.48
1816	6,177	65,489	4.01	10.60
1817	6,289	66,602	1.70	10.59
1818	6,398	68,154	2.33	10.65
1819	6,502	69,763	2.36	10.73
1820	6,617	70,325	0.81	10.63
1821	6,626	70,920	0.85	10.70
1822	6,626	72,912	2.81	11.00
1823	6,626	74,424	2.07	11.23
1824	6,691	74,731	0.41	11.17
1825	6,739	75,087	0.48	11.14
1826	6,830	75,478	0.52	11.05
1827	6,830	76,257	1.03	11.17
1828	6,830	77,187	1.22	11.30
1829	6,830	78,082	1.16	11.43
1830	6,830	78,871	1.00	12.55
1831	7,370	79,671	1.01	10.81
1832	7,370	79,850	0.22	10.83
1833	7,370	82,390	3.18	11.18

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1834	8,193	86,392	4.63	10.54
1835	8,193	86,392	—	10.54
1836	8,193	86,820	0.50	10.60
1837	8,193	87,370	0.63	10.66
1838	8,193	88,211	0.96	10.77
1839	8,193	89,673	1.66	10.95
1840	8,249	91,766	2.33	11.92
1841	8,332	93,532	1.92	11.22
1842	8,332	94,502	1.04	11.34
1843	8,332	95,481	1.04	11.46
1844	8,332	96,801	1.38	11.62
1845	8,348	97,985	1.22	11.74
1846	8,363	99,105	1.14	11.85
1847	8,357	99,889	0.79	11.98
1848	8,357	100,088	0.20	11.98
1849	8,374	102,443	2.35	12.23
1850	8,383	104,282	1.80	12.44
1851	8,383	106,713	2.33	12.73

1846.<sup>20</sup> Thus the seeming decline in the population per unit of arable land ratio of 1846 suggests the continued growth of population. It was not until after 1874 that the southeast corner of the I-lan plain was finally cultivated and incorporated into the taxable land record.

Information from the 1899 reassessment of the 1886 field classification system for tax purposes tells us that the quality of a great many fields was upgraded because of increased productivity—a consequence of soil amelioration brought about by Chinese agricultural practices. Moreover, while population had remained largely at the 1846 level, the acreage of taxable land

## CHINA'S ISLAND FRONTIER

TABLE 4-2  
Population/Arable Land Ratio

Year	Population (A)	Arable Land ( <i>chia</i> ) (B)	Ratio (A/B)
1810	49,204	2,443	17.5
1814	62,243	4,309	14.4
1822	72,912	5,743	12.7
1829	78,082	5,283	14.8
1846	99,105	7,275	13.6

had increased dramatically. Land which previously had been tax exempt, such as tidal lands, sandbars, and edges of hill slopes, seems to have been utilized by the time of the 1899 survey. The area which had been annexed in 1874 continued to be rated mostly as lower or lowest in productivity.

Towns took their place alongside the rural settlements, although not in great number. Several nucleated fortified bases were built in the decades after Wu Sha and his men built T'ou-wei. When the Ch'ing authorities were pondering whether to incorporate I-lan into the administrative system, the viceroy of Fukien and Chekiang, in a memorial to the court, named thirteen I-lan settlements in addition to Wu-wei. Those who lived outside these small towns were classified as *wei-wai ling-hu* (a few residences scattered outside the fortified settlements).<sup>21</sup>

When Yang T'ing-li came to I-lan, its new capital—Wu-wei—was a settlement of at least two thousand thatched huts, which incidentally were gutted by a major fire in 1810 as recorded in Yang's poetry.<sup>22</sup> If each of these huts housed five persons, Wu-wei's population may well have exceeded ten thousand, approximately one-sixth of the total population of Ko-ma-lan. If each hut contained a household often persons, as Ch'en Shao-hsing suggests in Table 4-1, then one-third of the population would have been in residence in Wu-wei—an astonishingly high degree of concentration. The census of 1936, it should be pointed out, did show an interesting parallel phenomenon. The figures reveal that I-lan city represented 26 percent of the district's population.

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Returning to Table 4-2, suppose we take 1822 as a watershed for the population/arable land ratio, after which date the increases in arable land did not match the increases in population. Then, using the 1822 ratio of 2.31 men per unit of productivity, we can estimate that the farming population would have been 66,602 in 1829 and 76,507 in 1846. The remaining population were likely residents of towns. Indeed, it was said that the last resort for the poor people was "going to the city [I-lan]." <sup>23</sup>

In the table of population growth (Table 4-1), Ch'en Shao-hsing gives an annual growth rate. During certain years, the growth rate suddenly rose dramatically—an indication of a large inflow of migrants either directly participating in rice production or indirectly attracted to Ko-ma-lan by a booming economy. Examining Table 4-1, we find a big leap in the years 1810-1819. During this period land was abundant and the rapid growth in population was not unexpected. The growth rate declined to 0.80 percent in 1820-1821, and according to the figures surged again to the level of more than 2 percent in 1822. Perhaps it was not sheer coincidence that in the preceding year, 1821, the Taiwan government designated I-lan to supply rice to the military granary in northern Taiwan after having experienced an extremely bad harvest in both the Taipei basin and the central plain along the west coast. <sup>24</sup> This measure suggests that I-lan was probably the only region in the northern half of Taiwan to have had normal rice production. The rice price in 1816 was 0.64 *liang* of silver per *shih*; the official price in 1821 was 1.4 *liang* of silver per *shih*. <sup>25</sup> The obvious profit seems significant enough to inspire would-be planters as well as hungry vagabonds to swarm to I-lan.

The trend of population increase continued for two years until the growth rate fell back to 0.41 percent in 1824, 0.48 percent in 1825, and 0.52 percent in 1826. In I-lan this was an eventful period. Many migrants departed after an anti-Manchu plot was discovered in the winter of 1822. Another rebellion led by camphor workers did break out in 1823 and the regular army was mobilized to crush it. Meanwhile, at the end of 1823, an edict was issued to resurvey the land. <sup>26</sup> Local disturbances and the deportation of migrants were already discouraging signs; now the announcement of another land survey obviously posed difficulties to landowners who tended to evade tax obligations.

The growth rate took another upturn in the 1833-1834 period. In the preceding year, 1832, the rice-rich southwestern plain of Taiwan suffered a severe drought which ruined the

entire crop. A large-scale peasant uprising affected the whole southern Taiwan area and lasted from fall to winter.<sup>27</sup> Meanwhile, the Taipei basin was struck by a natural disaster and crop failure.<sup>28</sup> Ko-ma-lan, far from these affected areas, should have been a main rice-producing area in that period. In 1834, however, I-lan also had a poor harvest. Local shortages were alleviated by drawing from reserves in the Everlevel Granaries.<sup>29</sup> In the same year, large-scale land reclamation in the Hsin-chu area, to the south of Taipei basin, was approved by the local administration.<sup>30</sup> I-lan's lean year and Hsin-chu's potential outlet for migrants may have combined to slow population growth for several years beginning with 1835.

Gazetteers reveal that ships sailing from the I-lan ports carried rice to the mainland and brought back textiles, hardware, housewares, chinaware, and other staples. The mainland markets were chiefly in the Shang-hai area and Chang-chou and Ch'uan-chou of Fukien. I-lan farmers, who could have had two crops of rice a year, never stored much for their own consumption. The importance of the rice trade is demonstrated by the fact that general stores were usually found in the rice trader's shop.<sup>31</sup> The price of rice in the 1840s remained fairly high until the end of the decade when the rice market on the mainland was captured by rice imported from Southeast Asia and shipped by foreign boats through the treaty ports. Taiwan rice prices thus fell sharply after 1850.<sup>32</sup>

After the Japanese occupation, Taiwan became a principal supplier of rice for the home islands. To increase production, the Japanese colonial authorities energetically instituted a series of agricultural improvements and encouraged the reclamation of still more land.<sup>33</sup> I-lan once again gained significance as one of the main rice production areas. In statistics taken in 1905 the arable land in I-lan comprised only 35 percent of the Taiwan total, yet the rice produced in I-lan exceeded 8.2 percent of the island's total.<sup>34</sup>

### *AGRICULTURE AND INVESTMENT*

Edgar Wickberg has divided the rural economy in late nineteenth-century Taiwan into four types: subsistence rice production; small-scale tea cultivation mixed with rice production; surplus, market-oriented rice production; and large-scale tea cultivation.<sup>35</sup> I-lan definitely falls into his third category—the surplus, market-oriented rice production. Nevertheless, I-lan

developed along a path distinctly different from what had been experienced in other areas of Taiwan. In most parts of Taiwan, the patent holder who was granted the privilege to open the land acquired title to it. These patent holders or *yeh-hu*, as discussed in the chapter by Ronald Knapp, collected *ta-tsu* ("the big rent") from tenant entrepreneurs they recruited who themselves often collected *hsiao-tsu* ("the little rent") from subtenant cultivators.<sup>36</sup> The existence of *yeh-hu* made taxation an indirect process with the *yeh-hu* responsible for paying all government taxes. From the viewpoint of the government, the "service" of a handful of *yeh-hu* indeed could be either a real help or a real nuisance. Often the *yeh-hu* was in an advantageous position to pay less tax or even withhold payment. Therefore, when Yang T'ing-li first proposed the establishment of a subprefecture at Ko-ma-lan, it was one of his conditions that no *yeh-hu* privileges be granted there.<sup>37</sup>

Wu Sha's descendants and others who had certain vested interest in the region were disappointed to learn that they were not to enjoy the privilege. Several attempts were made by local dignitaries or adventurous persons to acquire *yeh-hu* status and thereby gain access to a secure future. No patents were granted, however. Ko-ma-lan remained the only place in Taiwan where no *yeh-hu* were created.<sup>38</sup>

The situation described here does not mean that there were no local large-scale landowners. In fact, two categories of landowners came into existence: one resident in Ko-ma-lan and the other composed of persons such as Wu Sha and his followers, most of whom remained influential in local affairs. The rise of the Ch'ens during the late nineteenth century illustrates the resident notables. Ch'en Hui-huang, a Ch'ang-chou immigrant, managed to obtain the assistance of sinicized aboriginal migrants to open land in the southeast regions of the plain. The migrant tribes, driven by the Han Chinese from west of the Central Mountains, had already adopted much of Chinese culture—especially advanced farming techniques. They served as a vanguard, spearheading Chinese penetration into the territory of the indigenous tribes. In the mid-nineteenth century, Ch'en led a mixed force of Chinese and aborigines into the southern part of the I-lan delta. Ch'en reached agreement with the tribal migrants indicating that he would extend a loan of 20 *liang* of silver for each *chia* of land reclaimed and that after the loan was paid back in three years, Ch'en, who was to be the landlord, and the borrower, who was to be the tenant, would share the opened land. If the latter failed to liquidate the

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TABLE 4-3  
*Land Tenure in 1903*

Region	Independent Farms	Tenants
County seat	375	797
Yuan-shan	3,056	4,797
Min-chuang-wei	2,776	3,331
Fu-chou	1,127	2,940
Ssu-wei	4,397	4,483
T'ou-wei	1,902	6,823
Lo-tung	1,671	2,119
Erh-chieh	1,459	2,623
Ch'ing-sui-kou	1,546	602
Hung-sui-kou	2,537	2,606
Li-tse-chien	2,182	3,683
Mao-a-liao	1,052	1,493
TOTAL	24,074	35,297

debt, all the land would go to Ch'en. By this agreement, Ch'en Hui-huang automatically acquired large landholdings when the newly reclaimed land was registered in 1874 in the local administration records.<sup>39</sup> It is understandable that a considerable portion of southern I-lan farmers then fell into the category of tenants. A census taken in 1903 (Table 4-3), eight years after the Japanese occupation, revealed a high rate of tenancy.<sup>40</sup> It should be noted that in the region Ch'en Hui-huang dominated, namely Fu-chou, each independent farmer faced almost three tenants. Meanwhile, the Wus dominated T'ou-wei where the ratio of the two groups was more than three to one.

Another category of landowner took advantage of the newly opened I-lan: wealthy entrepreneurs living in the Taipei region. The forefathers of this group included the early partners of Wu Sha who financed his reclamation activities. Ke Yu-ch'en, Ho

Hui, and Chao Lung-sheng were all citizens of Tang-sui.<sup>41</sup> The investment made by these three led to the construction of irrigation facilities which were made available to farmers for an unspecified rent. As more and more irrigation facilities were needed and local peasants were unable to finance their construction, other corporate groups put forward capital in return for the right to receive rent. In one contract which has been preserved, it is said that four persons jointly financed the construction of a system to irrigate six villages where previously the small irrigation channels dug by the farmers had been insufficient. The entire work of irrigating 247 *chia* took four years (1807-1811) to complete. Those who relied entirely on the new system paid rent of 4 *shih* of rice per *chia*; those who already had access to the small system paid 2 *shih* of rice per *chia*. The cost for the entire system was 4,868 silver (Mexican) dollars, and the annual rent income is estimated at some 700 *shih*, a cash value of some five hundred silver dollars. The magnitude of the profit is obvious. This contract was drafted as if the principals were partners. The seller who already held half the total shares sold to the buyer half of his shares because he (the seller), having residence outside the irrigated region, "was not able to take good care of the management."<sup>42</sup>

Another contract was signed by two partners who jointly purchased from a third party, also a corporate group, an existing irrigation system complete with all equipment. The lion's share, three-fourths of the total, actually belonged to Lin Kuo-ying, son of the wealthiest man in northern Taiwan, Lin Ping-hou.<sup>43</sup> The Lins' interest in I-lan was not new. As early as 1822 Lin Ping-hou had paved stone steps along a main route through the mountains between the Ko-ma-lan and the Taipei region. The annual repair job was also taken care of by Lin Ping-hou and his eldest son Kuo-hua.<sup>44</sup> The Lins, today known as the Lins of Pan-chiao, had sent large shipments of rice to North China several times as a donation to help relieve famine. Lin Ping-hou and his children thus won both honor and eminence on a national level. The rice-rich Ko-ma-lan area, though not the major interest of the Lins, who had large landholdings in the Taipei basin, still attracted much of their attention. Indeed, the author who recorded the merit of paving roads expressed great admiration for the detailed knowledge Lin Ping-hou commanded of the Ko-ma-lan area.

In other words, the market-oriented rice production economy of I-lan had provoked outside as well as local investment. What strikes me most is that almost from the be-

ginning of the region's settlement by Chinese there had been people who aimed at a purpose that went beyond looking for new land to make ends meet. Also surprising is that formal contracts and corporate activities had become part of daily life.

### KINSHIP AND HOUSEHOLDS

The presence of strong lineages in South China has aroused speculation on their origin. One of the most eloquent statements is that presented by Maurice Freedman, who has suggested a correlation between strong lineages and a number of socioeconomic factors: rice cultivation, extensive irrigation, and frontier conditions.<sup>45</sup> Taking fieldwork in Hong Kong's New Territory as a case, Jack Potter later substantiated part of Freedman's hypothesis by explicitly naming four elements favorable to the development of a strong lineage—a rich agricultural environment, frontier conditions, the absence of strong governmental control, and commercial development.<sup>46</sup>

Burton Pasternak has argued that frontier conditions should not be viewed as a favorable factor encouraging the emergence of strong lineages. He has suggested that large localized lineages should represent a "second stage" phenomenon in frontier regions when local population begins to strain land and water resources and ethnic alliances become less critical. Pasternak regards strong lineages as an answer to the increasing intensity of intravillage conflict.<sup>47</sup>

In the case of I-lan, one finds that problems which required corporate effort were solved by means other than lineage organization. Hakka guards provided I-lan farmers as well as travelers with effective protection against the hostile aborigines, for example. Local order was generally kept by the headman (*chieh-shou*), who was leader of a reclamation band. Irrigation construction was financed by outside investment. And many such activities were carried out by concerned parties who signed formal contracts with explicit rights and obligations. What Freedman viewed as favorable conditions to create strong lineages seems to have spurred the growth of local ties and the commercialization of agriculture. Very few strong lineages appeared in I-lan in the nineteenth century, yet I-lan people erected scores of temples during this period. Even in 1933, when I-lan was sufficiently wealthy to maintain no less than two hundred temples for various dieties, there were only three lineage temples in the whole region.<sup>48</sup> The villages in I-lan

remain small and scattered. Moreover, there were almost no compact villages dominated by one or a few surnames, a phenomenon not uncommon in southern Taiwan. Few I-lan villages can claim a population of as many as three hundred.<sup>49</sup>

The temple organization of the Lins represents an interesting case to test the hypotheses suggested by Freedman, Potter, and Pasternak. When Wu-Sha entered I-lan, there were no eminent figures known as Lin. Yet when the second wave of migration pushed into the heartland of the region, there were two persons with the surname Lin among the nine band leaders, though there is no record to reveal their actual relationship. More Lins appeared as more migrants entered I-lan. By 1835, one generation after I-lan was opened, the Lins of seven mainland Chang-chou counties jointly erected a temple called Chui-yuan-t'ang (Hall to Trace the Remote Origin). The Lins, however, came from seven different places and were far from real kinsmen. No attempt, therefore, was made to reconstruct a genealogy. In fact, one of the principal contributors to the temple was Lin Ping-hou's family, who lived in Taipei, not I-lan. The temple was dedicated to worshiping ancestors who were vaguely symbolized by a tablet inscribed "Fathers and Mothers of Various Branches of All Generations" in addition to a tablet with the names of the alleged first Lin in Fukien and his wife. The corporate estate of the temple was 50 *chia* of land that supported activities such as the spring and autumn festivals at which ancestors were worshiped; scholarships were distributed to the children of the members; poverty relief was given to those who were in need, whether Lins or not. In the early twentieth century, there was a quarrel among the managers and in 1931 bylaws were adopted by all the Lins in I-lan to set up a management and policymaking body to be composed of elected representatives and supervisors.<sup>50</sup> This case indicates the weak position of the Lin lineage organization. Neither *fang* nor *chih*, both lineage segments, was ever mentioned as actual kinship units below the Chui-yuan-t'ang. Among the temple's activities, there was no mention of financing irrigation work, protecting members in court suits, or other matters on an exclusive basis. Even the poverty relief continued to extend beyond the Lin members.

*CONCLUSION*

I-lan's development during the nineteenth century presents an interesting case study of Chinese frontier settlement. It is clear that foreign initiatives, military colonization, and patent-derived efforts spurred development in other areas of Taiwan but did not nurture settlement of the I-lan plain. It was entrepreneurial leadership that guided early pioneering activities and affected subsequent development. Are the patterns described in this chapter unique to I-lan? The answer awaits detailed studies of other local areas in Taiwan as well as pockets of Han settlement on the southern mainland of China.

## 5

# Frontier Social Organization and Social Disorder in Ch'ing Taiwan

WEN-HSIUNG HSU

Taiwan was regularly rent by popular disturbances during the Ch'ing period (1683-1895), a turbulent time characterized by a common saying: "A minor revolt every three years and a major one every five years." Among the Chinese, violence was mainly expressed in banditry, communal strife (*hsieh-tou*), and popular uprisings. Banditry was rampant after the early eighteenth century and at least seventy-seven instances of communal strife and sixty-eight uprisings were recorded. The occurrence of social disorder was partly conditioned by the unstable frontier situation. With the gradual disappearance of the frontier after the mid-nineteenth century, both popular uprisings and communal strife became less frequent. Social disorder reflected the degree to which Ch'ing authority and local voluntary associations operated in an area. This chapter examines the relationships between social organization and two major forms of social disorder, communal strife and popular revolts, with a special emphasis on some of the geographic aspects.

### *BACKGROUND OF SOCIAL ORGANIZATION*

The nature of migration to Taiwan and settlement there led to a variety of organizational responses. Peasant pioneer migrants often remained remote from the formal Ch'ing administrative system for decades or longer. They depended, for the most part, on systems of social control which were based on a range of voluntary associations that met the needs of the migrants. Although the clearing of land could be an individual activity, effective control of water demanded collective action. Hence

Chinese peasants in Taiwan could not function independently of other Chinese migrants as was usually the case with the atomistic efforts of European farmers in colonial America. Furthermore, the persistent threat posed by the aboriginal inhabitants promoted mutual defense.

Neither the migration of kinsmen nor the early emergence of nuclear families facilitated stability. Lineage groups which most likely would have, at the least, fostered internal stability were rare on Taiwan. Moreover, an unbalanced male/female ratio prevented some Chinese men from establishing families and compelled them to seek associational ties outside kinship. The danger in crossing the straits, the rugged frontier life, the Ch'ing policy against women's migration before 1790—all contributed to the abnormal composition of population. The compilers of the *T'ai-wan hsien-chih* in 1720 remarked that it was extremely difficult for Chinese men to marry because women were scarce.<sup>1</sup> The sagacious official Lan Ting-yuan (1680-1733) observed in 1721 that among 257 residents in Ta-p'u (in Chu-lo *hsien*) only one was a woman.<sup>2</sup> Six years later, the governor-general of Fukien and Chekiang, Kao Ch'i-cho, reported that new settlers in Feng-shan, Chu-lo, and Chang-hua *hsien* were "all without wives."<sup>3</sup> A popular saying, "Having a wife is better than having a god," aptly expressed the frustration of Chinese men over their bachelorhood. However exaggerated this remark might be, the abnormal sex ratio during the eighteenth century is quite apparent.

To ease rough life in the island frontier lacking lineage support, people of the same surnames (*t'ung-tsung*), ancestral places (*t'ung-hsiang*), and dialects helped each other. Mutual aid rarely transcended ethnic and geographical boundaries. The aborigines, far from being helped by the Chinese, were in fact exploited by them. Among the settlers, people migrating from Ch'uan-chou and Chang-chou, prefectures in southern Fukien, and the Hakka from Kwang-tung developed communal animosity in their competition for land. Despite its limitations, mutual aid remained the most common mode of functional reciprocity of social action in Ch'ing Taiwan.<sup>4</sup> The compilers of the *Chu-lo hsien-chih* (1716) described this idea as follows:

Because native-born residents are few and settlers do not have close relatives, people from the same mainland districts are treated as kindred. They help each other in illness and death,

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with all neighbors attending funerals. Residents generally give out money to aid the poor and homeless. Even stingy people do so in order to avoid being ridiculed by others.

A stranger who has lost his way is welcome to lodge at someone's home. If he and the host are of the same surname, they treat each other as brothers or nephews; if they are of different surnames, they will later regard each other as cousins.<sup>5</sup>

Although strangers were sometimes refused lodging, villagers in general were willing not only to "take off their clothes" but also to "give their food to the needy" during the early eighteenth century.<sup>6</sup> As late as 1894, a Japanese visitor still saw very few hostels on the island because travelers generally could lodge with friends.<sup>7</sup> Since a spirit of mutual aid governed the whole complex of social relationships, refusal to help the needy was considered a moral failure.

Another paradigm of social action was religious belief. The Chinese on Taiwan worshiped some 131 deities, whose images were mostly from the mainland. The insecurity of living on the island frontier drove the settlers to supplicate gods for protection and well-being. It was said that Chinese on Taiwan worshiped deities more earnestly than they cared for their own ancestors.<sup>8</sup> Chinese religious fervor is most clearly manifested in the three thousand temples they built during the Ch'ing period. These temples did not include the ubiquitous roadside shelters for the Earth God, the most common deity on the island. In order of the number of temples devoted to each, the five other popular deities were Wang-yeh (in eighty-five different forms), the Goddess of Mercy (Kuan-yin), Ma-tsu, Sakya-muni, and Kuan Yu. The cult of Kuan Yu exemplifies Chinese religiosity on Taiwan. Kuan Yu, as a historical figure, was the valiant and loyal general of Liu Pei, the founder of Shu Han (221-264), but as an idol he was both a benevolent sage incarnating many virtues and an omnipotent god protecting people in all seasons. The cult of Kuan Yu was also promoted by the Chinese government after the third century; during the Ch'ing dynasty it became a state religion. In Taiwan, even Buddhists and Taoists considered him their temple guardian; sworn brothers, secret societies, and commercial guilds worshiped him as a tutelary god.

In place of lineage ties, the Chinese settlers formed various social organizations along the lines of common geographical background and personal interest according to the dictates of

mutual aid and religious beliefs. Sworn brotherhoods, secret societies, and religious associations are illustrations of this fraternity.

### SOCIAL AFFILIATIONS

Sworn brotherhoods (*chieh-pai hsiung-ti*) were ubiquitous in Ch'ing Taiwan. Though also common in Fukien and Kwangtung, they became more important for the social life of Chinese settlers on the island frontier. During the Dutch period (1624-1662), the Chinese who had arrived on the island formed brotherhoods among themselves and with the natives. In Cheng times (1662-1683), the practice became so common that the Chinese settlers and the plains aborigines simply called each other brothers or relatives (*fu-tun*).<sup>9</sup> The spread of this alliance of friendship was encouraged—not only by the need for mutual aid, but also by its use as a justification for occupying the aborigines' lands. Sworn brotherhoods also facilitated aggressive action. After the Ch'ing takeover in 1683, the first Chu-lo *hsien* magistrate, Chi Ch'i-kuang, observed that such a system engendered three social evils: gambling, banditry, and fighting. He then sought to check its spread.<sup>10</sup>

The Ch'ing government considered the sworn brotherhoods as clandestine and subversive organizations and therefore suppressed them, the first dynasty in Chinese history that ever took legal action against such groups.<sup>11</sup> But because sworn brotherhoods were primarily formed in the countryside, officials could seldom detect their existence until the early eighteenth century. They flatly admitted in 1720 that they had never heard of such organizations in the city.<sup>12</sup> In 1721 Chu I-kuei and fifty-one other men pledged brotherhood in a hamlet, yet officials discovered it only after some of the rebels were captured during an uprising later that year.<sup>13</sup>

After the mid-eighteenth century, with the increase in population and the migration of vagrants to urban areas, the covenanted groups also became common among the city folk. Because of their expansion, an article specifically dealing with Fukien province, in which Taiwan was a prefecture, was added to the Ch'ing Penal Code in 1764: sworn brothers, regardless of their number or leadership, were to be strangled.<sup>14</sup> Persecution, however, did not curb the spread. By the mid-nineteenth century, the sworn brotherhood was practically ubiquitous in the populated areas of Taiwan, rural and urban alike.

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As Intendant Hsu Tsung-kan (1790–1866) observed: “The more strictly you deal with sworn brothers, the stronger the group becomes.”<sup>15</sup>

Sworn brotherhoods could be formed with or without initiation rituals. A formal ceremony was held in front of Kuan Yu’s picture or statue at a temple, in a private house, or in the open air. In the ceremony, a sheet of red paper was copied out for each initiate. The paper, pressed with his personal seal, listed his name, age, birthdate, birthplace, mainland ancestral place, address in Taiwan, and the names of his family members. It also included an oath:

On the date here mentioned, in the temple of Kuan Yu, we made a sacrificial offering and pledged our loyalty to one another. Hereafter we will live and die together, help each other in times of emergency, and never betray one another. Whoever flinches from hardship shall be struck down by a thunderbolt.<sup>16</sup>

After taking the oath and drinking blood, the most capable member was elected “elder brother” or “big brother,” and the others were called according to their ages.<sup>17</sup> Men otherwise unrelated were now bound by a blood oath and formed a cohesive primary group.

The members of covenanted groups came from all walks of life: peasants, vagabonds, soldiers, merchants, manual workers, and scholars.<sup>18</sup> The membership was exclusively in terms of geographical origin; the Ch’uan-chou people, for example, joined only their own groupings. Brotherhoods were generally reserved for adult males. Though composed of men of all ages (married and unmarried), they usually attracted people of the same age—those in their late teens and early twenties seemed most likely to form them.<sup>19</sup> Even teenagers as young as fifteen did so.<sup>20</sup> The group was generally small, often fewer than ten members. A person might join more than one covenanted group, however, and hence be entwined in a web of social affiliations.

Sworn brothers formed a reference group; they lived up to their own contracultural norms that deviated from China’s great tradition and tended to disregard the law. They also easily became a natural group for gambling both among themselves and with nonmembers. Gambling sometimes led sworn brothers to social deviance: their behavior degenerated when they resorted to banditry in order to pay back gambling debts.<sup>21</sup> Their

oath committed them to help each other and to take vengeance on those who harmed their brothers, thus contributing to the frequency and scale of communal feuds.

In spite of government persecution, sworn brotherhoods not only survived but even expanded and formalized into secret societies. The most common and famous one was the Heaven and Earth Society (*t'ien-ti hui*). The first reference to the Heaven and Earth Society in Chinese historical documents was made during Lin Shuang-wen's rebellion in 1787-1788 on Taiwan. The society was not founded on the island, however, and scholars have been debating when, where, how, and by whom it was established. The Heaven and Earth Society that the rebel Lin Shuang-wen joined in 1784 was said to have been propagated by a man from Chang-chou, named Yen Yen, who went to Taiwan a year before. Yet one of the branches of the Heaven and Earth Society, the Small Sword Society, was already active in 1782 when its members were involved in communal strife in the Chang-hua area. The following year government soldiers captured one of its members and gouged out his right eye.<sup>22</sup> In any case, from 1783 to 1786 the Heaven and Earth Society attracted a great number of vagrants after they learned that it facilitated not only reciprocity but also racketeering. Tenant peasants joined the society to protect themselves from oppression by landlords and hoodlums; well-off people became members to avoid being harassed and robbed.<sup>23</sup> The members of secret societies on the island were mostly people from Chang-chou and Ch'uan-chou. The Hakka, who used the secret societies to unite themselves in Kwangtung, were the least likely to do so on Taiwan because they generally lived in nucleated settlements and had more organized community associations.

The secret society had more strictly defined structures of leadership and compliance than the sworn brotherhood. Unlike the sworn brotherhood, whose participants could let their families know of their affiliations, the secret society forbade its brothers to divulge their membership to anyone. Members often suppressed their individuality in subordination to it, becoming the victims of what George Simmel calls "de-selfing" (*Entselbstung*).<sup>24</sup> Though "drawn together by a sense of mental and moral kinship," the secret society members did not necessarily get an amulet that provided total protection.<sup>25</sup> They obeyed orders unconditionally—even if it meant participating in plans involving robbery, blackmail of their own kinsmen, communal strife, or revolt against the government.

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The third major type of social organization, the religious society, was established to worship patron deities, to promote fellowship, to facilitate public well-being, and to provide protection in times of social disorder. It was generally the largest voluntary association in a rural or urban community. Though sometimes organized in conjunction with the construction of a temple, many religious societies were neither in charge of a temple nor related to one.<sup>26</sup> Besides arranging activities regarding patron deities and temples, the religious societies played an important role in community affairs. They held festivals, organized idolatrous processions, and sponsored pilgrimages; they also arranged visits to the mother temples on both the island and the mainland where their guardian deities had obtained divinity. Some of the religious societies drew members from other areas and organized communities into "worshiping circles."<sup>27</sup>

These worshiping circles in certain areas were coterminous with connubium locales where residents chose their spouses and thus consolidated the communities through both religious beliefs and affinal ties. The religious associations also exercised social sanctions against the members. When disputes came up, the leaders were frequently invited to resolve them; and, if necessary, the members mediated the disputes in open meeting. Finally, by mobilizing residents in defense against attack from outside, the religious societies could contribute to community security, but they could also involve the members in intergroup feuds.

The network of voluntary associations on the island constituted a mechanism of social control. They had functions the government was unwilling or unable to perform; some, such as secret societies, formulated a set of rules to regulate the conduct of their members. The leaders (mostly commoners), therefore, could mobilize the members more easily than the local power elite or officials could. In a sense, then, the voluntary associations exerted more control over their members than did the state, thus enhancing the traditional autonomy of communities. They took part in feuds often without the awareness of the government. Social organization, in other words, contained the seeds of social disorganization and posed a counterweight to the state. Even so, the legitimate organizations—such as religious societies—never challenged the government; on the contrary, they invariably helped officials to put

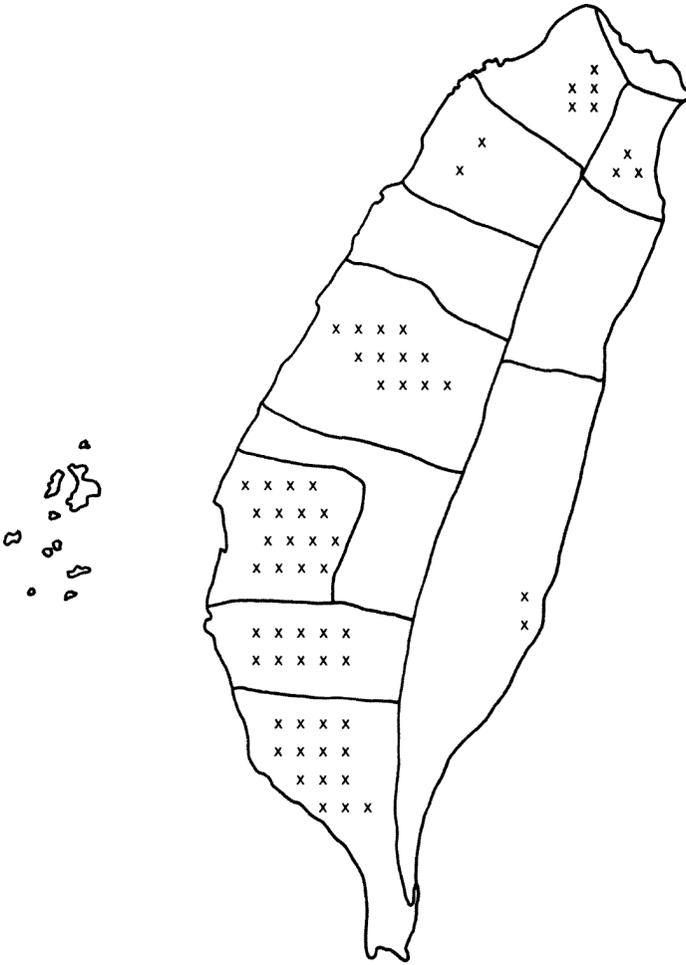
down popular disturbances. In contrast, the illegitimate organizations like sworn brotherhoods and secret societies rose up in arms.

### *POPULAR UPRISINGS AND SOCIAL ORGANIZATION*

The frontier condition, with an armed population and weak government surveillance, invited violence. Once the settlers possessed weapons to protect themselves against attack by aborigines and bandits, it was also easy for them to fight among themselves and even rise up against the government. As mentioned earlier, the immigrant society was composed mainly of unattached men who, once organized, were more likely to create disturbances.

Ch'ing military and civil control on Taiwan was indirect and minimal. Though the island was considered as a frontier important to national defense, the military forces there were imposing only on paper. Before the 1860s Taiwan officially maintained ten thousand or more troops and had some ninety ships, double the number of any province. Official quotas, however, often inflated the real numbers. The soldiers, recruited from Fukien and Kwangtung, were required to be married, but often they were vagrants. The government's delay in the construction of city walls and the lack of mounted troops further weakened Ch'ing political control on the island. Established as a prefecture, Taiwan was under the jurisdiction of Fukien until 1887 when it became a province. At the *hsien* level, the Manchu court adopted the expedient policy of local autonomy in which it invested neither money nor talent. The Ch'ing government on Taiwan, as an official acknowledged, was one of the worst in the empire.<sup>28</sup> People bitterly called venal bureaucrats "cash-eating officials" and challenged their political legitimacy.<sup>29</sup>

During 212 years of Ch'ing rule, sixty-eight revolts broke out on Taiwan, an average of one every three years. The most serious rebellion, led by Lin Shuang-wen in 1787-1788, may be used as a dividing line for the history of political disturbances in Ch'ing Taiwan. Before it, during the first half of Ch'ing rule (104 years from 1683 to 1787), there were thirteen revolts, an average of one every eight years. But during the second half of Ch'ing rule (107 years from 1788 to 1895), fifty-five took place, an average of one every other year. The frequency of uprisings was greatest during the seventy-five years between Lin's



*Figure 5-1. Areas of popular uprisings in Ch'ing Taiwan.  
(The location of four uprisings cannot be determined.)*

rebellion in 1787 and the second largest rebellion led by another leader of the Heaven and Earth Society, Tai Ch'ao-ch'un, in 1862—forty-three revolts took place, an average of one every 1.8 years. After Tai's disturbances, however, twelve uprisings occurred, approximately one every 2.7 years, during the remaining thirty-three years of Ch'ing rule. This pattern suggests that with the passage of the frontier after the mid-nineteenth century, popular uprisings also became less frequent.

Revolts flared up in all populated areas of Taiwan (Figure 5-1). The south, the earliest settled region, recorded the highest incidence of popular uprisings—forty, or 59 percent of the total. A region developed later, eastern Taiwan, experienced only five revolts, all taking place during the nineteenth century. The uprisings tended to occur in what might be called the marginal areas, characterized by a relatively mobile and mixed population (southern Fukienese, Hakka, and aborigines), armed residents, and nominal government control. Twenty-five revolts broke out in the marginal regions contiguous to mountains. Historically, any frontier at its early stage of development is marginal in nature. In this context, more revolts can be considered to have occurred in the marginal regions. As the heterogeneous population, and hence the marginal areas, moved north, the focus of popular uprisings also shifted northward, stimulating as a consequence the construction of walls around towns and incipient cities.<sup>30</sup>

Of the sixty-eight revolts, sixty-six started in rural areas. But because the rebels regarded the seizure of the *hsien* seat as the defeat of the local authorities, they usually proceeded there after attacking military garrisons and acquiring weapons in the countryside. Even so, only seven uprisings ever took either the *hsien* capitals of Feng-shan, Chia-i, or Chang-hua. The occupation of the prefectural capital Taiwan symbolized control of the island, yet only Chu I-kuei's rebels seized it in 1721, and only for fifty days. Three other uprisings in later times led by Lin Shuang-wen (1787-1788), Ts'ai Ch'ien (1805-1806), and Lin Kung (1853) all attempted to take it, but none ever succeeded.

Sworn brotherhoods and secret societies formed the nuclei of rebel organizations. The government considered them subversive and its efforts to suppress them often provoked their members to rise up in arms. Sworn brotherhood groups launched at least twenty-seven uprisings, or 39 percent of the total. Ubiquitous as they were, such groups might have been involved in more than these revolts. Since an oath enjoined sworn brothers not to divulge their affiliations, rebels generally concealed their memberships after being captured. This practice obscured the role of covenanted groups in many revolts. In any case, with a sworn brotherhood at the core of an insurgent organization, the rank and file of the rebels easily increased. The nucleus of Chu I-kuei's group was composed of fifty-two sworn brothers in 1721; as each of them recruited more, the number of rebels quickly swelled to a thousand and later to ten thousand.<sup>31</sup>

Among the twenty-seven known sworn brotherhood uprisings, ten were actually led by secret societies (eight by the Heaven and Earth Society, two by the Small Sword Society).

If an uprising was not led by a sworn brotherhood or a secret society, its organization was still largely modeled after them. The rebels were organized into bands (*ku*), a term commonly used in the Heaven and Earth Society; each band then was assigned a flag. The number of bands varied with the scale of revolt. During Chang Ping's uprising (1832), the rebel forces comprised forty-one bands, each consisting of 100 to 300 men.<sup>32</sup>

During the uprisings, neither sworn brotherhoods nor secret societies espoused egalitarianism, upheld ideology, or expressed demands for economic reforms. Indeed, the dynamic role of the Heaven and Earth Society in the making of the revolts was organizational. Its rules aimed at forming a cohesive covenanted group but were not directed against the government. Although the society's avowed political goal was believed to be "oppose the Ch'ing and restore the Ming," only its 1853 revolt ever raised this slogan. The sworn brotherhoods and secret societies, after all, were not political groups originally attempting to seize power. Normally these two groups did not become politicized until after government troops were dispatched to search for their members.

Lineage organization, uncommon and weak on the island, was rarely used by the rebels. The only case I can find is one in 1862 when a rebel leader by the name of Hung Ts'ung mobilized his clansmen to fight against government troops in the present Ts'ao-t'un area.<sup>33</sup> Although a few instances of feuds among some surname groups erupted in the late eighteenth century and the second half of the nineteenth century, none of the large clans ever revolted against the government.<sup>34</sup> The lineage organization usually allowed no bifurcation of power. Serving as the custodians of harmony and peace among the clansmen and as buffers between the government and the community, synaptic village headmen or elders would foil any attempt at revolt. A leader of Lin Shuang-wen's lineage had tried to dissuade him from revolt because it could "exterminate the entire lineage"<sup>35</sup> During Ch'en Chou-ch'uan's uprising (1795), two civil service degree holders in the Lu-kang area even led people to round up their own rebel clansmen.<sup>36</sup> Nevertheless, few lineage organizations on the island were strong enough to prevent their kinsmen from revolting or to protect them in times of social disorder.

Social unrest prompted people to establish societies for mutual protection—such as the counterrevolt organization of “righteous volunteers” (*i-min*). This organization was first formed during Chu I-kuei's uprising in 1721 when some 10,200 Hakkas from seven hamlets in the Hsia-tan-shui valley (southern Taiwan) united to resist the rebels. The most famous counterrevolt association of this kind was the Hakka Six Detachments (*liu-tui*) in the Feng-shan area, a group which still exists today as a community organization devoid of military function.<sup>37</sup> After 1721, such volunteers were invariably mobilized to attack the rebels; when the people from Ch'uan-chou revolted, the Hakkas and those from Chang-chou would become volunteers fighting against the rebels and vice versa.

Though originally intended to protect their own communities, the organizations of “righteous volunteers” themselves also created disturbances. In fact, many residents justified their participation in feuds by joining the organizations. They refused to pay taxes under the pretext of preparing supplies, and sometimes they openly plundered, causing greater havoc than the rebels and bandits. During the uprisings in 1832-1833, Hakka volunteers indiscriminately attacked the southern Fukienese in the P'ing-tung area.<sup>38</sup> As a result, often the government simultaneously had to cope with both the uprisings and the Hakka disturbances.

Another voluntary association, the commercial guild (*chiao*), was established primarily to promote merchants' interests but also organized forces of counterrevolt. After the popular uprisings broke out in the countryside, the merchants generally financed militia to defend the cities where they did business. At T'ai-wan-fu (present-day Tainan), the amalgamated Three Guilds (*san-chiao*) were instrumental in defeating the rebels led by Ts'ai Ch'ien in 1805-1806 and by Lin Kung in 1853. The active involvement of the commercial guilds in defending the capital city of T'ai-wan-fu prevented the insurgents from seizing it after 1721. These commercial guilds, unlike other voluntary associations which escalated popular uprisings, actually contained them and protected the cities. Some of the guilds, however, could not avoid involving themselves in feuds.

*COMMUNAL STRIFE AND SOCIAL ORGANIZATION*

Discord had existed among the Chinese people before their emigration to Taiwan, but it was given a wider base and intensified by the frontier situation.<sup>39</sup> Competition for land heightened friction. In the early eighteenth century, rivalry among the three regional groups in claiming land and obtaining irrigation water gradually changed from object-centered competition to opponent-centered conflict. Chinese allegiance to ancestral places further aggravated factionalism. But because their defense against the aborigines required joint effort, their dissension did not result in overt infighting until 1721 when Chu I-kuei's uprising broke out.

Supraorganization on the island heightened the potential for conflict. Most voluntary associations not only were tinged with regional biases but also failed to work out a device of cooption by which they could have included hostile forces in the community's authority structure. In emphasizing internal solidarity, moreover, the voluntary associations intensified enmity against other groups. A leader's success in minimizing intra-group friction also tended to broaden the dimensions of inter-group conflict.

Communal strife on the island, unlike that in Fukien and Kwang-tung, was rarely clan oriented. In terms of geographical origins, surnames, and occupations of the participants, seventy-seven instances of communal strife in Ch'ing Taiwan are shown in Table 5-1. Strife between the southern Fukienese and the Hakka had the highest incidence rate: twenty-four instances, or 31 percent. The twenty-two outbreaks of fighting between the people of Chang-chou and those of Ch'uan-chou tended to occur in the areas where Hakka strength was weak. Altogether, the first two types of strife between different regional groups accounted for forty-six instances, or 57 percent of the total, and the scale of the fighting was also much greater than that of the other three types.

The feuds between different surname groups and the infighting among the same surname groups were not the same as lineage strife. Though not necessarily of direct common descent, the surname groups often felt a quasi-kinship bond and easily entered into conflict by helping their own surname people. The strife between people of the same occupation involved porters (one instance), soldiers (three instances), and musicians (four instances), all of whom had their own organizations before the outbreak of fighting.

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TABLE 5-1  
Major Types of Communal Strife

Participants	Instances
Chang-chou people vs. Ch'uan-chou people	22
Southern Fukienese (people from both Chang-chou and Ch'uan-chou) vs. Hakka	24
Different surname groups	11
Same surname groups	4
People of the same occupation	8
Unknown	8
TOTAL	77

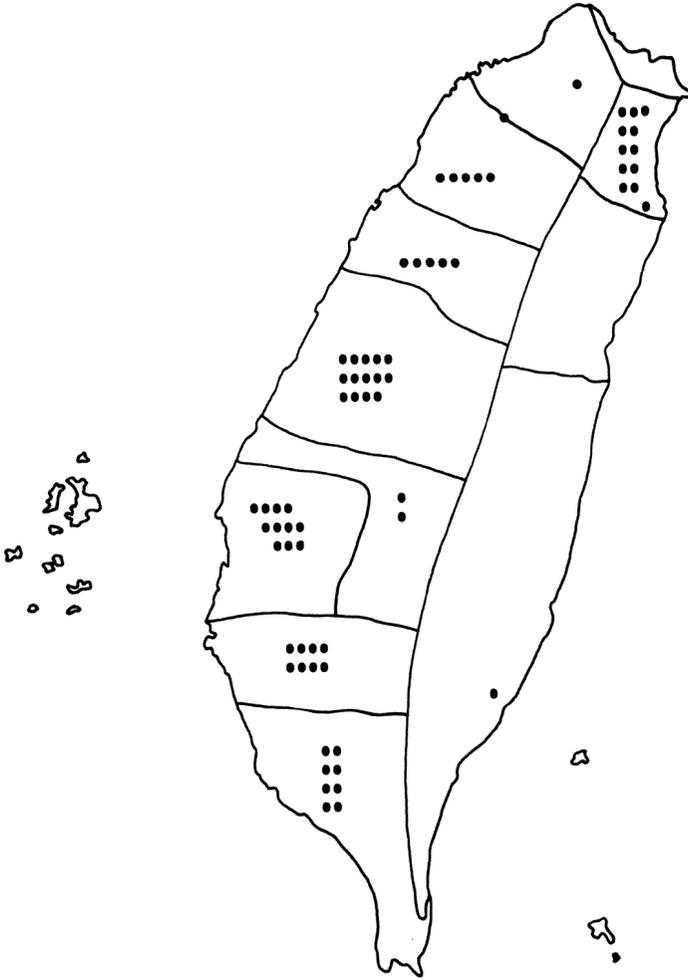
Communal strife afflicted almost the entire Chinese-populated area on the island. It broke out twenty-seven times (32 percent of the total of seventy-seven instances) in the earliest developed south, twenty-one in the central region, nine in the north, eleven in the east, and nine in places unknown (Figure 5-2). This kind of fighting was primarily a rural phenomenon on Taiwan—with the exception of five outbreaks, all occurred outside cities. In the urban areas, though the heterogeneous and concentrated population increased the potential for conflict, the relatively tight government control there tended to forestall minor brawls from evolving into feuds. The predominant settlement of southern Fukienese in the cities also precluded the possibility of infighting between them and the Hakka there. The division of labor in the cities might have structured the residents into solidarity within their distinct groups, leading to conflict with others. The propinquity of urban dwellers and the variety of groups, however, developed a mechanism of checks and balances that averted conflict for the sake of common interests.

## Chapter 5

During the 212 years of Ch'ing rule, Taiwan experienced communal strife on the average once every 2.7 years. From the first outbreak in 1721 to the end of Ch'ing rule in 1895, a span of 174 years, one instance of communal strife occurred every 2.2 years. During the eighteenth century there were nineteen incidents, or 25 percent, and during the nineteenth century, fifty-eight outbreaks, or 75 percent. In 1862, however, Tai Ch'ao-ch'un's rebellion marked the last flare-up of social conflict between the southern Fukienese and the Hakka on the west coast of Taiwan. Feuds after the 1860s were waged primarily among same surname people, between different surname groups, and among same occupational groups. From 1863 to 1895 there were a total of sixteen reported incidents. The only Fukienese-Hakka fighting during this period took place in the newly developed southeast coast of the T'ai-tung area; the other fifteen feuds occurred among different surname groups (eight instances), same surname people (two instances), same occupational groups (four instances), and one in which the circumstances are not known.

After 1865 the southern Fukienese descendants and Hakka occasionally brawled, but such incidents no longer led to a greater social chasm. Although population pressure and reduction in government military forces after the mid-nineteenth century made social conflict more likely, communal strife actually became less frequent. The population figure is not known for mid-nineteenth-century Taiwan, but it was reported that little uncultivated land existed on the western coastal plains.<sup>40</sup> Overall administrative surveillance did not improve even after 1875 when more counties were established. The government troops, on the other hand, were decreased by half in 1869, from 14,425 to 7,621, and in 1881 there was a further cut to 4,500. Despite these conditions favorable to social disorder, fighting between the southern Fukienese descendants and Hakka in western Taiwan did not take place. It appears that with hostile groups drawn into direct and intense contact in feuds and revolts, Chinese had gradually allayed their enmities and mended their differences. In the mid-nineteenth century, the frontier that provoked violent action was vanishing, and despite the vestiges of integrative strains, social conflict simmered down. After the 1860s, if the frontier existed in western Taiwan at all, it was the frontier of inclusion (more properly social integration), not the frontier of exclusion.<sup>41</sup>

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*Figure 5-2. Areas of communal strife in Ch'ing Taiwan.  
(Nine instances of communal strife cannot be located.)*

Voluntary associations contributed to the frequency and scale of communal strife. With their internal spontaneity, ascriptive voluntarism, and exclusively regional memberships, the sworn brotherhoods, secret societies, and associations of righteous volunteers were readily used by the combatants in two types of communal strife: the fighting between the Chang-chou people and the Ch'uan-chou people and the feud between the southern Fukienese and Hakka. Especially active were the

associations of righteous volunteers. Organized in the popular uprisings, they became institutionalized in feuds; and while helping to bring the revolts to an end, they also engendered and prolonged feuds. With a stockpile of weapons (including cannons), they were prepared for any fighting between regional groups. In a sense, the feuds of these two types were waged largely between two consolidated associations of southern Fukienese and Hakka volunteers.

Commercial guilds, though structuring the factionalism of the merchant groups into amiable rivalry, still caused divisions in their spheres of influence, but only those in the north engaged in feuds. The Upper Guild (*ting-chiao*) and Lower Guild (*hsia-chiao*) in the Taipei area masterminded the communal strife between the Chang-chou and Ch'uan-chou groups in 1853. By contrast, the merchant groups in T'ai-wan-fu were amalgamated into the Three Guilds and never experienced armed conflict among themselves. Chinese feuds on Taiwan, after all, generally originated from regional and communal jaundice rather than from commercial interests.

Though feuds in Taiwan were not religious wars, the temples, as centers of community activities, often became the headquarters of the combatants. Since most religious associations took charge of temples, they were inevitably involved in communal strife. Before a battle, the participants worshiped in their temples to supplicate the patron deities for divine protection. The occupation or destruction of the temple symbolized the defeat of one party and the triumph of another. During the 1853 feud in Taipei, the Ch'uan-chou people even went so far as to set fire to the image of the Chang-chou people's patron god, K'ai-chang sheng-wang, snatched its statue, and gouged out its eyes and nose. In order to have their god returned, the Chang-chou people swallowed the insult and yielded.<sup>42</sup> After the feud, the partisans enshrined their martyrs and occasionally established a religious association to ensure worship. Such martyr worship further aggravated group enmity.

### CONCLUSION

Taiwan's frontier situation was characterized by an armed population, unbalanced sex ratios, ineffective political control, weak lineage organization, and supravoluntary association—all of which were interrelated and contributed to the occurrence of social disorder. Voluntary associations on Taiwan were origi-

nally joined by pioneers of similar geographical background and personal interest to facilitate reciprocal assistance and promote religious beliefs. Serving as interstitial mechanisms for the settlers' social life, these organizations also mobilized themselves into action for various purposes, both legitimate and illegitimate, thus increasing social disturbance. The occurrence of social unrest, on the other hand, increased the number of voluntary associations as nonrebels united to protect their own communities by forming such societies as the organizations of righteous volunteers. Table 5-2 summarizes the involvement of five types of voluntary organizations in social disorder.

The most violent and destructive incidences of social disorder were popular uprisings and communal strife. Sworn brotherhoods and secret societies actively participated in the revolts against the Ch'ing government. Of sixty-eight revolts, sworn brotherhoods launched twenty-seven, of which ten were actually led by secret societies. In general, it was after government troops attempted to crack down on them that their members resisted and later revolted. The role of these voluntary groups in the revolts, however, was organizational; they offered neither ideology nor specific programs for reshuffling political power. To be sure, it was their negative consciousness of opposition and not their positive consciousness of revolution that stimulated them to revolt.

Communal strife on Taiwan was mostly waged between different regional groups rather than between lineages as on the mainland. The frontier condition of Taiwan before the mid-nineteenth century generated social conflict, but it was supraorganization that intensified communal strife. In emphasizing solidarity of in-groups, the voluntary associations also aggravated hostility toward out-groups, especially those organized by people from other mainland districts, thus heightening possibilities for fighting. Feuding in turn enhanced social organizations and enlarged their size. Even the religious societies, which were relatively open in terms of membership, exacerbated violence because combatants often used temples as headquarters during feuds. The residents, however, did not fight for religious reasons.

Both popular uprisings and communal strife were interlocking sociopolitical problems in the history of Taiwan: the areas plagued with communal strife also had a high incidence of popular uprisings. Since communal strife intensified enmity among the three regional groups, generally only the people whose mainland ancestral prefectures were identical with those

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TABLE 5-2.  
*Social Organization and Social Disorder in Ch'ing Taiwan*

Social Organization	Social Disorder		
	Banditry	Communal Strife	Popular Uprising
Sworn brotherhood	A	A & C	A
Secret society	A	A & C	A
Religious society	C	A & C	
Communal protection society ( <i>i-min</i> )	A	A & C	C
Commercial guild	C	A & C	C

A = attacks on people or government; C = counterattacks.

of the rebel leader joined uprisings; the others would organize themselves under the name of righteous volunteers to fight against the rebels. These volunteers waged counterrevolts simply because the insurgents were their foes; they paid allegiance to their own groups, not to the government. Under other circumstances they too might revolt, and the former rebels might become righteous volunteers. This vicious circle of revenge not only spurred, intensified, and prolonged popular uprisings but, more seriously, sapped the rebels' strength and disrupted their unity.

Besides preventing the rebels from forming a united front, the frontier situation also affected popular uprisings in two other ways. First, with the social organizations, the members' overemphasis on regional concerns and mutual aid led them to neglect class interests; and outside the organizations, tenant peasants cooperated with their landlords for the sake of security, thus weakening their class consciousness. Second, many voluntary associations were established for defense against outsiders and aborigines. The aborigines, from whom the settlers wrested land, chose to help the government put down Chinese revolts. Furthermore, during the popular uprisings, rural

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dwellers invariably organized community protection associations to attack the rebels and the commercial guilds financed militia to reinforce local defense.

Although voluntary organizations on Taiwan increased the frequency and raised the scale of social disorder, they also hastened the defeat of revolts. After the mid-nineteenth century, however, with the frontier disappearing, popular uprisings became less common and communal strife between the southern Fukienese and Hakka did not occur on the west coast of Taiwan. It appears that the Chinese on Taiwan about this time became more willing to cooperate in developing the island. In this regard, the proliferation of voluntary associations after the mid-nineteenth century facilitated Chinese social integration on the island.

## 6

# Sequent Occupance and Place Names

*CHIAO-MIN HSIEH*

During the historical period, the significance of Taiwan's location has shifted dramatically. The island's physical proximity to the coastal mainland, for example, belies its anonymity throughout much of Chinese history, yet in recent centuries Taiwan has been a crossroads of European and Asian interests to a large degree because of its critical location. European commercial excursions into the western Pacific region during the sixteenth and seventeenth centuries not only brought a European presence to the island but set in motion the movement of Chinese pioneers across the straits and Taiwan's eventual incorporation into cultural and political China. The chronology of this successive occupation is undertaken in other chapters of this volume.

Sequent occupance, however, is more than chronological occupation. It is both a pattern and a process of superimposition and replacement. It is recognition of the characteristic occupance traits of a given period. Contesting aboriginal dominance, Dutch, Spanish, Japanese, and discrete waves of Chinese brought overlaying patterns to the landscape of the subtropical island. Agricultural organization, cropping systems, and technology, for example, varied with each sequent occupance, as did settlement forms, house types, and a multiplicity of other concrete expressions of culture. There are many observable remnants of sequent occupance in Taiwan today that offer glimpses of the island's checkered past. I have dealt with Taiwan's sequent occupance and its various manifestations in an earlier work and will not reiterate the details here.<sup>1</sup> In this chapter, I have isolated one manifestation—place names—for examination. Although seemingly less tangible than cropping systems, house types, or other commonly highlighted cultural indices, contemporary place names fossilize the past and endure to a re-

markable degree. Thus they offer much to our understanding of Taiwan's historical geography and clarify one aspect of sequent occupance.

With a contemporary map in hand, the curious observer often has difficulty interpreting the place names.<sup>2</sup> Place names represent a complex yet incomplete summation of past influences. In aggregate, they express the multiplicity of factors that give rise to the naming of places—characteristics of local topography and biota, aspirations of pioneer settlers, reminiscences of earlier homes, character of current settlement. When taken individually, each place name has a history that cannot always be traced precisely. This difficulty is compounded when one is using romanized transliterations of Chinese place names, but it exists nonetheless even when one is confronted with Chinese characters. Underlying this problem is the fact that early place names persist out of the past as fossils, the modern-day reading of which often rings unfamiliar and without apparent meaning. Moreover, certain names that had their origin in the language of one cultural group are frequently unintelligible to another. Several scholars have made excursions into the convoluted world of Chinese toponymy, but as yet there is no comprehensive treatment of Chinese place names and their role as a cultural index.<sup>3</sup>

Before we consider local place names, a few words should be said about the names "Formosa" and "Taiwan," which are often used interchangeably. Formosa, as is well known, is a shortened form of *Ilha Formosa* ("Beautiful Island"), a name given by the Portuguese in the early 1540s as they passed along the island's west coast. Although the Portuguese never occupied the island, the name Formosa has persisted to the present as one of the few western-language names used to identify places in China. Searching for the derivation of the name Taiwan is more difficult. As Wen-hsiung Hsu discusses in the first chapter of this volume, the early Chinese nomenclature for the island is vague and often contradictory. Even though the name Taiwan has had currency for more than three centuries, there is no unanimity as to its origin. It is frequently claimed that the name is a descriptive one meaning "big or great bay." Some scholars believe that "Taiwan" is a corruption of "Ta-hui" or "Tayouan," early aboriginal names for the southwestern section of the island.<sup>4</sup>

## PLACE NAMES OF ABORIGINAL ORIGIN

As Chinese settlement extended north and south from the core area of southwestern Taiwan, Chinese peasant colonizers came into contact with an unspecified number of aboriginal settlements (*she*), many of which were identified on early Chinese gazetteer (*fang-chih*) maps. Subsequently, under the pressure of continuing Chinese migration, the aborigines were displaced from these sites; but the sounds of the aboriginal names were often retained in corrupted form in Chinese characters. Seventy-one such names were noted in the gazetteer of *T'ai-wan-fu*. In other cases, the Chinese settlers named places by using characters that reflected an aboriginal presence: more than a score of place names use the character *fan*, meaning "aboriginal" or "barbarian." Other names incorporate a reference to nearby *she*, such as She-ch'ien ("in front of the aboriginal village") and She-hou ("in back of the aboriginal village").

One sure way to spot that a contemporary place name is of aboriginal provenance is to discover that the characters in the name have no meaning when linked. Such attempts have produced crude Chinese homonyms. One encounters difficulty in reproducing the aboriginal sounds for such names, however, because of the uncertainty of whether the names were originally rendered according to a Min-nan (southern Fukien), K'o-chia (Hakka), or some other dialectical pronunciation. Examples are Tun-hsia in Miao-li *hsien*, pronounced Tun-cio in the Min-nan dialect, and Pei-t'ou, pronounced Pak-tao in Min-nan. It may be assumed that most of these aboriginal names originally had meanings which have become obscured in the transformation; other examples are Pa-yao-wan and Lang-wai-chi in P'ing-tung *hsien*, Chia-lu-lan and Chia-li-meng Kai in T'ai-tung *hsien*, and Ma-lin and Li-tzu-chien in I-lan *hsien*.

It may well be that those contemporary place names which reveal the natural vegetation or animals commonly found during the seventeenth century stem from aboriginal names. The abundance of deer is expressed in the following names: Lu-ch'ang ("deer fields"), Lu-liao ("small house for storing the hunted deer"), and Lu-man-shan ("hill where the deer are plentiful").

## PLACE NAMES OF EUROPEAN ORIGIN

One writer has noted that Chinese place names "almost never indicate a cultural influence from other parts of the world (as do the names Canton, Ohio; Cairo, Illinois; New Hampshire; New Jersey)."<sup>5</sup> Given the early and persistent European interest in Taiwan, it may not be surprising, then, to see toponymic relicts of European colonization on contemporary maps of the island to a greater degree than in other parts of China. Although most of the early Dutch and Spanish names, such as Rio Quero near Hua-lien, have been dropped, a small number of others like Santiao-chiao—a transliteration of the Spanish Santiago—have continued. Fu-kuei-chiao, located at the northern tip of the island, is a Min-nan dialect transliteration for the Dutch words meaning small peninsula.

Several western-language names from the seventeenth and eighteenth centuries have been retained to the present on English-language maps of the island. The P'eng-hu islands, for example, located midway between Taiwan and the mainland, are still often called the Pescadores, the Spanish word for fishermen. A less frequently seen English-language rendering for Jih-yueh T'an (Sun Moon Lake) is Lake Candidius, named for the first Dutch missionary, Rev. Georgius Candidius, who served on Taiwan from 1627 to 1631. Mt. Morrison, named after a nineteenth-century missionary, is located in the central mountain ranges and is also known as Yu-shan. It was commonly found on maps up through World War II.

Other names characterize the nature of Dutch colonization. From 1624 to 1662, all of the land was claimed by the Dutch East India Company as *wang-t'ien* ("crown fields"). Wang-t'ien in the northwest section of the Taichung basin is a reminder of this period. Under Dutch rule the unit for measuring land in Taiwan was called *kah* by the Fukienese migrants to Taiwan. *Kah* is a linguistic vestige of the Dutch *akker* measure. When the Chinese and Japanese came to the island, attempts were made to change the land measure from *kah* to the Chinese *mou* or the Japanese *cho*. Its long-standing use, however, worked against such change, and it is still used on the island as a basic land measure. Some of the early names which incorporated this unit measure are the following places: Shih-erh-chia ("twelve *kah*"), Chiu-chia ("nice *kah*"), Liu-chia ("six *kah*"), and Wu-shih-erh-chia ("fifty-two *kah*"). In the Dutch land surveying system used in Taiwan, five *kah* was called a *li*, meaning plow in Chinese. Gradually this land surveying system became popular

for place names. Among the places encountered are Shih-wu-chang-li ("fifteen pieces of *li*"), located in Chang-hua *hsien*. San-chang-li ("three pieces of *li*") and Liu-chang-li ("six pieces of *li*") are located in Taipei *hsien*.

A half dozen places in Taiwan use the characters pronounced *hung-mao* in their names—*hung-mao* ("red hair") was the term used by seventeenth-century Chinese settlers to describe the Dutch. Hung-mao-lou was the common Chinese name for Fort Provintia, located in the present city of Tainan. All the existing places identified as *hung-mao* are located in Chia-i, Yun-lin, Kaohsiung, or Tai-chung *hsien*. Examples are Hung-mao-ching ("red hair's well"), Hung-mao-kang ("red hair's harbor"), and Hung-mao-liao ("red hair's village").

### *PLACE NAMES FROM THE CHENG PERIOD*

Cheng Ch'eng-kung, his son, and his grandson provided a 21-year interlude between Dutch rule and the incorporation of Taiwan into the Ch'ing empire. During this period, immigration was encouraged and significant expansion of arable land occurred. The Dutch *wang-t'ien* became *kuan-t'ien* ("government land"). An innovation was the colonization plan in which military units were required to reclaim and till the land surrounding their encampments in an attempt to be self-sufficient. Most of these encampments and their associated fields (*t'un-t'ien*) were located on the Chia-nan plain or along the coastal plain near Kaohsiung, although five were strategically sited along the coastal plain north of the Cho-shui River. The noun *ying* was used in the names of a majority of these encampments. In the Tainan area today one can locate more than a dozen places with names like Hsia-ying ("lower camp"), Ying-hou ("behind the camp") and Liu-ying ("willow camp"). North of Kaohsiung city is Tso-ying ("left camp"), today an important naval base.

### *PLACE NAMES FROM THE CHINESE PERIOD*

Most of Taiwan's place names naturally reflect the imprint of Chinese settlement. Some names, too numerous to list, were brought from the home communities of the migrants. Yet, contrary to the common pattern in America where the word "new" often precedes such names as New York and New London, the character *hsin* ("new") was seldom used in transferring a

mainland name to Taiwan. On the other hand, *hsin* ("new"), like the characters *ta* ("big") and *hsia* ("below"), were commonly used in general descriptive names.

Some place names were related to the early immigrants themselves. Although many frontier communities were made up of migrants from the same region and adopted a name which reflects a common origin, still others were established by individuals related by blood. Thus one finds a number of places which include common Chinese surnames—such as Sung-wu ("Sung family house") in T'ao-yuan *hsien* and Hsieh-ts'o-liao ("Hsieh village") in Tainan. In the case of these two settlements, the Sung and Hsieh families still are dominant today. The use of *ts'o* or *wu* in a place name enables the careful observer to determine whether the original settlers were from southern Fukien (Min-nan speakers) or from Kwangtung province (Hakka speakers). *Ts'o*, which usually denotes a hut or cottage, is used by southern Fukienese to refer to their dwellings whereas *wu* is the common form for other Chinese.

A good many of the place names originating in the century and half after 1683 relate to Chinese attempts to deal with the aborigines. Most of the place names in this category are located in the foothill—the zone separating the mountain aborigines and the sedentary Chinese. Chang-chou migrants came to Heng-ch'un and built a settlement, surrounding it with a wall of firewood in order to defend themselves against the native tribes. They called the settlement Ch'ai-ch'eng ("firewood city").

In some places the Chinese immigrants built earthen walls around their settlements, and several places are called T'u-ch'eng ("earth city"). Some towns were surrounded by walls made of brick and so the towns are called T'u-wei ("earth enclosure"). Others are called *tu* ("fort")—such as Ting-tu ("first fort"), Erh-tu ("second fort"), and San-tu ("third fort") in I-lan *hsien*. Others with similar names are located in the Taipei area. At the time, these fortifications were outposts of immigrant settlement. Other places similarly express defense: Mu-sha ("wood fence"), T'ung-kuei ("mortar gun case"), Ying-k'ou ("strategic pass"), Ying-liao ("the small house at the pass").

As skirmishes between aborigines and Chinese intensified, the Chinese authorities implemented a boundary policy that led to the construction of a demarcated line to separate the two groups. Termed *t'u-niu-kou*, it took the form of a linear ridge of earth. From a distance the dirt ridge (*t'u*) presumably resembled a basking water buffalo (*niu*). Most of the guardhouse

settlements related to this system are gone, but a few settlements still hint at this early system, such as T'u-niu villages in Taichung and Miao-li *hsien*.

Chinese land reclamation took several forms. Some land was opened by corporate groups of shareholders, and this fact is reflected in a large number of place names. *Ku* ("shares") or *fen* ("subdivisions of shares") are components of some place names—for instance, Liu-ku ("six shares") or Shih-san-fen ("thirteen divisions") in T'ao-yuan *hsien*. Many additional place names used the numerical character to specify the number of persons who pooled resources for the purpose of reclamation.

Under the Ch'ing dynasty there were several uprisings on the island. After they were quelled, imperial decisions sometimes conferred names of new hope for towns. An example of this is Chia-i, where *chia* means "good" and *i* means "fitting or proper." Originally the city was called Chu-lo-shan, which approximates the pronunciation of the aboriginal name for a village the Dutch called Tilaossen. Other examples include Pao-chung-miao ("temple of loyalty") and Chung-yi-ting ("pavilion of loyalty and prosperity").

The Ch'ing empire also attempted to extend its influence by renaming villages in praise of the regime. Pan-hsien ("half line") was the aboriginal name for a settlement in central Taiwan. After the place became a *hsien* (county) seat, it was renamed Chang-hua, which means "manifest the influence of the empire," and this is what it is called today. Kan-en originally was called Nin-ma-she by the aborigines, but it subsequently became Kan-en ("thanks for the mercy"). Other place names which expressed praise are Yung-nin ("peaceful forever"), Kuei-jen ("return to the benevolent"), and Yen-ch'ang ("prosperous forever").

### *PLACE NAMES FROM THE JAPANESE PERIOD*

Japanese immigrants to Taiwan lived principally in the cities, and it is there that many vestiges of their occupation may be seen. Except in eastern Taiwan, few rural place names were added by the Japanese, although the original Chinese characters were usually rendered and romanized according to Japanese pronunciation. In Taipei city today some districts, such as the Hsi-men district, are still popularly referred to as *ding*, the Japanese term, rather than *ch'u*, the Chinese term.

Still other places retain names introduced by the Japanese but pronounced and romanized according to the Chinese language. Sung-shan, originally Matsuyama, and Tien-chung, originally Tanaka, are but two examples of this type. T'ien-mu, located north of Taipei city, was named Tenbo by the Japanese to commemorate a deity. Names such as these have for the most part been detached from their origin in common usage, although Lin Heng-tao has written that "these place names of the occupation period must be changed back to the original Chinese as soon as possible"<sup>6</sup> He makes no comment on those names which are the legacy of the distant Dutch and Spanish occupations.

### *SUMMARY*

The sequent occupance of Taiwan has left a palimpsest of curious and complex inscriptions of past patterns whose traces can be viewed today by the careful observer. Buildings, road patterns, characteristics of agriculture and industry—all reflect influences that came to the island at different times from different groups. Some vestiges of early occupance stand as mute reminders of lost or vague origins; others, such as the temple commemorating Cheng Ch'eng-kung in Tainan, the Spanish fort at Tan-shui, or the large number of Japanese-style houses in Taipei, speak loudly of a past now transformed. Although contemporary place names are often less bold in suggesting their patrimony, examination of them can yield illuminating vignettes of the island's past.

Part Two

URBANIZATION AND  
ECONOMIC INTEGRATION



# 7

## Walled Cities and Towns in Taiwan

TAO-CHANG CHIANG

The significance of the wall is a common topic in the study of cities in most parts of the world.<sup>1</sup> This is particularly the case in China where the association between the wall and the city has been so intimate that the same character *ch'eng* is used for both.<sup>2</sup> The walled city in China was a phenomenon found early in history and subsequently in numbers that exceeded those elsewhere in the world. The presence of a walled city was clear evidence of Chinese penetration and settlement and, in a frontier area, served as an outpost of imperial authority. As Chinese peasants moved to Taiwan in the seventeenth through nineteenth centuries, and transformed the island into a rural analog of Fukien and Kwangtung, urban centers emerged as well to serve administrative, social, and economic purposes. Distinct differences promoted the development of individual walled cities as Harry J. Lamley has so well pointed out for Taipei, Hsin-chu, and I-lan.<sup>3</sup> Viewing the broader context of Taiwan's urbanization, this chapter examines the origin and spread of walled urban centers on the island and identifies aspects of their sites and distribution, their size and shape, and their function.

### EARLY FORTRESSES

Chinese historical records indicate that at the end of the thirteenth century there were about 1,600 Chinese pioneers on the Pescadores (P'eng-hu), but no walled town was built there until 1563 when a Ming general erected a walled town at An-ao for defense against the pirates in the Taiwan Straits.<sup>4</sup> One record shows that this walled town was devastated at least as early as

1694.<sup>5</sup> Although there is no way to know in detail about this walled town, it is certain that it was not much more than a small military fortification.<sup>6</sup>

The Dutch visited the Pescadores in 1622-1624 and secured a toehold on the island of Taiwan in 1624. Two years later the Spaniards landed at its northern end, but they were driven away by the Dutch in 1642. At the end of four decades, the Dutch themselves were forced to surrender to the Ming loyalist Cheng Ch'eng-kung (Koxinga), and as a result Taiwan emerged as an active Chinese frontier. From 1622 to 1653 the Dutch erected several forts on the Pescadores and in southern Taiwan, while the Spaniards built forts at the northern end of Taiwan. Best known among these forts were Fort Zeelandia and Fort Proventia built by the Dutch near present-day Tainan, Fort San Salvador at Chi-lung (Keelung) erected by the Spaniards in 1626, and Fort Santo Domingo at Tan-shui built by the Spaniards in 1629.<sup>7</sup>

Fort Zeelandia was expanded several times and by 1632 was an imposing fortification on a sand spit off the southwest coast (Figure 7-1). The site chosen for Fort Zeelandia illustrates the fact that the Dutch viewed the facility as essentially a defensible factory or emporium oriented outward rather than as a node from which to promote the development of the island: "The builders of this Castle paid more attention to the convenience of loading and unloading vessels than to the situation of the place"<sup>8</sup> Initially the fortress was nothing but a wooden palisade, but it was rebuilt in 1630 using bricks shipped to Taiwan from Batavia. Split into two parts, the fortress was constructed atop an elevated earthen mound.<sup>9</sup> Limited room for expansion and the need to secure access to sources of water and food prompted the Dutch to build another fort, called Proventia, on the mainland only several hundred yards across a shallow inlet to the east. From these two bases, the Dutch East India Company carried out triangular trade between China, Japan, Holland, and Dutch possessions. Dutch commercial interests were aborted when Cheng Ch'eng-kung laid siege to the fortresses in 1661; after holding out for nine months, the remaining Dutch forces exchanged safe passage to Batavia for 471,000 guilders and the fortifications. Remnants of these Dutch forts are observable today as is the Spanish fortress at Tan-shui.

In 1673 Koxinga sent his men to a garrison at Keelung (Chi-lung). Ten years later they erected at the site of the Spaniards' Fort San Salvador a new fort known as Chi-lung Ch'eng. This



Figure 7-1. Fort Zeelandia.

was the first known wall built by Chinese on the island, but it did not survive long.<sup>10</sup> No true Chinese walled town appeared on Taiwan until the beginning of the eighteenth century.

During the Dutch occupation of southwestern Taiwan and the Cheng family interlude which followed, Chinese migration from the coastal areas of Kwangtung and Fukien increased greatly, so that the population was at least 120,000 by 1680. After a little more than twenty years of Cheng family domination, Ch'ing military forces brought the island within political China in 1683. In the following year the island was made a prefecture of Fukien province, consisting of three *hsien*: T'ai-wan, Feng-shan, and Chu-lo. As a signature of imperial authority and following practices on the mainland, walls should have encircled the local administrative centers of these *hsien*. Two decades passed before the first of these centers was encircled, and then only by a wooden palisade.<sup>11</sup> It was Chu-lo rather than T'ai-wan-fu (now Tainan) which was encircled first, probably because T'ai-wan-fu was more secure than Chu-lo and was situated in an area well occupied by Chinese whereas Chu-lo was not. Later palisades of wood or thorny bamboo were used to ring other centers. Eighteen years later, in 1722, an earthen wall with an encircling moat was constructed for the capital of

Feng-shan *hsien*. With the wall were governmental buildings, barracks, and temples with stores lining the streets.<sup>12</sup> The local gazetteer of Feng-shan *hsien*, completed in 1764, has the following passage describing the construction of the wall (Figure 7-2):

The wall of the county seat at Hsing-lung-chuang was built in 1722 under the direction of its Magistrate, Liu Kuang-sze. The wall, one and three-tenths *chang* [about 4.7 meters] high, has a circumference of eight hundred and ten *chang* [about 2,900 meters]. It is situated between Kwei-shan [a hill] at the left and She-shan [also a hill] at the right. A moat encircling the wall was dug. The moat is one *chang* [about 3.6 meters] in width and eight-tenths *chang* [about 2.9 meters] deep.<sup>13</sup>

Whether built by Chinese or by Europeans, these seventeenth and eighteenth-century walled centers were for the most part fortresses or protective enclosures. At a larger scale than the palisaded peasant villages, they provided security from marauding aborigines and local banditry. Their bureaucratic function was limited. In this regard they differed significantly from eighteenth and nineteenth-century walled towns whose genesis owed more to administration and marketing than to defense.<sup>14</sup>

### HISTORICAL DEVELOPMENT

During the early decades after 1683, the Ch'ing court displayed an indifferent attitude toward Taiwan and even considered abandoning the island. As an appendage of Fukien, Taiwan received only periodic visitations by mainland officials. For fear of reemergent alliances of anti-Ch'ing elements, migration from southeastern China to Taiwan was officially interdicted. Nonetheless, the Chinese population on the island increased dramatically through the clandestine movement of peasants across the straits. Many of these peasant pioneers then traveled from the southwestern settled core to virgin areas in the central and northern sections of the coastal plain. The rapidity with which this settlement occurred is suggested by comparing the observations of Yu Yung-ho, who traveled south to north in 1697 and noted extensive vacant areas, and Huang Shu-ching, who journeyed in the same area in 1722 and commented on the extent of the fields under cultivation by Chinese peasants.<sup>15</sup>

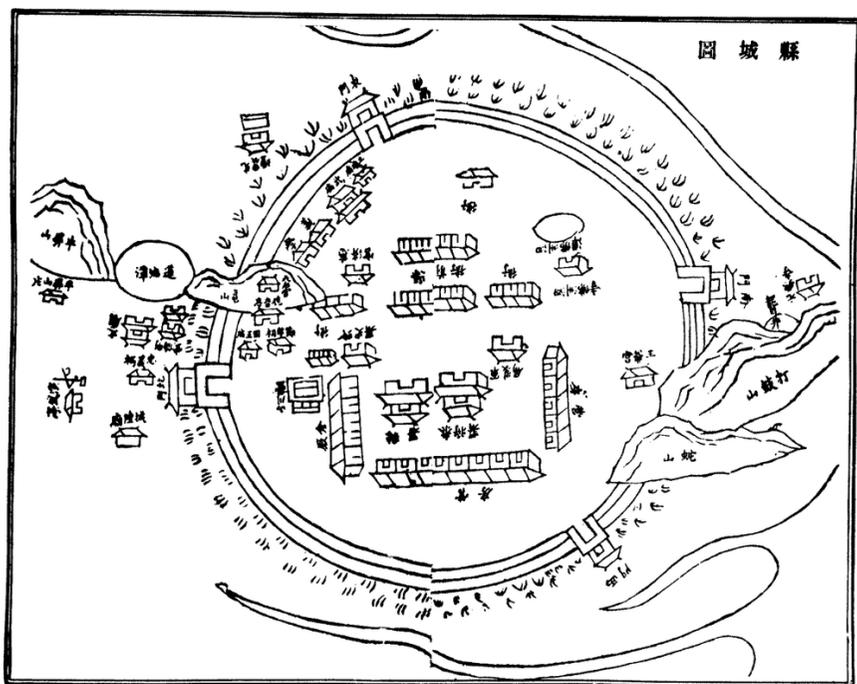


Figure 7-2. The walled city of Feng-shan ca. 1764. [From *Feng-shan hsien-chih.*]

Frontier conditions promoted conflict and in early 1721 an uprising led by Chu I-kuei focused imperial interest in the island. Administrative reorganization in 1723, the first year of the reign of the Yung-cheng emperor, brought about a new district called Chang-hua and a marine district called Tan-shui; both were formed by dividing the Chu-lo district into three parts. With the addition of Ko-ma-lan (present-day I-lan), this new structure lasted until 1875. Meanwhile immigration continued apace, especially with the lifting of official restrictions in 1760. A second uprising in 1788 led the Ch'ien-lung emperor to call for an examination of the need to build or strengthen walls around existing towns.<sup>16</sup> Chinese records indicate that the immigrant population had swelled to 2 million by 1811, distributed as shown in Table 7-1.

During the eighteenth and nineteenth centuries three characteristic periods of wall-building activity can be recognized. Each lasted, on average, forty-five years. The first period

## CHINA'S ISLAND FRONTIER

TABLE 7-1  
*The Chinese Population on Taiwan: 1811*

<i>Hsien and T'ing</i>	Population	Percentage
Chia-i <i>hsien</i>	816,659	40.8
Chang-hua <i>hsien</i>	342,166	17.1
T'ai-wan <i>hsien</i>	341,624	17.1
Tan-shui <i>t'ing</i>	214,833	10.7
Feng-shan <i>hsien</i>	184,551	9.2
P'eng-hu <i>t'ing</i>	59,128	3.0
Ko-ma-lan <i>t'ing</i>	42,900	2.1
TOTAL	2,001,861 <sup>a</sup>	100.0

<sup>a</sup> The original source indicates that the total population is 2,003,861, which does not correspond with the sum (2,001,861) of the seven *hsien* and *t'ing* figures.

SOURCE: Lien Heng, *T'ai-wan t'ung-shih [A history of Taiwan]* (Taipei: Chung-hua ts'ung-shu wei-yuan-hui, 1958), pp. 123-124.

started at the beginning and ended in the middle of the eighteenth century and saw the construction of walls around several major administrative centers: Feng-shan (Figure 7-2),<sup>17</sup> Chu-lo (Figure 7-3),<sup>18</sup> T'ai-wan (Figures 7-4 to 7-6),<sup>19</sup> Chang-hua,<sup>20</sup> and Tan-shui. T'ai-wan-fu was the capital of T'ai-wan prefecture; the rest were *hsien* capitals. A secondary wall was erected for the Taiwan garrison within the wall of T'ai-wan.<sup>21</sup> In addition, an earthen wall was built at Pa-li-fen.<sup>22</sup> All, except Pali-fen, were located in southern Taiwan. Official arguments went against the construction of heavy walls for fear such enclosures might fall into the hands of rebels and become redoubts against imperial control. For the most part, they served as protective enclosures and as tacit statements of Ch'ing presence.

Wall-building activities came to a halt at mid-century and then were revived as a result of the Lin Shuang-wen uprising in 1788. At Chu-lo (renamed Chia-i) and at T'ai-wan-fu, stone

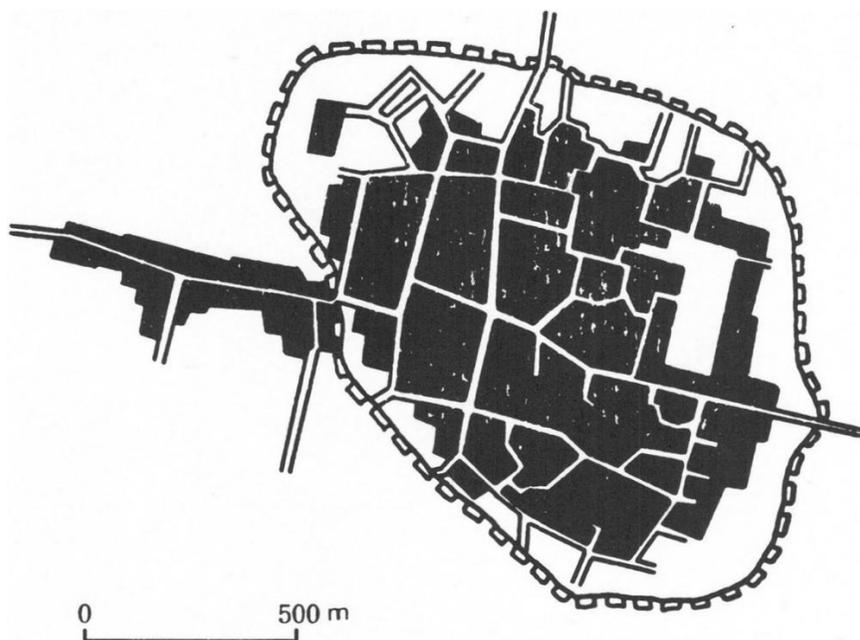


Figure 7-3. Chia-i (formerly Chu-lo) in 1901.

and brick were authorized to strengthen the existing walls. The second period beginning in the early and ending in the middle nineteenth century marks the most active wall-building years in the history of Taiwan. Four major walls and twelve minor ones were constructed. The four major walled towns were Ko-ma-lan (I-lan),<sup>23</sup> Chu-ch'ien (Hsin-chu) (Figure 7-7),<sup>24</sup> T'ao-yuan,<sup>25</sup> and Feng-shan.<sup>26</sup> The twelve secondary walled towns were Yen-shui,<sup>27</sup> Ta-chia,<sup>28</sup> Wu-ch'uan-ch'eng,<sup>29</sup> Hou-lung,<sup>30</sup> A-hou,<sup>31</sup> Chung-li,<sup>32</sup> Fang-li,<sup>33</sup> Chung-kang,<sup>34</sup> Fang-ch'iao,<sup>35</sup> Ta-k'o-k'an,<sup>36</sup> T'u-ch'eng,<sup>37</sup> and Ch'e-ch'eng.<sup>38</sup> The majority of these sites are located in northern Taiwan. During this period some of the walls passed through a metamorphosis that resulted in increasingly more substantial enclosures. Chu-ch'ien (Hsin-chu) was ringed by thorny bamboo until 1813 when this was replaced by an earthen wall; in 1827 stone was used to face the wall.<sup>39</sup> Major reconstruction occurred at Chang-hua and Feng-shan. At Chang-hua from 1811 to 1815, local capital enabled the construction of brick and stone walls, moats, gates, and ancillary buildings.<sup>40</sup> Self-protection from the fighting be-

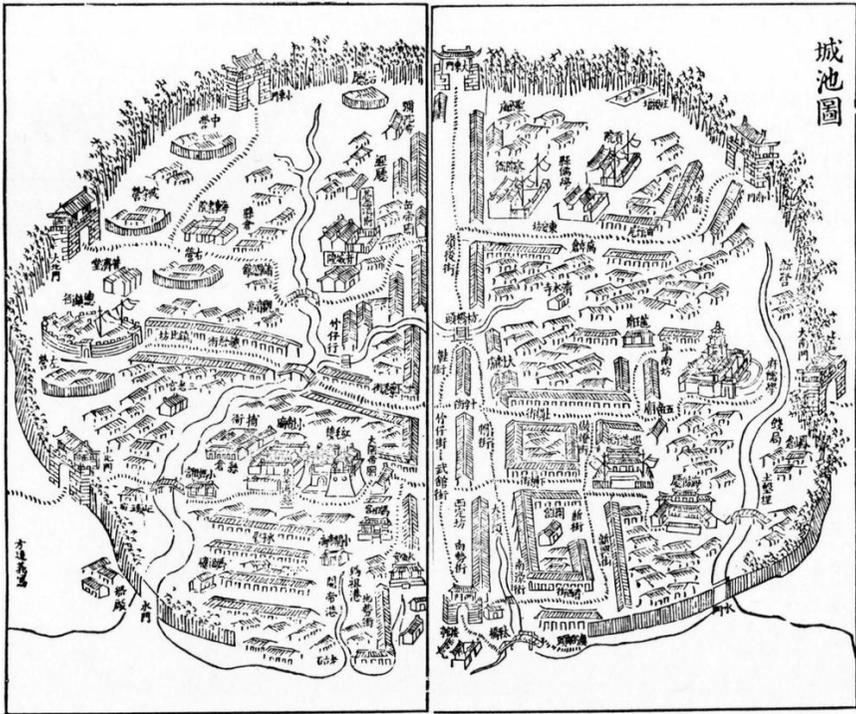


Figure 7-4. Palisaded T'ai-wan-fu ca. 1752. [From Ch'ung-hsiu T'ai-wan hsien-chih.]

tween rival communities in northern Taiwan was an important reason for some of these wall-building activities. Walls were also built for protection against aborigines and local bandits.

The third period, which began in 1862 and ended in 1908, resulted in the building of seven town walls. These walled towns were all administrative centers, either *hsien* or *t'ing* seats. They were located in all regions except eastern Taiwan and include Heng-ch'un (Figure 7-8),<sup>41</sup> P'u-li (Figure 7-9),<sup>42</sup> Taipei (Figure 7-10),<sup>43</sup> Ma-kung (Figure 7-11),<sup>44</sup> Taichung (Figure 7-12),<sup>45</sup> Chu-shan,<sup>46</sup> and Tou-liu.<sup>47</sup> Their completion symbolized the conclusion of Chinese colonization on the fertile lowlands of Taiwan.

The development of Chinese settlements on Taiwan started in the Pescadores and spread to the island of Taiwan itself. On Taiwan, the southwestern part was opened up first and settlement then expanded gradually toward the north along

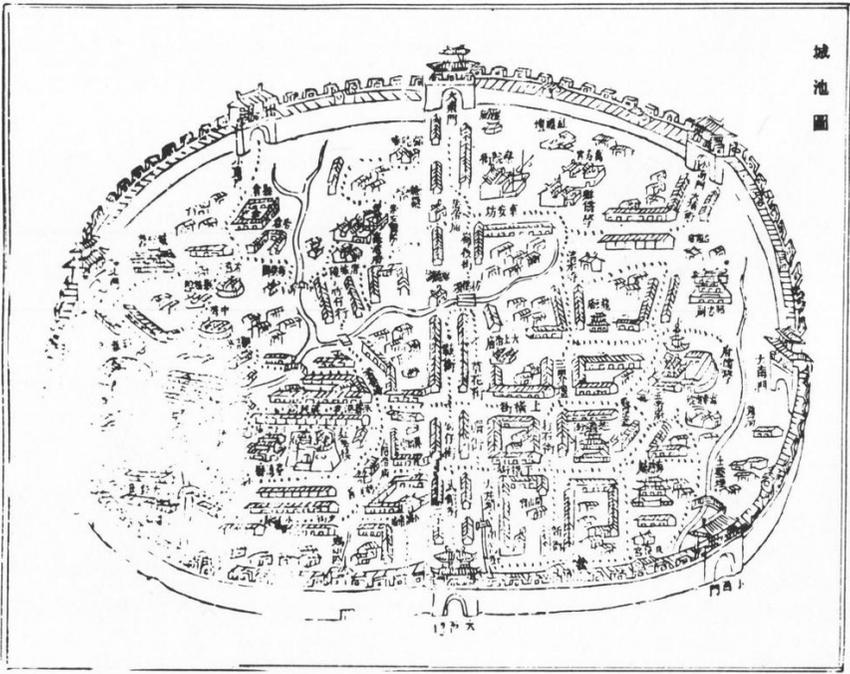


Figure 7-5. T'ai-wan-fu ca. 1807. [From Hsu-hsiu T'ai-wan hsien-chih.]

the coastal plain; eastern Taiwan was settled last. The walled towns appeared accordingly. Older walled towns were found in southern Taiwan, newer ones in the north.

Chinese walled towns may be viewed as symbols of Chinese penetration and successful habitation of a frontier area. In most cases such construction was preceded by peasant land reclamation and the development of incipient markets. The sequence of these walled sites established on the lowlands of Taiwan indicates the temporal process of agricultural colonization there by Chinese who migrated from Fukien and Kwangtung. The three distinctive periods of wall building reveal different geographical patterns and significantly varied motivations. Twelve administrative centers as well as more than a score of other towns were walled in one form or another on Taiwan during the frontier period.



*Figure 7-6. Tainan (formerly T'ai-wan-fu) at the turn of the twentieth century.*

### *SITE AND DISTRIBUTION*

The western fortresses built before the Ch'ing occupation of Taiwan were all on the coastline. Such locations served entrepôt functions and provided defense against attack from the sea. Moreover, they permitted exchange with the aborigines and the early Chinese pioneers on the coastal lowlands.<sup>48</sup> On the other hand, few Chinese walled towns erected during the Ch'ing dy-

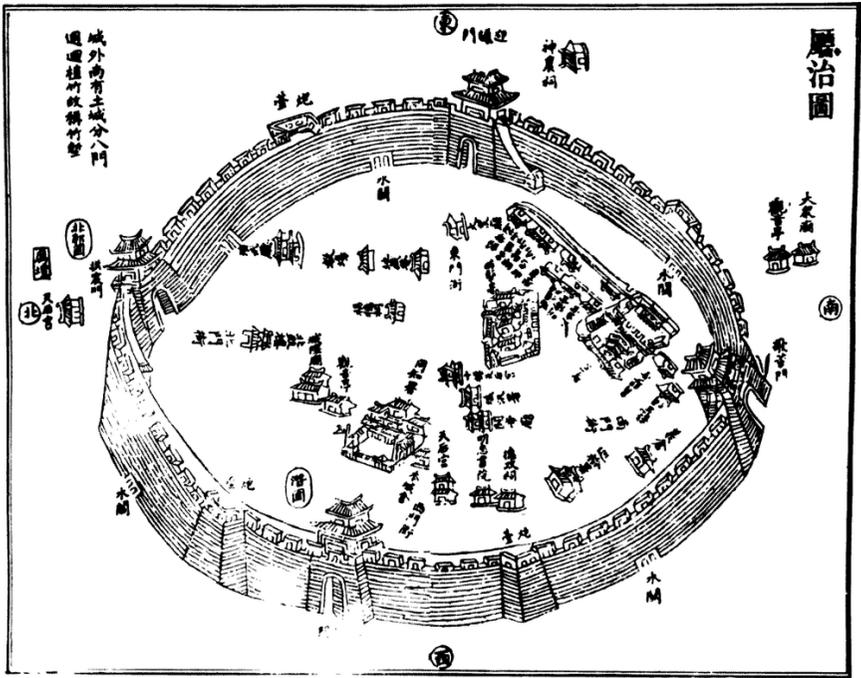
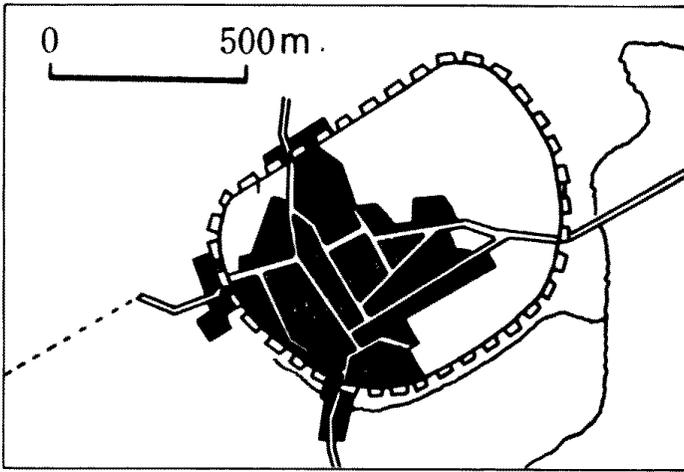


Figure 7-7. Chu-ch'ien ca. 1871. [From *Tan-shui t'ing-chih*.]

nasty were situated on the coast, mainly because Chinese settlements had already penetrated deeply into the coastal lowlands where reclamation and settlement were directed away from the sea.

Chinese walled towns, unlike many medieval European, ancient Near Eastern, and Japanese daimyo towns, were almost exclusively lowland-oriented. The overwhelming majority of the Chinese population had been concentrated in lowland areas while upland, marginal areas remained largely unsettled, especially when compared with Europe. Arising in agricultural lowlands, Chinese walled towns served the economic, political, and social needs of the rural population in their tributary areas. To function as administrative center, local market, and social focus, a walled town was often located at the heart of the area it served. Taipei, for example, is at the center of the Taipei basin, as is I-lan (Ko-ma-lan) in the I-lan plain, T'ao-yuan in the T'ao-yuan tableland, Taichung in the Taichung basin, and Chang-hua in the Chang-hua plain. All the walled towns were located below



*Figure 7-8. Heng-ch'un in 1951.*

500 meters elevation. Most were below 250 meters, as only lowlands had enough arable land to sustain a population that could support a walled town (Figure 7-13).

Sen-dou Chang has observed that "water was the most important factor influencing the site selection of walled cities, since it figured in transportation, defense, water supply, and (indirectly, through irrigation) food supply. As can be seen from detailed maps of every region in China, the most favored place for a walled city was on a river-bank."<sup>49</sup> Taiwan's walled towns and cities were an exception to this mainland rule. Not only were most rivers on the island short and swift with an irregular seasonal flow and thus not navigable, but many of the riverbanks were subject to dangerous floods during the typhoon season. Hence place names on Taiwan rarely denote a riverine site as is the frequent case on the mainland. As Chiao-min Hsieh indicates in an earlier chapter, it is only ports at the mouths of short streams that incorporate a river location in their names.

Walled towns tended to be somewhat evenly distributed on the western coastal lowlands. This is particularly so for the fifteen major walled towns; five of them are in southern Taiwan, five in central Taiwan, and four in northern Taiwan.<sup>50</sup> The Pescadores have one and eastern Taiwan none (Table 7-2). On the average, major walled towns were roughly 40 kilometers away from one another. In a nearest-neighbor analysis of the lo-

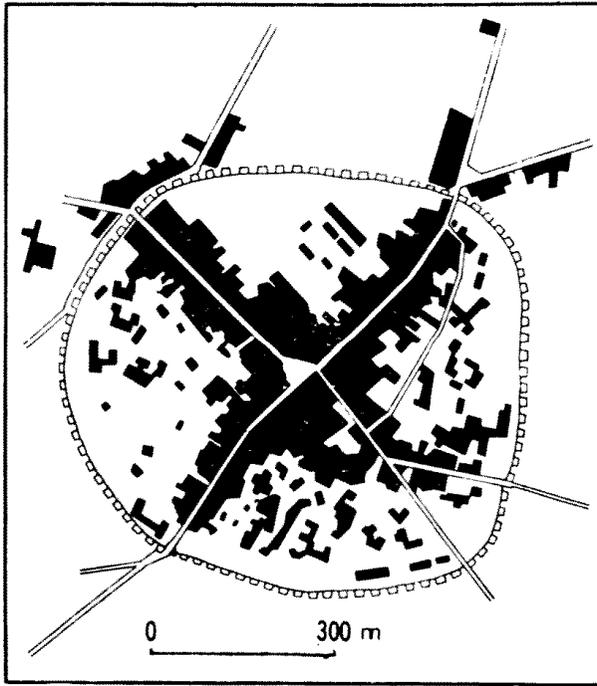


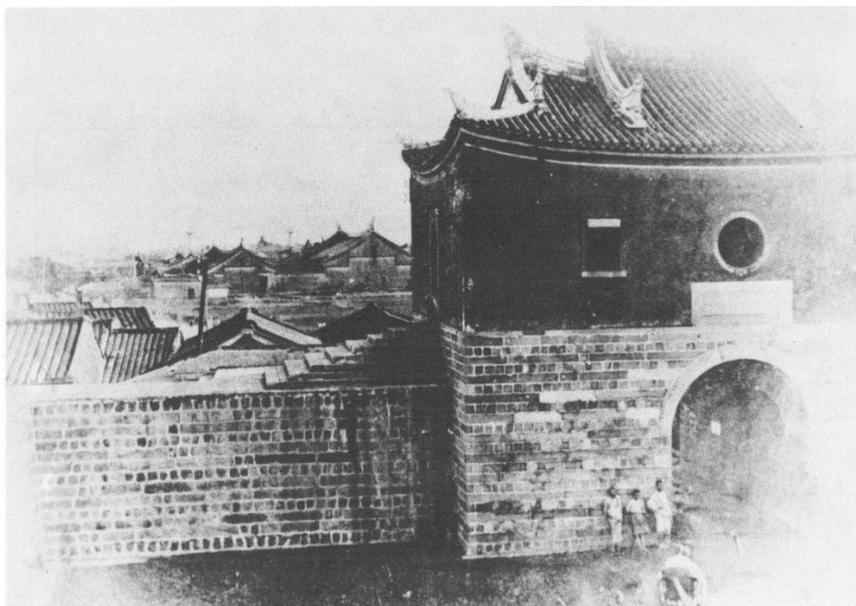
Figure 7-9. P'u-li in 1914.

cation of the major walled towns on the lowlands of northern, central, and southern Taiwan,  $R = 1.86$  is obtained. In other words, their distribution tends to be regular.<sup>51</sup>

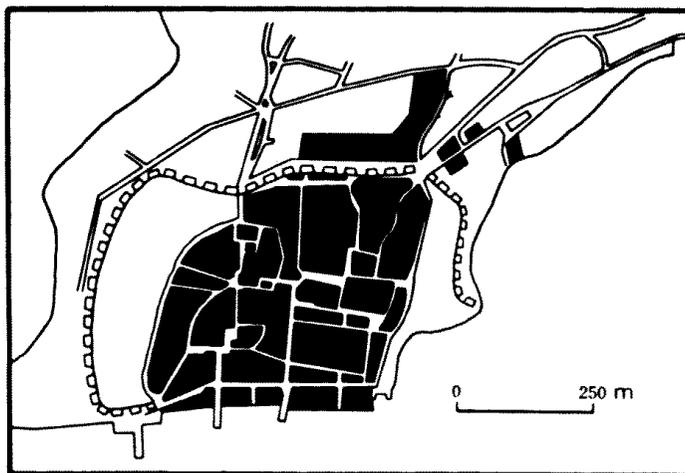
### SIZE AND SHAPE

Town walls built before the Ch'ing dynasty were very small. None had a circumference of more than half a kilometer, and even the palisades were considered not worthy of the term *ch'eng* ("wall") by some writers. Commenting on towns in early eighteenth-century Taiwan, a prominent Chinese mandarin wrote:

There are no walls and moats for towns in Taiwan. Therefore, they cannot be defended in emergencies and insurgencies. It is expensive and complicated to build a city wall made of compressed



*Figure 7-10. Taipei in the early twentieth century.*



*Figure 7-11 Ma-kung in 1930.*

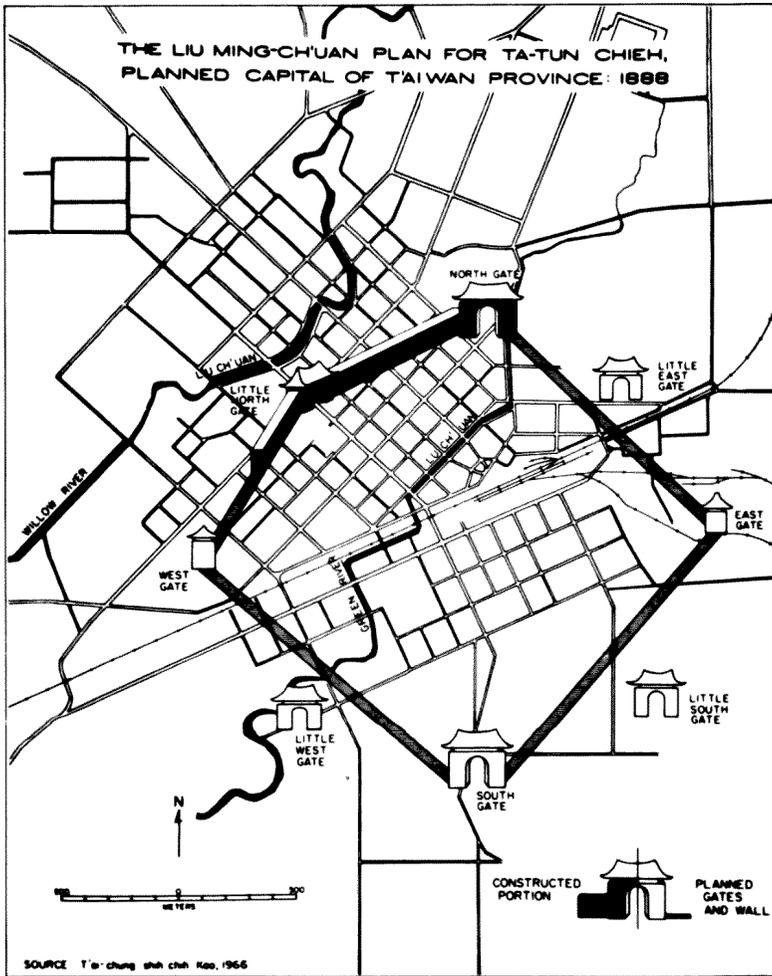


Figure 7-12. The Liu Ming-ch'uan plan for Ta-tun Chieh (Taichung), planned capital of Taiwan province, 1888. [From Clifton W. Pannell, *T'ai-chung, T'ai-wan: Structure and Function*.]

earth faced by bricks and cut stones. Funds cannot be appropriated from local land tax. One way to solve this problem is to plant bamboos forming a palisade.<sup>52</sup>

## CHINA'S ISLAND FRONTIER

TABLE 7-2.  
*Distribution of Walled Towns*

Region	Number of Major Walled Towns <sup>a</sup>	Number of Secondary Walled Towns	Total
Pescadores	1	—	1
Southern Taiwan	5	4	9
Central Taiwan	5	1	6
Northern Taiwan	4	8	12
Eastern Taiwan	—	1	1
TOTAL	15	14	29

<sup>a</sup> A major walled town is one whose wall is 600 *chang* (equivalent to about 2,150 meters) or longer in circumference.

Due to the difficult financial situation on the frontier, town walls built in the Ch'ing dynasty were also small.<sup>53</sup> The original palisades encircling a number of towns were usually larger than the subsequent earthen walls with or without brick or stony facing. The earthen wall of Chu-ch'ien (Hsin-chu), for example, had a circumference of 4,130 meters, but its subsequent earthen wall with stony facing was only 2,600 meters long.<sup>54</sup> The latter was less than two-thirds of the former. Both Miao-li and Hou-lung were located in the Miao-li hills and only 7 kilometers apart. The bamboo palisade of the former had a circumference of 4,621 meters; the earthen wall at the latter was only 1,155 meters around.<sup>55</sup> The circumference of the earthen wall was only one-fourth that of the bamboo palisade. The average circumference of the eleven major walled towns was 3.55 kilometers. Indeed, they were very small (Table 7-3).

Prefectural capitals were larger than *hsien* capitals. The two largest walled towns, T'ai-wan-fu and Taipei, were both prefectural capitals. The former had a walled area of 3.1 square kilometers, the latter 1.4 square kilometers. The walled areas of *hsien* capitals ranged from 0.22 to 0.80 square kilometers. The varying sizes of the walled areas of prefectural and *hsien* cap-

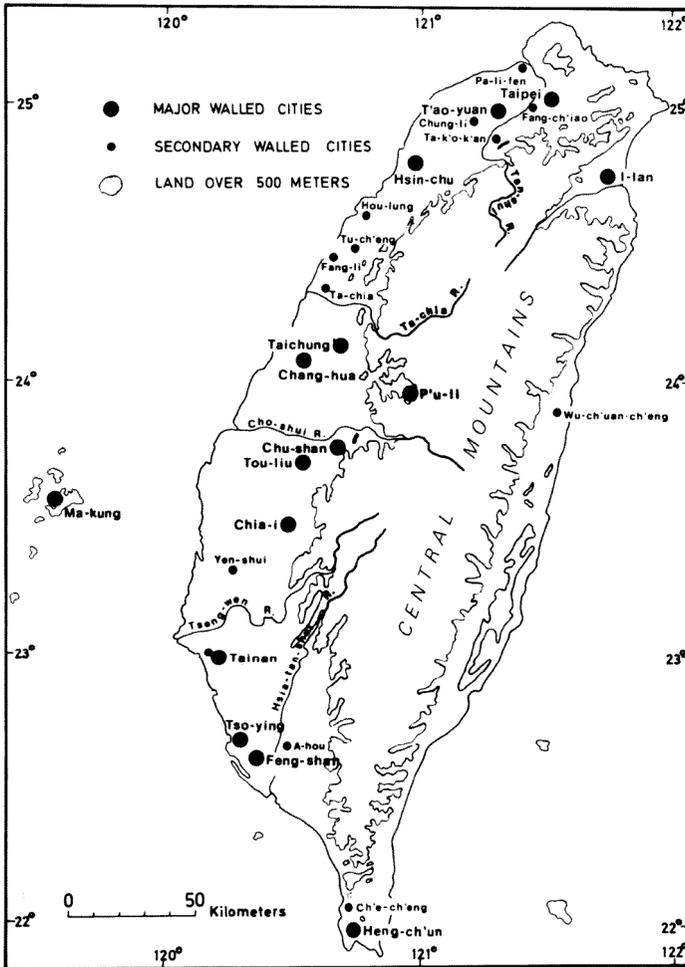


Figure 7-13. Walled cities of Taiwan.

itals reflect their economic, administrative, and military importance at the time the walls were built. Taiwan's walled towns were smaller than those on the mainland. The average size of the walled area for nine *hsien* capitals in Taiwan was less than half a square kilometer; the average size for 157 selected *hsien* capitals on the mainland was more than a square kilometer,<sup>56</sup> In general, the size of walled towns in Taiwan was comparable to that of walled towns in peripheral areas of China Proper.

## CHINA'S ISLAND FRONTIER

TABLE 7-3  
*Size of Major Walled Towns*

Town	Status	Circumference of Wall (Meters) <sup>a</sup>	Walled Area (Square Kilometers) <sup>b</sup>
T'ai-wan-fu	Prefectural capital	9,674	3.1048
Taipei	Prefectural capital	5,800	1.3935
Feng-shan <sup>c</sup>	<i>hsien</i> capital	4,155	0.7984
Heng-ch'un	<i>hsien</i> capital	3,755	0.5099
Chang-hua	<i>hsien</i> capital	3,551	0.5368
Feng-shan <sup>d</sup>	<i>hsien</i> capital	3,327	0.4911
Hsin-chu	<i>hsien</i> capital	4,130	0.5523
Chia-i	<i>hsien</i> capital	3,062	0.4026
Ma-kung	<i>hsien</i> capital	3,038	0.2592
Taichung	<i>hsien</i> capital	2,503	0.2177
Ko-ma-lan	<i>hsien</i> capital	2,465	0.3768

<sup>a</sup> All figures were originally in *chang*. One *chang* normally equals 3.581 meters, although its length may vary slightly from place to place.

<sup>b</sup> The size of walled areas was measured by the author from maps. Both the dot grid and the polar planimetric methods were used. When different results were obtained, this column gives the average.

<sup>c</sup> At P'i-t'ou.

<sup>d</sup> At Hsing-lung-chuang.

To a historical geographer the shape of walls constitutes a fascinating topic of analysis. Scholars of sinology often write that the shape of the Chinese city was a perfect square or rectangle.<sup>57</sup> In fact, except for prominent imperial capitals, there was great deviation from such a norm. Misunderstanding has come about because of emphasis on the study of imperial capitals such as Peking, Loyang, and Sian which indeed have square or rectangular walls. Although it is not clear exactly how many walled towns or cities have been built in China, and very little research has been done on this aspect, it is estimated that it might have been more than ten thousand. A sample of 196 walled cities on the mainland shows that only 22 (11 percent of the total) were square in shape, 18 (9 percent) were rectangular, and 157 (80 percent) had various other shapes.<sup>58</sup>

Only several of Taiwan's seventeen town walls are close to a rectangle in shape (Figure 7-14). The reasons for this are not clear. Topographical irregularities did not normally necessitate an irregular shape, since most walled towns were built in flat lowland settings. Perhaps the irregular shapes reflect the relatively late date of urban development and great temporal distance from the square prototypes. Chang has suggested that "since circular walls require fewer construction materials per unit of enclosed area than rectangular walls, it may have been considerations of economy that encouraged departure from the cosmological ideal."<sup>59</sup>

### FUNCTION

Two types of walled town, each having a different function, can be identified. The first type includes those that were neither *hsien* nor prefectural capitals but central markets for surrounding rural areas. Their commercial function is easily identified by their name suffixed by the generic term *chieh*, which means street or market in Chinese. Walled towns of the second type were administrative headquarters, central markets, and cultural centers. All were *fu*, *hsien*, or *t'ing* capitals. As a rule, if a settlement was chosen to be the capital of a *fu*, *hsien*, *chou*, or *t'ing*, a wall would eventually be built. In the late nineteenth century, Taiwan province had three *fu*, one *chou*, eleven *hsien*, and six *t'ing*.<sup>60</sup> Fifteen of the twenty-one capitals of these civil administrative divisions were walled towns (Table 7-4).

# CHINA'S ISLAND FRONTIER

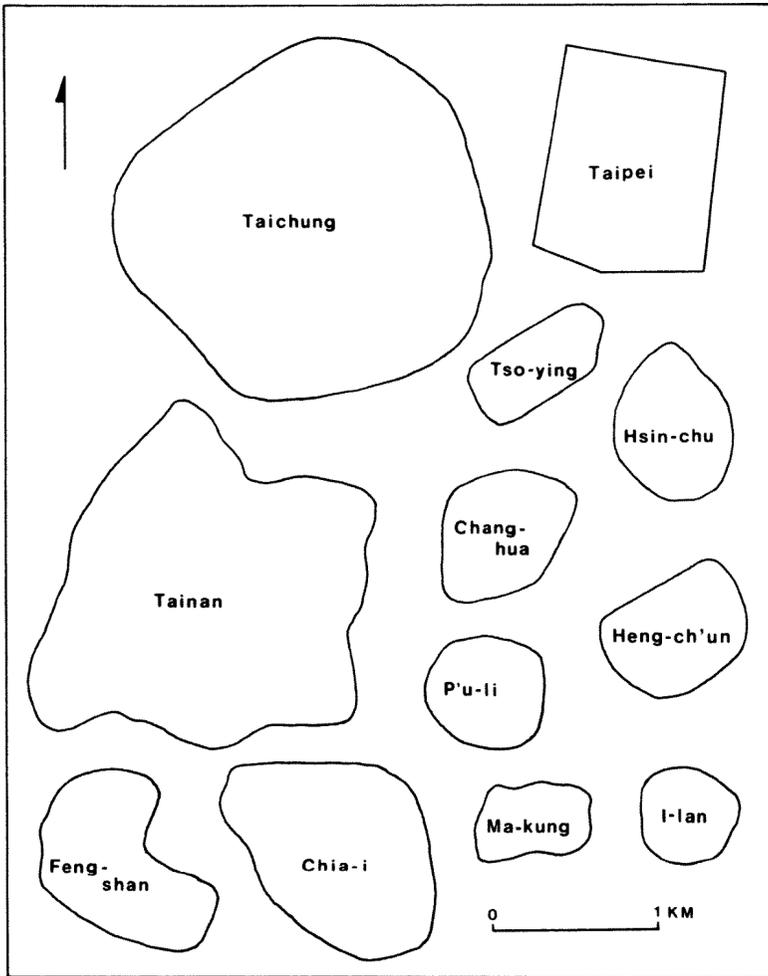


Figure 7-14. Shapes of selected walled cities in Taiwan.

During the Ch'ing dynasty, every central market town was a walled town.<sup>61</sup> Situated at the central place from where it was easy to reach all corners of its umland, the walled town attracted trade from the umland. On Taiwan during the early eighteenth century, for instance, there were four major walled towns: Chang-hua, Chia-i, T'aiwan, and Feng-shan. They were about 40 to 70 kilometers apart.<sup>62</sup> In other words, the radius

of each umland was 20 to 35 kilometers. This, then, was the longest distance the most disadvantaged peasant had to travel and return to his village by foot.

According to local gazetteers, a major walled town, in fact, had more streets than any settlement around it. This suggests that a major walled town had more volume of trade than minor market centers. Zones of different functions were well developed. In Tainan in the early nineteenth century, for example, one would have found a noodle street, a cooking oil store street, a blacksmith street, a silversmith street, a shoe street, and a cap street.<sup>63</sup> Obviously, these streets responded to the needs of the surrounding rural areas. A major walled town not only sold staples but also supplied various services such as treatment by traditional Chinese herbalists.

A major walled town was also the cultural center of the area it served. The gentry of a *hsien* usually lived in its capital town even before its wall was erected. Perhaps the best index to show that major walled towns were cultural centers is the distribution of Confucian temples and traditional academies in Taiwan. Of the eleven Confucian temples, all were within or just outside the major walled towns (Table 7-5).<sup>64</sup> Before the Japanese introduced a modern educational system, students on the island, like those on the mainland, usually studied Chinese classics at home under a tutor. This tutoring system was found in towns as well as in rural areas. Traditional academics, in which groups of students studied Chinese classics under learned scholars, on the other hand, were found mainly in the major walled towns. Eighteen of the twenty-three academies (Table 7-5) were found in the major walled towns on the island during the Ch'ing dynasty.<sup>65</sup>

### *IMPACT ON THE TOWNSCAPE*

Almost all former walled towns have developed as contemporary towns or cities. Today half of Taiwan's towns and cities with over 100,000 population were former walled towns. Among the fourteen largest cities with over 150,000 population, only three (Kaohsiung, Chilung, and San-chung) were not former walled towns. This continuity reflects the fact that the original walled towns often were located at strategic points and normally occupied major nodes in the emerging transportation

## CHINA'S ISLAND FRONTIER

TABLE 7-4  
*Administrative Divisions and Walled Towns*

Administrative Division	Year Established	Seat	Year Town Wall Built
<i>T'ai-pei Fu</i>		T'ai-pei	1879
Tan-shui <i>hsien</i>	1875	Meng-chia	not built
Hsin-chu <i>hsien</i>	1875	Chu-ch'ien	1825
I-lan <i>hsien</i>	1810	Wu-wei	1810
Chi-lung <i>t'ing</i>	1875	Chi-lung	not built
Nan-ya <i>t'ing</i>	1894	Nan-tzu	ca. 1855
<i>T'ai-wan Fu</i>		T'ai-chung	(see <i>T'ai-wan hsien</i> )
<i>T'ai-wan hsien</i>	1886	T'ai-chung	1888
Chang-hua <i>hsien</i>	1723	Pan-hsien	1728
Yun-lin <i>hsien</i>	1886	Tou-liu-men <sup>a</sup>	1893
Miao-li <i>hsien</i>	1886	Miao-li	not built <sup>b</sup>
P'u-li-she <i>t'ing</i>	1875	P'u-li	1878
<i>T'ai-nan Fu</i>		T'ai-nan	1723
An-p'ing <i>hsien</i>	1886	An-p'ing	not built
Feng-shan <i>hsien</i>	1684	Feng-shan <sup>c</sup>	1854
Chia-i <i>hsien</i>	1684	Chia-i	1704
Heng-ch'un <i>hsien</i>	1875	Lang-ch'iao	1875
P'eng-hu <i>t'ing</i>	1727	Ma-kung	1887
<i>T'ai-tung Chou</i>			
P'i-nan <i>t'ing</i>	1886	P'i-nan	not built
Hua-lien-kang <i>t'ing</i>	1886	Hua-lien-kang	not built

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a It was originally at Lin-i-pu and later moved to Tou-liu-men in 1893.

b Only a palisade was erected in 1890.

c Originally, it was at Hsing-lung-chuang, whose wall was built in 1722.

*SOURCE: Chiang Tao-chang, "T'ai-wan te ku-ch'eng" [Walled towns of Taiwan], Ti-li-hseuh yen-chiu [Geographical studies] 1(1966):72.*

*TABLE 7-5  
Distribution of Traditional Academies and Confucius Temples*

Major Walled Towns	Number of Traditional Academies	Number of Confucius Temples
Ko-ma-lan	1	1
Taipei	3	1
T'ao-yuan	0	0
Hsin-chu	1	1
Taichung	1	1
Chang-hua	1	1
Tou-liu	1	0
Chia-i	1	1
Tainan	7	2
Feng-shan	1	1
Heng-ch'un	0	1
Ma-kung	1	1
TOTAL	18	11

*SOURCE: Lien Heng, T'ai-wan t'ung-shih [A history of Taiwan] (Taipei: 1958). pp. 196-209, 218-221.*



*Figure 7-15. Heng-ch'un.*

network. Chapter 9 of this book analyzes the changing accessibility and connectivity of urban centers as the road and rail networks expanded.

If a place had a wall, it would grow faster than neighboring settlements which had no protection. When the walled space was filled with buildings, though, the wall itself often limited further growth. In the subsequent development of a town, the wall affected the shape of its built-up area and the pattern of gates determined the direction of main streets, secondary streets, and lanes. Thus the wall and its gates determined the town's street pattern; and when a town expanded beyond its wall, the new street pattern started at the gates.<sup>66</sup> This evolution still can be observed at Heng-ch'un, whose town wall is the best preserved on the island (Figure 7-15).<sup>67</sup>

Most of the major town walls in Taiwan were torn down during the Japanese occupation. The former sites of these walls in I-lan and Taipei provide broad encircling boulevards quite unlike the maze of internal streets. In most cases, the gates which were preserved became traffic circles and form islands of safety in the streets. Such gates stand in several of Taiwan's cities, among them Taipei, Hsin-chu, and Tso-ying, where they are impressive landmarks of times gone by.

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Although the first Chinese landed in Taiwan in very early times, then, it was not until the eighteenth century, after Chinese agricultural colonization had become well established, that serious wall building was undertaken in towns and cities. This activity then continued well into the late nineteenth century. Walled towns formed foci which spread Chinese culture throughout the island and symbolized the passage of the Chinese frontier.

## 8

# Lu-kang: A City and Its Trading System

*DONALD R. DEGLOPPER*

The city of Lu-kang, halfway down the west coast of Taiwan in Chang-hua *hsien* (county), is today an out-of-the-way small city of about 28,000 people.<sup>1</sup> Yet for more than a hundred years, from the mid-eighteenth century to the last quarter of the nineteenth century, Lu-kang was Taiwan's second largest city, the home of wealthy merchants and degree holders. Both its rise and its precipitous decline in the first decade of the twentieth century were consequences of its location and its function as the node of a large-scale trading system that linked central Taiwan with southern Fukien. Any attempt to understand Lu-kang's history requires examination of factors common to all of Taiwan and Taiwan's relations with the Chinese mainland. In the last analysis Lu-kang's prosperity and indeed its very existence depended on a trading system that exchanged the rice, sugar, and fiber (hemp, ramie) of central Taiwan for the cloth, crockery, and other manufactured goods of southern Fukien.

### *THE MAKING OF A PORT*

From the earliest substantial Chinese settlement of the island under the Dutch East India Company until the end of the nineteenth century, Taiwan may be considered an agricultural colony of Fukien. Fukien was importing rice by the end of the eleventh century; by the seventeenth, it was a province with a chronic rice deficit.<sup>2</sup> Its people increasingly turned to the production of such high-value commercial crops as sugar, oranges, and tea, to the manufacture of textiles and ships, and to foreign trade and sojourning outside the province.<sup>3</sup> The attraction of Taiwan, so close offshore, is obvious, and the surprising thing is that the island was not colonized and settled earlier than it was. From its beginning under the Dutch, Chinese agriculture

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on the island was commercial and export oriented. Land on Taiwan was commonly opened up by development companies who brought in tenant farmers, and the capital for land development and the construction of irrigation systems often came from the merchants of southern Fukien. By the mid-eighteenth century the imperial garrisons in Fukien were fed largely on Taiwanese rice, and each county on the island had an annual quota of rice that went to the mainland both to feed the army and to stock the official granaries.

There were, however, many obstacles to the trade, and the regional trading system linking central Taiwan with southern Fukien depended on a number of factors, the most important of which were the efficiency and relative cost of land transport in Taiwan and water transport across the Taiwan Straits. When these changed around the turn of the twentieth century, the system collapsed, and with it went the foundation of Lu-kang's economy.

Although with a fair wind junks could cross the Taiwan Straits in a day or a day and a half, navigation in the straits was difficult and hazardous.<sup>4</sup> The straits are shallow; they are subject to gales in winter and typhoons in summer; and strong currents run through them. In the seventeenth and eighteenth centuries they were haunted by pirates and the shoal coasts were lined with wrecks.<sup>5</sup> An edition of the *T'ai-wan hsien-chih* from the Tao-kuang period (1821-1850) reports that if lookouts on ships sailing from Amoy did not sight the Pescadores Islands at the expected time, the junk would turn about and return to Amoy, fearful that it might be off course and in danger of missing Taiwan entirely.<sup>6</sup> An article in the *Chinese Repository* of 1834 noted of the junk trade in the Taiwan Straits that:

The currents in the channel are very strong, so that unless the wind be fair, Chinese vessels cannot bear up to regain their course; and in passing from Fukheen to Formosa they have often been driven so far to the south that they could not reach their destination, when not infrequently they bring up at Cochin China or Siam, there to wait a change of the monsoon.<sup>7</sup>

The 1937 edition of the *China Sea Pilot* advises ships sailing off the southwest coast of Taiwan to "exercise the utmost caution when navigating this channel." (The channel between the shoals off the Pescadores and the shoals off the coast of Taiwan is only 9 miles wide.) It goes on to warn ships to avoid the mouth of

the Cho-shui River, Taiwan's largest. "Although the entrance to this river is about one mile broad, it is impossible for even small boats at high tide to pass over the flats off its mouth."<sup>8</sup>

There are no natural harbors along Taiwan's west coast between Tamsui (Tan-shui) in the extreme north and Kaohsiung in the south. The coast is low, flat, and bounded by tidal flats, sandbars, and ephemeral islands that extend several kilometers out to sea. The coastline moves out each year as rains wash silt down from the central mountains, and at the mouth of the Cho-shui in central Taiwan the coast moves out several meters a year.<sup>9</sup> The mouths of most rivers are blocked by sandbars, and the configuration of offshore mud flats, sandbars, and islands changes from year to year. Shipwrecks have been frequent, and Davidson's *The Island of Formosa* (1903) provides a long list of foreign vessels that met their end along this shore.

A western traveler in nineteenth-century China watching cargo being transshipped and hauled up the rapids of mountain streams remarked that Chinese commonly shipped goods on waters that no European would consider navigable, and one might add shipping along Taiwan's west coast as another example. Cargo was carried across the straits on small ships of very shallow draft, whose fitness for their task was aided by the flat bottom and retractable rudder common to all Chinese junks. The British merchant and consular official W. A. Pickering, who spent much of the 1860s sailing along the west coast of Taiwan in small craft, mentions tracking and poling small ships along a channel between the sandbanks, and the procedure appears to have been a routine response to adverse winds.<sup>10</sup> Davidson reports that during the French blockade of Taiwan in 1885 junks crossed the straits at night and then sailed along the channels between the offshore sandbanks and islands where the French gunboats could not follow.<sup>11</sup> In both the anchorages and the channels approaching them junks frequently grounded at low tide, and extensive use was made of bamboo rafts for transporting both people and cargo along the coast.<sup>12</sup>

Inland transport was even more difficult. As in the rest of South China, roads and wheeled transport were poorly developed; the most common means of transport was the human carrier, with ox carts serving in some areas. Taiwan differed from South China in that its rivers were nearly all unnavigable. The rivers that meander across the southwestern coastal plain are shallow and swift with wide stony beds, and their volume of water fluctuates wildly with rainfall. Before they were confined by massive dikes, they frequently flooded whole sections of the

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plain and changed their courses, making new beds and flowing into the sea miles away from their old mouth. Furthermore, the many rivers that cross the plain made movement of goods to the north or south arduous indeed. Banditry and endemic subethnic strife made the roads dangerous as well as hard to travel.

In the late nineteenth century one road, maintained for administrative purposes and known to Europeans as the Mandarin Track, ran from the port of Tamsui in the north to Tainan, the island's capital. Colquhoun and Stewart-Lockhardt described it in their "Sketch of Formosa" (1885):

A track, made for military and administrative purposes, runs from north to south on the western side of the island. The distance from Tamsui to Tainan, some 200 miles, takes in ordinarily fair weather ten days on foot, while in bad weather it is impassable. The "road" passes along paths a foot or less broad, through paddy fields, following here and there a local cart track, and then leaving it again. These cart tracks become during the rainy seasons water channels draining the surrounding country. To cross them the foot passenger has often to wade up to the waist.... The least time in which an official answer can be received in Tamsui from the capital in the south is fourteen days, while it often takes several weeks.<sup>13</sup>

Takekoshi, a native of a country never famous for the quality of its roads, complains that when the Japanese occupied Taiwan in 1895:

It was impossible to find anything like a state or government road from town to town.... Even the country roads which ran from village to village were not like those of Japan, but were rather boundary lines around the farms, being in most cases little more than a foot wide.... Our army experienced so much difficulty from the absence of roads that they were compelled to widen them wherever they passed.<sup>14</sup>

Under these circumstances, the best thing to do with goods was to get them to the coast as directly as possible, whence they could be moved by bamboo raft or small boat to some spot where it was possible for a junk to approach at high tide. Although virtually all of Taiwan's major walled towns were located on inland sites, the coast itself was lined with port and market towns sited wherever a tidal lagoon or small river mouth afforded relatively safe anchorage for some part of the year.

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Each port and market town had its own marketing territory stretching back to the hills and overlapping to only a limited degree with that of other towns. Rather than the overlapping, nested hexagons that G. W. Skinner employs as a model of the marketing structure and city trading systems of much of the Chinese mainland, one might describe the west coast of Taiwan before 1900 with a segmentary model.<sup>15</sup> To some extent it resembles the pattern Skinner describes for the upper reaches of rivers, as in western Szechuan, where the cities were not located in the geographic center of their trading system but were offset or even sited at the edge.<sup>16</sup> In economic and social terms, though not in an administrative sense, the Taiwan of that period might be thought of not as a single island but as an archipelago—an aggregation of similar regions, each of which had more contact with Amoy (Hsia-men) and Ch'uan-chou across the straits than with the other Taiwanese segments. The earliest settlers and officials commented not on how small the island was, but on how vast it was, and they consistently overestimated its size. Settlers in one region looked back to the mainland and their native places rather than to other parts of Taiwan. In fact, the general use of the term "island" for the place and "islander" or "Taiwanese" for the inhabitants dates only from the Japanese period.<sup>17</sup> One can question whether Taiwan had a central place in any but the administrative sense before the Japanese built a road network and the railroad. (The railroad running from Chi-lung to Kaohsiung was completed in 1908.)

### *A SURGE OF GROWTH*

Such was the context in which Lu-kang grew and prospered. As seaports go, it was never very good. Lu-kang was used for two centuries only because there was no better way to move goods out of and into the Chang-hua plain. Built on the northern bank of one of the many small streams that cross the plain, Lu-kang provided a sheltered anchorage. The Chang-hua plain, bounded by the Ta-tu River on the north and the Cho-shui River on the south, has some of the best soil on the island, a more reliable water supply than the plain farther south, and a longer growing season than northern Taiwan. Today it produces two rice crops a year, with an additional winter crop of wheat, flax, or vegetables. Since its settlement in the early eighteenth century it has been one of Taiwan's major rice-producing areas.

Lu-kang lies in a narrow littoral strip that receives less rain than anywhere else on the island. The soil around the city is for the most part fertile enough, but low rainfall and high winds make agriculture and especially rice cultivation a difficult task. Rice cultivation along the entire coastal plain must rely on irrigation for dependable yields, but the problems are most acute along the dry and windblown coast. Rice can be grown with least effort further inland, along the edge of the hills, where rainfall is higher and the wind, which damages standing crops and increases evaporation, is less strong. Even today the area along the coast, and especially that to the south of Lu-kang, remains one of relatively sparse population and low living standards: sweet potatoes are the staple and people eat rice only on special occasions. Lu-kang's immediate hinterland is thus a poor, thinly settled, and relatively unproductive region (Figure 8-1).

At the beginning of the eighteenth century Lu-kang was a minor river mouth port on the northern fringes of Chinese settlement. The *Chu-lo hsien-chih*, compiled in 1717, records that a coast guard post was established at Lu-kang in 1685, soon after the Ch'ing authorities occupied the island. The troops were coast guards and their duties were to deny pirate ships the use of the harbor and watch for corsairs and commercial ships making unauthorized and untaxed voyages across the straits.<sup>18</sup> The *Chu-lo hsien-chih* fails to include Lu-kang in its list of towns and villages, but the gazetteer does note that: "At Lu-kang Port there is a large fishing platform which can contain sixty or seventy men. In the winter they net fish. Merchant ships come and carry off fiber [*ma*], grain, and beans."<sup>19</sup> The port of Pen-kang (the present Pei-kang), 60 kilometers south and close to the *hsien* capital (the present city of Chia-i) is described as a flourishing commercial center.

The subsequent growth of Lu-kang and its trade until it far surpassed Pen-kang took place in the fifty-year period between 1730 and 1780. The fundamental reason for that growth was the settlement of the Chang-hua plain and the production of an exportable surplus of rice and sugar. This process began in the early 1700s and was greatly aided by the construction of the massive Pa-pao irrigation system, which was completed in 1719. This system, which took water from the Cho-shui and irrigated eight of the thirteen *pao* (sub-*hsien* administrative units) of Chang-hua *hsien*, was built as a private venture by a Ch'uan-chou merchant.<sup>20</sup> In 1723 Chang-hua *hsien* was formally established, taking in the northern portion of the existing *hsien* of

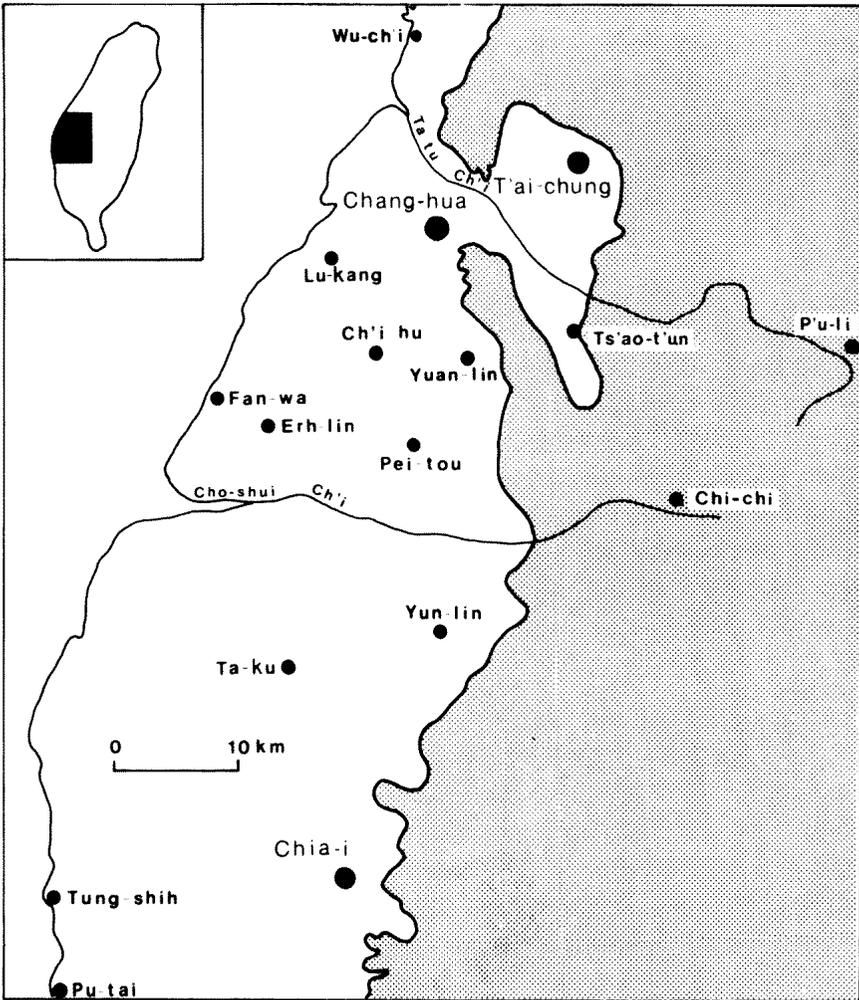


Figure 8-1 Lu-kang and its hinterland.

Chu-lo—an administrative response to the growing population and prosperity of the area. The *hsien* seat was placed 12 kilometers inland from Lu-kang at the site of a military post on the road to the north.

When the *Chu-lo hsien-chih* was compiled in 1717, Lu-kang's harbor was narrow and choked with silt and the main coast guard station had been moved 20 kilometers south to San-lin-kang. During the Yung-cheng period (1723-1736), large ships

could enter the channel leading to Lu-kang only at high tide, and even then they could not reach the city. The outer channel through the sandbanks was 40 *li* in length (assuming 1 *li* to equal about one-third of a mile, then 13 miles or 22 kilometers), and if one did not know the channel's course, one did not dare enter.<sup>21</sup> By about 1740, however, all the other ports of central Taiwan were so badly blocked by silt as to be useless whereas Lu-kang harbor had become broad and deep. Consequently, it became the major port for all of central Taiwan and maintained this position for over a century in spite of later silting and blockage.

In 1729 the *hsien* government established an official granary at Lu-kang to store the tax grain that was to be sent to Fukien. In 1731 the authorities of Fukien province declared Lu-kang to be a port legally open for trade along the coast of Taiwan and posted a minor official to supervise that trade.<sup>22</sup> In 1742 the *T'ai-wan fu-chih* recorded that "Lu-kang has docks and is a grain exporting center" The 1763 edition noted laconically that "small ships of the island trade at Lu-kang" In 1774, when the city's trade and population had grown considerably, Chu Ching-ying's *Record of the Eastern Sea* said: "Lu-kang is a port where many small ships come and go to trade. It has several thousand households; sails and masts crowd together; brokers and wholesalers are settled there."<sup>23</sup>

The entrance to the channel that led through the offshore sandbanks to Lu-kang was 15 or 20 kilometers south of the city, near the settlements of Fan-wa or Wang-kung. The course of the channel changed from year to year, as did its depth. From the early nineteenth century on, Lu-kang struggled with the silt that blocked the channel and the harbor. The *Chang-hua hsien-chih*, compiled in 1832, says that Lu-kang harbor was blocked with sand but the obstruction was not constant. "Sometimes it is deep, sometimes it is shallow. When it is deep, large ships enter; when it is shallow, only small ships dare enter"<sup>24</sup> The channel could only be entered if ships had a favorable wind; from late October through March, when gales howl down the straits from the north, the port was closed. During the 1860s the Cho-shui repeatedly flooded and changed its course and, before long, one of the main channels flowed into the sea only 7 kilometers south of Lu-kang. A small delta appeared in what had been called Lu-kang Bay, and silt choked all the channels leading to the city from the south. A new anchorage was developed in a creek

mouth 6 kilometers north of Lu-kang, but it was shallow in the extreme and could only be reached at high tide. The *China Sea Directory* of 1884 describes the approach to Lu-kang:

From Quang-wa [Fan-wa] to Lo-kiang [Lu-kang], a distance of ten miles, the coast continues low. This uninteresting seaboard becomes even more dreary at low water, when the mud and sand flats uncover for miles, outside of which again is shallow water with three, four, and five fathoms. Ships should not approach this coast in less than ten fathoms, for the currents are very strong.... To the westward of the town of Lo-kiang and distant a little less than four miles is a small outlet marked by two bamboo beacons; in this creek a great number of junks find anchorage and shelter, but most of them ground at low water. They communicate with Lo-kiang, which is a large, straggling town, by boats and land.<sup>25</sup>

The Japanese *Report on Economic Conditions*, published in 1905, substantially repeats this description, adding that ships carrying up to 300 *shih* (300 piculs, about 20 tons) could enter at high tide with difficulty; low tide there was no water at all. Goods went to and from Lu-kang on bamboo rafts.<sup>26</sup> Such was the premier port of central Taiwan.

### *THE PORT IN ITS PRIME*

The trade across the straits was also subject to official control and regulation, and Ch'ing administrative policy had a direct and significant effect on Lu-kang's commerce and general prosperity. In order to discourage piracy, restrict overseas trade, and prevent illegal emigration, the government in the early eighteenth century attempted to limit the size of ships and their numbers constructed in Fukien. Each ship was to be licensed by the authorities; all crew members were to be registered. In the eighteenth century there were prohibitions on the shipment of certain articles between Taiwan and the mainland. Iron was not to be imported to Taiwan lest the inhabitants use it to make weapons. Ships leaving Taiwan were forbidden to carry more than 60 *shih* of rice, so that the island's inhabitants could be assured of a sufficient supply. It is doubtful that the regulations were actually obeyed, but their existence and the threat of enforcement gave officials an excuse to extort bribes from merchants and shipowners as well as an incentive to keep track of ships.<sup>27</sup>

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The officials attempted to control sea traffic not only by licensing ships and their crews but by permitting trade only at certain ports and allowing voyages only between certain points. Ocean trade was to be reduced to fixed routes like canal traffic. Thus in the early eighteenth century there was only one legal route between Taiwan and the mainland: from Tainan (An-p'ing) to Amoy. Military and civil officials at both ends inspected ships, passengers, and cargo and placed their seals on the appropriate certificates and manifests.<sup>28</sup> To ship rice from Lu-kang to Ch'uan-chou, for example, it was necessary to load the rice on a coasting vessel at Lu-kang and sail down to Tainan. There the rice would be inspected, certified, and perhaps be transshipped to a larger vessel. It would sail to Amoy, there go through customs, and then be shipped up the coast to Ch'uan-chou. There was a temptation to avoid such fuss and expense and to sail directly to one's ultimate destination without going through official channels. Such voyages were "illegal crossings." As the Chinese frontier moved northward in Taiwan during the eighteenth century, illegal crossings became more and more frequent. A series of apparently ineffective edicts command officials in Taiwan and Fukien to enforce the rules and denounce the corruption that permitted the flourishing illegal trade.<sup>29</sup> One of the early eighteenth-century editions of the *T'ai-wan fu-chih* says:

Various small craft set out from such northern ports as Pen-kang and Lu-kang, and, taking advantage of the south wind, cross over to Amoy and Ch'uan-chou. Going from west to east they cross directly to the north of the Pescadores. This is called the passage to the west. It is most strictly forbidden, but they flock to danger like ducks to the water.<sup>30</sup>

A thriving and technically illegal sea traffic between southern Fukien and the recently settled areas of central Taiwan grew up in the course of the eighteenth century. The restriction of sea traffic to the route between Tainan and Amoy, a reasonable arrangement in the 1680s and 1690s when Chinese settlement was limited to the area around Tainan, became increasingly irrational as the rest of the island was settled. The requirement that everything be shipped from Tainan to Amoy not only inconvenienced merchants and caused higher prices for legal grain and goods in Fukien and Taiwan; it also interfered with the army's grain supply. The policy could only be changed by the central administration in Peking, and it is likely that the

officials on both sides of the straits who were profiting from the squeeze on the direct trade opposed any change in the regulations.

As early as 1758 the governor of Fukien requested permission from Peking to open a legal route between Foochow and Tamsui. He cited the transport cost of the rice ration, but his request was turned down.<sup>31</sup> In 1784 the commander-in-chief of the forces in Fukien suggested that Lu-kang be made a legal port for sea trade linked with the port of Han-chiang on Ch'uan-chou Bay. He wanted to put the stamp of legality on existing practices, eliminate corruption, provide a new source of revenue, and reduce the cost of shipping rice. He argued:

Fukien's Ch'uan-chou and Chang-chou are short of rice, and depend on rice from Taiwan. Merchant ships go from Amoy to Tainan and back, being inspected by the subprefects in charge of ocean traffic. But many make illegal crossings from other ports. Last year the Fukien Commander-in-Chief exerted himself to apprehend the criminals who make illegal crossings. Most of them came from Han-chiang in Ch'uan-chou, there being over twenty ships from there captured. The legal route is the southern one from Amoy to Tainan, but a northern route from Lu-kang directly over to Han-chiang also exists, and is much more convenient. So, many merchants are making great profits on illegal voyages over the northern route. I suggest that, taking the southern route from Amoy to Tainan as an example, a legal route be established between Lu-kang and Han-chiang and officials be posted to supervise it. This would benefit the common people; men would not be led into crime; and crafty men would no longer benefit from corrupt practices.<sup>32</sup>

His suggestion was accepted by the court, and Lu-kang and Han-chiang were made legal ports for direct trade, as were Tamsui and Foochow in the north. A yamen was built in Lu-kang for the subprefect (*t'ung-chih*) who was posted to the city to oversee the trade. Lu-kang, which had been prospering on the illegal trade, now boomed on legal commerce. The sixty-year period from 1790 to 1850 was its golden age and the peak of its prosperity. During that period it was the second city of the island and the economic center for all of central Taiwan.

In 1787 the great Lin Shuang-wen uprising broke out in Chang-hua *hsien*. It was finally put down when Fu K'ang-an, a high-ranking Manchu general who had previously quelled rebellions in Mongolia and Nepal, landed a large army at Lu-kang.

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After the rebellion was put down the governor-general of Fukien suggested to the imperial court that the seat of Chang-hua *hsien* be moved to Lu-kang. He pointed out the strategic value of Lu-kang, which, having no wall, could be easily captured by rebels who could then deny the port to mainland armies. "Fortunately Lin Shuang-wen and his fellows were all mountain brigands who, though they knew enough to attack walled cities, were not smart enough to seize the seaports. Therefore our officials were able to set sail and land on Taiwan." The governor-general goes on to denigrate the *hsien* seat (the present Chang-hua City):

The present seat of Chang-hua *hsien* is twenty *li* distant from Lu-kang. It does not border the mountains; there are no water communications to it; it is really not at all the sort of place to establish a *hsien* city. If the seat of the county were moved to Lu-kang and high civil and military officials stationed there, then in times of peace they could command the areas to the north and south, and information could be easily gathered. In times of disturbance the port could be guarded and held to ensure access to the interior. Lu-kang and Lu-er-men [the port of Tainan] would thus serve as pivots to the door, that is, as key points for the control of Taiwan.<sup>33</sup>

The suggestion, which was to be revived again and again during the nineteenth century, was turned down by the court. Lu-kang remained a commercial city without a wall. But the court does seem to have responded to the military arguments, for in 1789 it stationed a battalion (*ying*) with a paper strength of 708 troops in a mud-walled fort overlooking the harbor.

By 1789 Lu-kang, while not the walled county seat, was the residence of three imperial officials, two civil and one military, all of whom were stationed there because of its importance as a commercial center and strategic value as the main seaport of central Taiwan. The resident officials collaborated with the city's mercantile elite, who were organized into the Eight Guilds, and it is likely that Lu-kang's official status as a legal port and the vested interests of its officials and merchants played some part in maintaining its preeminent position throughout the nineteenth century in spite of its progressive deterioration as a seaport.<sup>34</sup> While the site of the region's main seaport in the early and mid-1700s was determined entirely by topographical and economic considerations, once a legal and administrative structure was involved it acted along with the vested interests of the city's elite to inhibit the development of a new port at some more suitable site. In fact as late as

1887, when the harbor was seriously blocked by silt and Lu-kang's trade and prosperity were already declining, twenty-two members of the Lu-kang gentry, including one *chih-shih* who had served as a district magistrate in Kwangtung, submitted a petition to Governor Liu Ming-ch'uan urging him to choose Lu-kang as the site for the capital of the newly established Province of Taiwan. Governor Liu was not impressed by the petition and rejected it, replying that Lu-kang's altitude was too low and its harbor too shallow. The petitioners, he said, were acting with the selfish commercial interests of Lu-kang in mind, rather than the best interests of the government of Taiwan. Finally, as a geomantic site Lu-kang was clearly not suitable for a provincial capital.<sup>35</sup> Instead, he decided to build his new capital on open ground on the site of the present city of Tai-chung, but lack of funds forced him to retain the seat of government at Taipei.

In the nineteenth century Lu-kang's population was most probably somewhere between 10,000 and 20,000 people. The first accurate figures on its population are those collected by the Japanese after their occupation of Taiwan in 1895. The *Report on Economic Conditions* gives figures on Lu-kang's population from 1896 to 1902. In 1896 it was 20,420. This figure dropped to 17,334 in 1897 but from then on it increased until there were 19,165 people in the city in 1902. In 1896 it was Taiwan's fourth largest city, ranking after Taipei, Tainan, and Chia-i.<sup>36</sup> In its prime it was a compact huddle of brick and tile houses interspersed with large yamens and elaborate temples, all rather arbitrarily set down among the sweet potato fields and mud and thatch villages of the windswept Chang-hua coast.

### *LU-KANG'S MAIN TRADING SYSTEM*

It is useful to think of Lu-kang's economic functions in terms of three related but distinct trading systems. The first, and most important, was the large-scale system embracing central Taiwan and southern coastal Fukien. Ultimately this system depended on Fukien's demand for Taiwan's surplus rice, on Taiwan's demand for Fukien's timber and manufactured goods, and on the inefficiency of land transport in both central Taiwan and coastal Fukien. The *Chang-hua hsien-chih* says of Lu-kang's trade that:

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Chang-hua and Ch'uan-chou are opposite each other. Lu-kang is the most important place for the commerce of the Ch'uan-chou and Amoy Guilds. The ships from Ch'uan-chou and Amoy come to carry rice, sugar, oil, and miscellaneous other goods to Han-chiang and Amoy. Lately small ships from Shen-hu and T'a-k'u [small ports on Ch'uan-chou Bay] have been coming to Lu-kang to buy rice, wheat, cattle bones, and such things. They carry them to Kwangtung, Macao, Che-lin, and other ports. They buy the mixed goods of Kwangtung along with salted and dried fish and bring them back to Lu-kang. These are called the "south ships."<sup>37</sup>

A later section of the *hsien-chih* adds that ships came from the Pescadores with salt fish and seafood and returned thence with rice, oil, and melons. Some ships carried sugar to Shanghai and Tientsin, but there were not as many of these "sugar ships" as there were sailing from Tainan. The section of the *hsien-chih* on sea routes notes that Lu-kang had no North Guild. Moreover, few ships from Lu-kang went up to the coast of central or northern China and Lu-kang's subprefect asked the ships of the Ch'uan-chou and Amoy Guilds to carry rice to Tientsin. They were rewarded by being allowed to carry cargo back without paying taxes on it. Such distant journeys remained rare, however. The bulk of Lu-kang's trade was the direct transport of rice to Ch'uan-chou, one day's sail across the straits.

European travelers of the early nineteenth century note the importance of the Taiwan trade for Amoy and Ch'uan-chou. Hugh Lindsay, an agent of the British East India Company who voyaged up the coast of China in 1832 to ascertain the prospects for trade, remarked of Amoy: "The district in which this flourishing town is situated is one of the most barren in all China, and consequently yields nothing for export. It is dependent, even for the necessities of life, on the neighbouring island of Formosa, which is most aptly described as the granary of the eastern coast of China."<sup>38</sup> The Reverend Charles Gutzlaff, a missionary who had learned Hokkien dialect in Thailand, accompanied Lindsay and says of Amoy: "In proportion as the adjacent island, Formosa, has been colonized and yielded export produce, sugar, rice, and camphor, Amoy has increased in wealth and importance.... Without Formosa the population hereabout would be starved; for the greater part of the supplies of rice come from that island."<sup>39</sup> An anonymous report in the *Chinese Repository* of January 1838 says: "Many parts of the op-

posite shore of Fukheen are so barren that without the aid of the oil cakes from Formosa, used in manuring the sandy hills, even the sweet potato could not be produced."<sup>40</sup>

The ships that came to Lu-kang were fairly small junks, carrying about a hundred tons of cargo. The largest ships came from Amoy; those from the ports around the shallow Ch'uan-chou Bay were smaller.<sup>41</sup> The information I have been able to find on the junk trade in the Taiwan Straits is far from complete, but it seems that most of the ships were built in Fukien and were owned by wealthy mainlanders. J. D. Clark, a British employee of the Chinese Maritime Customs, reported that most of the junks coming to the treaty ports of An-p'ing and Tamsui in the 1880s and 1890s averaged about a thousand *shih* (66.5 tons) in capacity. He notes that: "Owing to the scarcity of wood and the high price of labor here [An-p'ing], the vessels are built on the mainland, where the owners dwell"<sup>42</sup>

In the second half of the nineteenth century Lu-kang's total share of Taiwan's trade and its relative importance in the island's economy had begun to decline. This was not so much the result of an absolute decline in the volume of trade at the city, though that may have been the case, as of the economic growth of the northern part of the island and changes in Fukien's rice trade. The last quarter of the century saw the development of the tea industry in northern Taiwan. Foreign firms, primarily British, set up establishments in Taipei, and the Japanese began exporting such manufactured goods as textiles and matches to Taiwan. Taipei grew rapidly, and labor in the northern third of the island was so scarce that tea pickers had to be brought in from Fukien each year.

Lu-kang's primary export had always been rice, but the rice trade appears to have fallen off by the end of the nineteenth century. As Taiwan's population grew, more rice was consumed at home by the city dwellers, tea pickers, and coal miners of the north. Fukien did not suffer, for it was able to import rice from Southeast Asia at a lower price. Colquhoun and Stewart-Lockhart, writing in 1885, note that: "The export of rice from the island has dwindled down until it has almost ceased.... Rice can be brought cheaper from Indo-China." They also reported: "The native junk trade has in some measure decreased, owing to the introduction of the foreign steamer. The greater portion of the junk trade is with Chinchew [Ch'uan-chou], a port situated a short distance north of Amoy."<sup>43</sup> H. B. Morse, commissioner of customs at Tamsui, reported in 1892 that rice had actually been imported to Taiwan from 1882 to 1891. "Rice

was in former years exported from Formosa in large quantities, mainly of course by junk. Even now the movement inward or outward of this bulky commodity is effected to a large degree in native craft."<sup>44</sup>

Since no steamship of even moderate size could get anywhere near Lu-kang or safely enter the shallow Ch'uan-chou Bay, the junks sailing in and out of Lu-kang were not directly threatened. But Lu-kang's trade with the mainland was challenged indirectly when large steamships were able to bring rice from Southeast Asia more cheaply than it could be shipped over from Taiwan in small junks. And any improvement of land transport, even in Fukien, directly threatened Lu-kang. The city functioned as a port—in spite of silt, tidal flats, the necessity of employing gangs of porters and longshoremen to load everything into small ships by hand, and the danger of shoals and storms in the straits—only because there was no better way to move things into and out of the Chang-hua plain.

The only available figures on Lu-kang's trade and population are those published by the Japanese colonial government, and it is not clear whether the city the Japanese found in 1895 had declined or changed in any major way since the middle of the nineteenth century. The only figure I have found is a statement, most likely quoted from a Japanese source, that in the early years of the Hsien-feng period (1851-1862), just before the long decline began, over 3,500 ships came to Lu-kang each year.<sup>45</sup> In 1896 the Japanese customs authorities counted 1,051 ships coming to Lu-kang, though that number declined to 515 in 1897 and 229 in 1900.<sup>46</sup> This looks like quite a drop in the last half of the century. But the Japanese totals probably do not include the coastal trade; the Japanese customs levies and the less corruptible Japanese civil service encouraged smuggling. According to residents of Lu-kang today, the city used to be a major center for opium smuggling, and it is likely that many ships landed goods, especially opium, near Lu-kang without being counted.

By the end of the nineteenth century the trading system linking central Taiwan and Ch'uan-chou and Amoy was already declining, as the rice trade dwindled and Japanese imports began to replace Fukienese cloth. Under the Japanese the commerce between Taiwan and Fukien dwindled yet further, and the trade of Lu-kang, by then only a minor junk port, was practically extinguished. The Japanese built roads and the railroad, and hence made it possible to move goods into and out of the Chang-hua plain more cheaply than they could be shipped

through Lu-kang's silt-choked harbor. The colonial government developed Chi-lung (Keelung) and Kaohsiung (then known as Takao) as modern, deep-water ports, served by direct rail lines and equipped to load large steamships, while Lu-kang remained a haven for small junks. Since the Japanese pursued a policy of integrating Taiwan's economy with that of their own country, most of the island's trade was with Japan. Direct trade between Taiwan and southeastern China was discouraged by tariff barriers, preferential treatment for Japanese companies, and monopolies of essential consumer goods by the colonial government. Taiwanese farmers sent their rice and sugar to Osaka and Tokyo by Japanese steamships that sailed from Chi-lung and Kaohsiung and bought cloth and hardware that came from the factories of Japan rather than the small workshops of Fukien. The entire pattern of trade shifted. Lu-kang was bypassed and left high and dry in not only a metaphorical sense.

The number of ships coming to Lu-kang fell off from 1,051 in 1896 to 220 in 1900; by 1910 the number had dropped to 61. In 1897, 5.4 percent of Taiwan's trade by value went through Lu-kang; in 1900, 2.5 percent went through Lu-kang; in 1910, only 0.3 percent. In 1900, 2,413 junks came to Taiwan, 229 of them to Lu-kang; in 1910, 1,100 junks came, 61 of them to Lu-kang. Half the junk trade went through Tamsui, An-p'ing, and Chi-lung, which took more than half the tonnage, indicating that the larger junks traded there. The rest of the junk trade was mainly with Kaohsiung and the five minor ports of the west coast: Chiu-kang, near Hsin-chu; Hou-lung, near Miao-li; Wu-ch'i, near Taichung (the site of the present Taichung Port); Lu-kang; and Tung-shih Kang, near Chia-i. In 1900, 35 percent of Taiwan's imports arrived by junk, with 7 percent of the total junk tonnage landing at Lu-kang. In 1910, only 5.7 percent of Taiwan's imports came by junk, and only 4 percent of that junk tonnage landed at Lu-kang. In the fourteen years from 1896 to 1910 Lu-kang's trade with Fukien dropped precipitously, thereafter remaining at the same low level until it dropped off once again in the 1930s and ceased entirely with the outbreak of war between China and Japan in 1937.<sup>47</sup>

During the nineteenth century Lu-kang's main export was rice and the main import was cloth. The cloth was dyed in Lu-kang, and the city had both a cloth guild and a dyer's guild. The Japanese colonial government's annual returns of trade provide exhaustive lists of all goods exported and imported through Lu-kang. Between 1900 and 1920 the main export was ramie, sometimes called China grass, a plant whose fibers can

be used to make a light and sturdy cloth. Rice was also exported, though the amounts fluctuated widely from year to year. Lu-kang also exported, in small quantities, such agricultural produce as linseed, dried fruit, turmeric, indigo, wheat, oil cakes, cut rattan, and rice paper. The main imports were, in order: cloth made of cotton mixed with ramie; worship paper (mock money, made of paper and tinfoil, used extensively in Chinese ritual); oil cakes (used as fodder and fertilizer); cotton cloth; ramie cloth; and hemp sacking. Small quantities of such Chinese goods as ginseng; herbs and medicines, cloth shoes, tiles, incense, pottery, and fireworks were also imported.<sup>48</sup>

### LU-KANG'S SECOND TRADING SYSTEM

The second trading system was along the coast of Taiwan and inland from Lu-kang—an area embracing the present Chang-hua *hsien*, most of the present Nan-t'ou *hsien*, and the northern third of Yun-lin *hsien*, the area along the southernmost branch of the Cho-shui, known as the Hu-wei River. The coastal trade was carried out in small ships and bamboo rafts, while somewhat larger ships, able to carry 50 *shih* (6.3 tons), traded between Lu-kang and the larger ports of the island such as Tamsui, An-p'ing, and Hou-lung. Lu-kang received Japanese or foreign goods from Tamsui, An-p'ing, or Wu-ch'i, the next port up the coast, and distributed them in smaller lots either to minor ports to the south or to the inland market towns. It also collected and concentrated the agricultural produce from the same lower-level centers, sending it either to Tamsui or across the straits. Since the coastal trade was not foreign trade, it was not reported with the statistics on foreign trade or customs receipts and hence it is difficult to judge its volume. Figures on the coastal trade from 1920-1923 and from 1930 show, on the one hand, that many more vessels engaged in the coastal trade came to Lu-kang than did those trading from Fukien; but on the other hand, the tonnage and cash value of the coastal trade was less than that with Fukien.<sup>49</sup>

The *Report on Economic Conditions* of the Temporary Commission for the Investigation of Taiwanese Customary Practices, published by the governor-general of Taiwan in 1905, gives a list of items traded through Lu-kang and cites their source or destination. It describes the pattern of coastal and regional trade centered on Lu-kang at the beginning of the twentieth century before the railroad was completed or the road

network substantially improved. Goods came and went from such inland market centers as Chang-hua city, Yuan-lin, Pei-tou, Nan-t'ou, Hsi-lo, Erh-lin, Mai-liao, and T'u-k'u, and occasionally from the hill towns of Chi-chi and P'u-li. The most common method of transport was by human carrier. Oxcarts were used between Lu-kang and the settlements directly to the south in the dry coastal belt. Between Lu-kang and Pei-tou, it was possible to use bamboo rafts coming down a main channel of the Cho-shui. Rafts were also used along the southernmost channel of the Cho-shui, the Hu-wei, the rafts proceeding up the coast to Lu-kang. This could only be done during the summer months.

Transport by raft was, of course, cheaper than by human porter, and the *Report on Economic Conditions* lists the relative cost of all means of transport. It cost about four times as much to move goods by porter as it did by raft; and, rather surprisingly, oxcarts appear to have cost about as much as rafts, although the distance for the oxcarts was relatively short. It cost 50 Taiwanese cents to move 1 *shih* (133 pounds) from Pei-tou to Lu-kang by porter, but only 14 cents by raft. It cost 36 cents to send 1 *shih* by porter from the minor harbor of Fan-wa, south of Lu-kang, while by raft it cost 8 cents and by oxcart 7.5 cents. Many goods went overland to Pei-tou, where they were transferred to rafts for the journey to Lu-kang. Pei-tou thus served as a major marketing center for the southern portion of the Chang-hua plain. With a population of 5,134 in 1911 it was the third largest settlement on the Chang-hua plain, after Lu-kang with 19,153 and Chang-hua city with 15,545.

Bringing things down from the mountains was, of course, the most expensive of all—1 *shih* from P'u-li cost \$1.68 Taiwanese if carried by porter to Lu-kang and \$1.58 Taiwanese if carried by porter to Pei-tou, by way of Chi-chi, and then to Lu-kang by raft. It was this easternmost area, the Nan-t'ou plateau and the hill basins, that first slipped out of Lu-kang's marketing zone. The *Report on Economic Conditions* notes that in 1903-1904 goods from Nan-t'ou were being shipped down the railroad to the south rather than to Lu-kang. By 1904 the railroad had reached Chang-hua from the south, connecting it with Tainan and Kaohsiung. The segment crossing the Ta-chia River and tunneling through the hills to its north was completed last. In Chang-hua the railroad ran along the eastern edge of the plain, through Yuan-lin and Chang-hua city, but came nowhere close to Lu-kang, which was eventually linked with Chang-hua city and then with Yuan-lin by a narrow-gauge rail line completed around 1912. From the market towns inland Lu-kang col-

lected such local specialties as indigo, fruit, and ramie, along with the staples of rice, sugar, and beans. To them it distributed timber, paper, dried fish, kerosene, cotton cloth, wine, matches, tobacco, and salt.<sup>50</sup>

During the nineteenth century Lu-kang was a city of wholesalers and middlemen, with many large firms devoted to trade in rice, sugar, cloth, timber, pottery, fish, and other commodities. Oxcarts and gangs of porters moved through its narrow streets, and hundreds of workers loaded and unloaded the bamboo rafts and small boats that were rowed or poled into its shallow inner harbor. The merchants lived in solid, multi-story houses, the very bricks and tiles of which had been imported from Fukien. The immediate environs of the city were the site of many small and relatively poor villages, their houses constructed of mud brick and thatch, and their inhabitants occasionally walking into Lu-kang for shopping or entertainment.

### *LU-KANG'S THIRD TRADING SYSTEM*

The third level of Lu-kang's economy was that of local market town serving the rural population within easy walking distance. It provided retail shops, some craftsmen, rice mills and peanut presses, agents who bought the farmers' produce, and purveyors of such specialized services as dentists, scribes, and Taoist practitioners. In terms of G. William Skinner's hierarchy of Chinese cities, Lu-kang was in the nineteenth century one of Taiwan's two "Greater Cities" (step four from the top in an eight-step hierarchy), the other being Meng-chia, the core of the present Taipei.<sup>51</sup> But, like all cities, it also served the functions of lower-order centers as well. In the pre-Japanese period, the local marketing aspect of the city's economy was the least profitable and important. Lu-kang's merchants made their fortunes on long-distance trade; they did not prosper by selling cheap cloth or hoes to the local rustics, and much of the agricultural land they owned or donated to temples and charitable trusts was in the productive inland zone along the edge of the hills rather than on the immediate periphery of the city.

Today handicraft work of all sorts is a major component of Lu-kang's economy, and it has a reputation for high quality, especially in cabinet making and woodcarving. I have been able to find no documentary material on this aspect of the city's economy in the past, and it is not clear whether it represents a direct legacy from the past or a response to the distress

caused by the collapse of trade with Ch'uan-chou. Arguments for both positions are plausible. I would guess that an original core of skilled craftsmen existed to serve the local elite, and that this occupational specialization then increased in relative importance during the Japanese and Republican periods. The two oldest and largest furniture making establishments in 1968 were founded at least as early as 1912; one incense making firm claimed to date back to about 1900. Early Japanese statistical summaries and lists of local factories do mention a few firms in the early 1900s, but it is not clear what the criteria of inclusion were. Many craftsmen such as blacksmiths, coffin makers, and cabinetmakers must have existed but are never mentioned. The "factories" that are listed were very small (almost all of them employed fewer than five people) and most of them were noodle makers or peanut presses or producers of dye-stuff made from the indigo grown inland.<sup>52</sup>

### *LU-KANG IN DECLINE*

The changes in Lu-kang's economy during the past century can be summed up as the withering away of the first two levels of its trading system as the large-scale system linking central Taiwan with Ch'uan-chou collapsed and the Chang-hua plain became part of an integrated, island-wide economy. By 1910 Lu-kang's position as main seaport for the trade with Fukien, hub of the coastal trade, and center of a regional trading system was clearly doomed. All that was left for the merchants of Lu-kang was selling cloth and hoes to the local farmers who had little money to spend in the city anyway. Lu-kang was thus left with a commercial population far too large to support itself by meeting the modest needs of the villagers. In the usual Chinese fashion many of the wealthy merchants had diversified and bought land, and some of them simply became landlords. But others, recognizing that they could not beat the modern transport technology that had doomed the city's commerce, chose to join it and took the train for Taipei or the booming port of Kaohsiung. The first decade of this century saw massive emigration from Lu-kang.

By the end of the nineteenth century some Lu-kang businessmen had already established themselves in the thriving commercial quarter of Taipei, where they organized a Lu-kang guild. They were soon joined by crowds of their fellow townsmen who sought opportunities in the growing cities along the railroad and in such frontier regions as the P'u-li basin and

the east coast. As Lu-kang slipped from its position of preeminence, many of its natives left for the cities that were moving up the hierarchy. In the Taiwan of the early Japanese period, an overwhelmingly agricultural society undergoing rapid economic development and urban growth, the Lu-kang emigrants with their urban background, literacy, and commercial skills had an edge over ordinary Taiwanese who moved to the cities from the countryside. Furthermore, the emigrants from Lu-kang did not go to Taipei or Kaohsiung or Taichung as isolated individuals. They went with introductions to other Lu-kang men who were already established and joined the Lu-kang associations which existed in all Taiwan's major cities.

Today it is claimed that one reason for the commercial success of Lu-kang émigrés was their solidarity and willingness to help each other. In doing this they were following the familiar Chinese strategy of sojourning, in the same way that their ancestors had left southern Fukien.<sup>53</sup> Sojourners, of whom the best-known examples are the Chinese migrants to Southeast Asia and California, were men who left their native places to seek their fortunes elsewhere but retained membership in the home community and regarded their stay abroad as a temporary expedient. The Lu-kang migrants were usually men who left their families in Lu-kang; they sent regular remittances and returned home as often as they could, most getting back at least for the Ch'ing Ming festival in the spring. They demonstrated their continuing identification with their old home by contributing large sums of money to Lu-kang temples and charitable funds. Under the Japanese, and to some extent to this day, Lu-kang came to resemble the emigrant districts of southeastern China.<sup>54</sup> Like those communities or the Hong Kong emigrant village of San Tin, Lu-kang has come to have a reputation for cultural conservatism and xenophobia.<sup>55</sup>

Elsewhere I have described Lu-kang as I found it in 1967 and 1968—presenting the rather odd spectacle of an industrial city of 28,000 people, with extensive economic and personal ties with the rest of the island, whose inhabitants describe it as if it were a closed corporate community.<sup>56</sup> This aspect of the present city can only be understood when one takes into account the many thousands of Lu-kang people scattered throughout the rest of Taiwan and comes to appreciate the importance for the city of maintaining links with the emigrants and keeping some hold on their loyalties. While I have no concrete information on the topic, I think it very likely that Lu-kang's present prosperity, which is based at least in part on its 500-odd small and very di-

versified factories, depends on links with successful emigrants who provide capital and, perhaps more important, information and contacts. Just as much as a century or two centuries ago, the present city of Lu-kang cannot be understood in isolation but must be seen as part of a far-flung economic network.

Robert Redfield remarks that accounts of particular communities usually carry our minds outside the place that is described. Every study of a community, he points out, has at least by implication a comparative aspect.<sup>57</sup> I have found it impossible to describe Lu-kang or understand its past without carrying my mind outside it. Because of its functions as a port and trading city Lu-kang was much more dependent on the economic system linking Taiwan and Fukien than was a village, which depended primarily on the sweet potatoes it grew in the soil surrounding it. And it was impossible to understand Lu-kang without forming, if only dimly, some sort of picture of what Taiwan in general was like in the eighteenth and nineteenth centuries, and this in turn proved impossible without understanding Taiwan's relations with Fukien. The picture of Taiwan one or two hundred years ago which emerges is in some ways curiously familiar. It is that of an island whose economy is dependent on foreign trade and outside capital, whose people are ruled by self-appointed outsiders, and where the lives of ordinary people in villages and towns are subtly but very definitely affected by events in far-off places. For the past 350 years this has been so even in the most bucolic depths of the countryside, but it comes more clearly to mind if one stands in one of the elegant old streets of Lu-kang and wonders why that street and those beautiful buildings are there at all.

# 9

## The Development and Structure of Transportation Networks in Taiwan: 1600–1972

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Historical studies of transportation networks, although not common, have become more popular in recent years. The basis for such studies is not new, and scholars other than geographers have acknowledged the universality of the development of transportation and communication systems in the economic, political, and social growth of states.<sup>1</sup> More recently, geographers have begun to recognize the significance and value of studying transportation network growth, change, and function for the light such studies shed on other aspects of economic, social, and political change.<sup>2</sup> Among topics related to transportation and communication, the structure of transport networks and the flows on such networks have increasingly become accepted as objects for study as a fundamental theme of geographic inquiry—a component of the spatial analysis approach.<sup>3</sup>

Compact and locationally discrete, Taiwan presents an uncommon but good choice for the study of the development of land surface transportation systems and their association with national development. The availability of quantitative data heightens the island's suitability for analysis and theory formulation and testing.<sup>4</sup> Learning more about Taiwan's developmental experience and the role that transportation played in it perhaps can provide valuable insights into the nature of China's national development.

One assumption held throughout this study is that much of the responsibility for Taiwan's economic growth belongs to the organizational capacity and decisions of various administrations

during the last century which tunneled capital out of the countryside (the agricultural sector), thus providing funds for capital improvements in nonagricultural areas. One objective of this study is to highlight the transport sector as a major beneficiary of this capital investment. Another objective is to determine the extent to which growth and improvement in the transportation network have been associated with the general economic transformation underway in Taiwan since the late nineteenth century.

A number of arguments have been advanced to explain this economic transformation, but none has identified the evolution of the transportation system as remarkable or of special importance.<sup>5</sup> If the findings presented here have something to contribute to the development literature on Taiwan, it may be to demonstrate that rapid growth in the urban and transportation systems took place in step with the transformation of traditional agriculture. Although Taiwan is small and compact, transport systems were expensive to construct because of the rough physiography. Nonetheless, payoffs from the crowded rural environments were rapid. Traffic demand for goods and passengers almost always was present and grew swiftly. Thus investments yielded quick returns for other projects and raised the confidence of decision makers in the wisdom of investment in transportation and cities. The extent to which capital was transferred out of the agricultural sector into transport or urban projects may not have been great, but the transfer process did extend for a long period of time. The agricultural sector, moreover, was a prime user of the evolving transport network, and the commercialization of agriculture appears to have been closely tied to the expansion of the transport network. The growth of towns and cities is more difficult to link to agriculture and transport, but the functions of towns and cities as market centers and processing points for agricultural commodities from the expanding rural sector suggest an influence on them as well.

### *THE EVOLVING TRANSPORT NETWORK*

Studies of Taiwan's political and economic history have commonly identified several periods of primary significance: an early western colonial period (1624-1662); a period of Chinese control (1662-1895); a Japanese colonial period (1895-1945); and restoration to China and the Nationalist exile (1945 to the present). All four of these historical stages have witnessed

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special contributions to settlement, transport network expansion, and economic growth. The period since 1900, however, has been most significant in the speed and nature of social, economic, and political change. The main developmental events in transportation are summarized in the following paragraphs.

Aside from establishing a few centers of trade and protection in the southwestern plains, the Dutch did little to develop an internal system of transportation, even in a rudimentary form. Dutch stimulation of Chinese migration to the island ultimately resulted in the expansion of Chinese agriculture and rural settlement which in time stimulated the development of an incipient urban system and associated surface linkages. Although the Spanish interlude was more limited in time and space than that of the Dutch, they did build two roads in northern Taiwan to link their settlements at Keelung and Tanshui.

Two centuries of Chinese rule, despite erratic policies on migration to the island, brought Taiwan's population from 100,000 in 1680 to over 3 million in 1890. Surface transportation between Chinese settlements, concentrated in the alluvial plains and basins in the western third of the island, was possible on a series of trails and traces as early as the latter part of the seventeenth century. Such tracks were usually short and frequently interrupted because of physical obstacles. Short streams, with broad cobble-strewn floodplains and enormous variations in discharge volume, were among the most serious impediments to north-south travel. Bridges were costly and hard to build; fords were unreliable and sometimes dangerous. In the context of such a rough landscape, overland transport was slow, arduous, and expensive. Even where conditions were good, as in the Chia-nan plain in the southwest, 10 miles was probably the maximum distance that could be covered in a day. Much of the north-south transportation flow was coastal, and small ships plied their trade between the small towns and ports of the coast and their adjacent interior centers. By 1850, it was possible, with the exception of the interior, high mountains, to go overland almost anywhere on the island by following a crude network of local routes which were tied to trunk lines.

Two able Chinese administrators in the latter part of the nineteenth century initiated important development projects, including major improvements in land transport that led Taiwan into the modern period. Shen Pao-chen in 1874 had three roads constructed to link eastern Taiwan with the west. Liu Ming-ch'uan, Taiwan's first governor when the island was elevated

to provincial status, established a postal system and initiated a railway project in northern Taiwan. In April 1887, with material from the dismantled Woosung-Shanghai Railway and capital from mainland and overseas Chinese merchants, construction was begun on the section from Taipei to Keelung. This section of 28.6 kilometers (17.17 miles) was completed in 1891. In 1888, construction was begun on a second section from Taipei to Hsin-chu totaling 78.1 kilometers (48.53 miles); this section was completed in 1893.<sup>6</sup> Because of shortages of working capital, there were only four locomotives. Stations were unpretentious. At that time, the Keelung River was still deep enough for Chinese junks, and river transportation was cheaper and more widely used. The Taipei basin was only partially developed and generated little freight traffic. Passenger traffic did not meet the expectations of the administrators, and the initial six daily runs were subsequently reduced to four. Governor Liu, intending to continue the route to the south, sent German engineers to survey two large streams, Ta-an Ch'i and Ta-chia Ch'i, for railway bridges. He was unable to continue the project not only because of lack of funds but also because conservative officials at court opposed the railway. Such opposition is reminiscent of that found on the China mainland where modernization similarly proved difficult. After Liu's resignation as governor in 1891, his successor recommended that construction be stopped. The proposed North-South Main Railway thus terminated at Hsin-chu, less than 80 kilometers from Taipei.

Nonetheless, this railway signaled a new transport era for Taiwan. By the end of the nineteenth century, increasing population densities and agricultural productivity were nurturing a yet to be realized integrated commercial stage of evolution. Markets, moreover, remained fragmented. Their integration awaited a more systematic elaboration of transport routes. No new Chinese administrative initiatives spurred further transport developments as the century came to a close. War between China and Japan culminated in the cession of Taiwan to Japan in 1895. Chinese efforts bequeathed the focal points of a transportation network, but it was left to the Japanese to articulate the details of a modern development strategy that would tie them increasingly together.

Japanese colonial administrators in the years immediately after takeover faced the military conquest of insurrectionary Taiwanese forces as well as the pacification of the aboriginal inhabitants in the mountains. To accomplish these two goals, the Japanese focused initially on constructing an integrated

north-south highway system with feeder routes to penetrate the central mountain range. The main settlements and population centers were linked, and the outline of the system which exists today was completed by 1906.<sup>7</sup>

### ***Prewar Road Construction***

Four hundred and twenty-eight kilometers (266 miles) of roadway had been constructed by 1896, but the quality of these roads was poor. In 1896 and 1897, roads connecting Keelung and Su-ao, Kee-lung and Taipei, Taipei and Hsin-tien, Taipei and Tan-shui, Hsin-chu and Taichung, Tung-chiang and Heng-ch'un, and Fang-liao and T'ai-tung were also completed—a total of 920 kilometers (572 miles) of Japanese built roadway. In 1897, road construction was delegated to local administrators and from 1897 to 1910 about 200 kilometers of local roadway was finished.<sup>8</sup>

Significant improvements in the highway system began when the Japanese turned to economic exploitation of the island in 1906. Between 1916 and 1925, the military road connecting the north and south that had been initiated during the pacification period was widened, improved, and renamed the Longitudinal Highway (Figure 9-1). Running from Keelung to Kaohsiung and P'ing-tung, it was 15.54 meters (47.69 feet) wide in areas of level land but narrowed to 10.91 meters (35.78 feet) in mountainous areas. Bridges varied in width over the 425-kilometer (264.1-mile) stretch, the narrowest width being 5.54 meters (18.17 feet).<sup>9</sup>

In 1916, the Japanese began constructing a road between Hua-lien and Su-ao that was completed in 1924. This highway was 119.9 kilometers (74.50 miles) long and was used initially by the police and army to go into the mountainous areas inhabited by aborigines. In 1927 the Japanese began improving the road to accommodate automobile traffic, subsequently becoming the bridge road connecting the separate road systems of east and west.

To link the southern and eastern portions of the island, the Japanese constructed a highway from Kaohsiung through Feng-chiang to T'ai-tung that was completed in 1939 and named the Nan-hwei Highway (around the southern tip of the island).<sup>10</sup> To shorten the distance between the Taipei basin and the I-lan plain in the north, a highway 4 meters wide was built between Hsin-tien and Chiao-ch'i in 1936; it was widened to 6 meters in 1945. Across the southern portion of the Central Mountain

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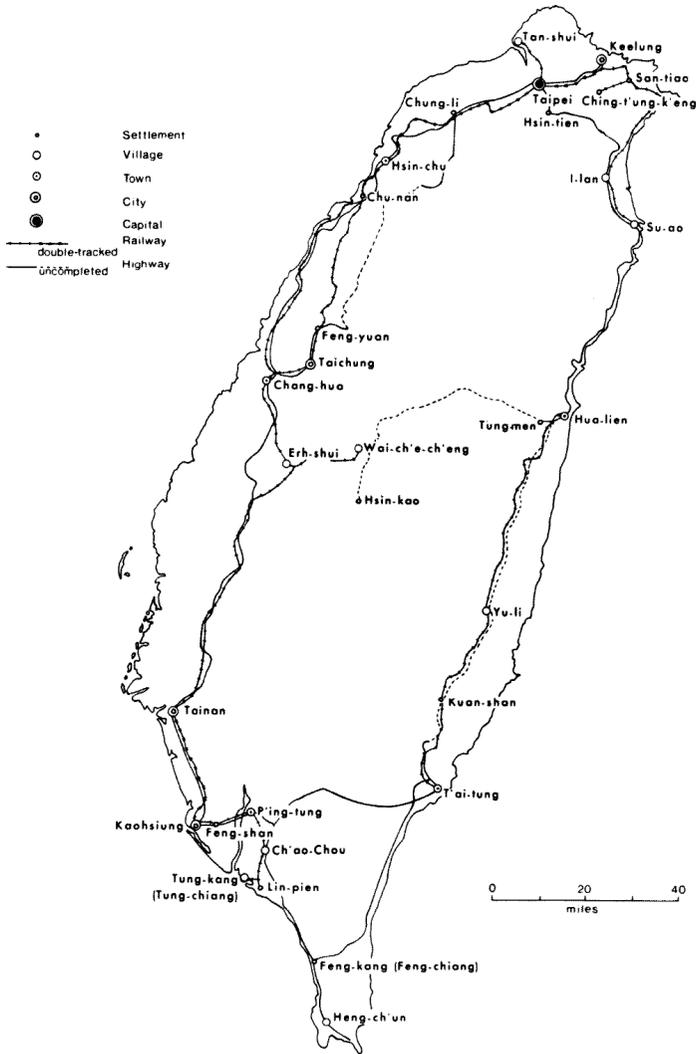


Figure 9-1. Transport network during the Japanese occupancy ca. 1925.

Range, a highway was built from P'ing-tung to T'ai-tung in 1927-1928; this road was improved in 1937. Construction was begun on an east-west highway from Hsin-kao in Taichung *hsien* to T'ung-men in Hua-lien *hsien* in 1941, but only 10 kilometers was completed by 1945 when shortages halted it.<sup>11</sup>

### ***Prewar Railway Construction***

Except for the early push car lines, railway construction under Japanese colonial aegis was motivated primarily by commercial expectations. Seeing the benefits of the system envisioned by Liu Ming-ch'uan, Japanese administrators enlisted army engineers to repair the original line from Keelung to Hsin-chu. Some parts of this line were relaid, and work began on laying the line southward from Hsin-chu. By 1908, the road reached central Taiwan.<sup>12</sup> Because demand outstripped the capacity of sections of the rail line, there were improvements. Between 1912 and 1919, the Keelung to Taipei section was double-tracked. Construction of a coastal branch from Chu-nan to Chang-hua was begun in 1919 because the steepness of the railway gradient in the original line had limited the movement of freight; since 1922, when this branch was completed, this alternate route has been termed the Coastal Line. Double track was laid between Taipei and Chu-nan and between Tainan and Kaohsiung by 1935.

Other lines became valuable economic, political, and military additions to the island network. The T'ai-tung Line, connecting Hua-lien and T'ai-tung on the east coast, was built in sections between 1910 and 1922. In 1924, the I-lan Line from Pa-tu to I-lan and Su-ao was completed, opening up markets for the surplus agricultural products of the I-lan plain and the lumber of the surrounding hill slopes. The P'ing-ch'i (Pinchi) Line, extending 12.9 kilometers (8.02 miles) from San-tiao-lin to Ching-tung-k'eng, was initially constructed by a private company as a coal carrier but was acquired by the Chinese government in 1952. The Chi-chi Line from Erh-shui to Wai-ch'e-ch'eng, constructed to haul equipment to Taiwan Electric Company plants in the mountainous areas, began operations in 1921 and was bought by the government in 1927. The P'ing-tung Line, begun in 1907 but not completed until 1923, passed through the productive southern plains of Taiwan; Chao-chou, midway on this line, had highway linkages with Heng-ch'un at the southern tip of the island. Other objectives may have been served, but the crucial motives in constructing these lines and a number of branches were to move people and goods around cheaply and quickly and hence support economic growth and modernization.

Supplementary narrow-gauge rail lines were built in the plains and basins and in some cases into the mountains; they were of two basic types. *Daisha* (*t'ai-ch'e*) or push car lines for

goods and people were primitive and often built to serve places isolated or neglected by the rest of the transport network. *Daisha*, although slow and crude, were relatively cheap to construct and maintain. Their role in Taiwan's development is described in the following chapter. Other narrow-gauge lines were either owned by a corporation or operated by the railway administration. Principally owned by the Taiwan Sugar Corporation on the Chia-nan plain in the southwest, some of these lines operated regularly scheduled passenger service among small towns and villages not serviced by the main system. Narrow-gauge lines also penetrated the Central Mountain Range—the line to A-li Shan is today more famous for its tourist trade than its heavy cartage of saw timber.

Japan's contribution to Taiwan's long-run success as a development model has been downgraded by some. George Barclay, for example, has noted that the Japanese were interested in exploitation to serve their own needs on the home islands.<sup>13</sup> No doubt this is true, but it in no way diminishes the contribution to economic growth on the island as a whole. One of the crucial elements in the Japanese strategy for colonial exploitation was an improved transport system, a fundamental precondition to any kind of success. Indeed, Japanese success in getting a good return from their southern colony reflects their sound economic approach to planning, financing, and building an integrated multimodal surface transportation system in the early decades of their colonial administration. The system worked well and largely survived World War II. Most of it continues in use today.

### ***Postwar Highway Construction***

After the destructive aerial bombing of Taiwan in the latter stages of World War II, only 40 percent of the highways and roads remained in operation.<sup>14</sup> Only the main lines were repaired in the early years because of shortages of capital and expertise. Most roads were left to the care of local authorities until 1949 when the Provincial Highway Bureau assumed this responsibility.

The main road left by the Japanese, the Longitudinal Highway which ran the length of the west coast, had paved surfaces only on the sections from Keelung to T'ao-yuan and Tainan to Kaohsiung; the remainder was surfaced with gravel. With assistance from the United States government, resurfacing of its entire length was completed in 1954. A supplementary line

was constructed between Chung-li and Feng-yuan; in 1951 this route had been no more than a trail. Building on the earlier Japanese surveys, an east-west line was built over the mountains in the late 1950s. Completed in 1960 and named the East-West Cross-Island Highway, this road (including a branch from Li-shan to I-lan) ran 348.1 kilometers (216.3 miles) from Tung-shih in Taichung *hsien* to Taroko Gorge where it joined the Su-ao to Hua-lien Highway. Under the Nationalists, gaps in the Hua-lien to T'ai-tung road were completed by 1958.

An especially important project was finished in 1964 with the completion of a high-speed highway between Taipei and its major port at Keelung. Without traffic lights and with an average speed limit of 40 miles per hour, this route was Taiwan's first expressway. Work began in April 1963 on a Northern Cross-Island Highway between Ta-ch'i in T'ao-yuan *hsien* and Li-shan, a distance of 166.6 kilometers (103.5 miles). This road connects with the northern branch of the East-West Cross-Island Highway at Chi-lan (I-lan *hsien*) and was put into service in April 1966.<sup>15</sup> A Southern Cross-Island Highway was begun in the middle of 1968 and completed in 1972; it runs 182.6 kilometers (113.5 miles) from Yu-ching in Tainan *hsien* to Ch'ih-shang in T'ai-tung *hsien*. Figure 9-2 shows the state of the transportation network in 1972.

The rich western plains have more than 70 percent of the island's population and most of its commercial and industrial activities. Within eight years, from 1954 to 1961, the total amount of freight tonnage of the western highway system doubled. From 1962 to 1965, it doubled again. Then, from 1966 to 1967, the amount yet doubled again.<sup>16</sup> To alleviate transportation bottlenecks, the government began plans in 1969 to build a north-south expressway. Construction was begun in July 1971 and was completed in 1978. Connecting the international ports at opposite ends of the island, the American-style expressway runs 373.4 kilometers (232 miles). Most of its route parallels the existing Longitudinal Highway. One spur connects with the new international airport in T'ao-yuan *hsien*; another reaches to the Wu-ch'i Port which is under construction in Taichung *hsien*. Construction was begun in October 1979 on the extension southward from Kaohsiung to P'ing-tung.

### ***Postwar Railway Construction***

Railways suffered from American bombing in much the same way as roadways, but their rehabilitation was technically more difficult and slower. Several new lines were constructed by the Chinese. The line from Lin-pien to Fang-liao with two branch lines (the Nei-wan Line and the Tung-shih Line) was completed by March 1958 and has spurred the development of the hilly portions of Hsin-chu *hsien*. The 30-kilometer (18.6-mile) Pei-hwei Line between Su-ao and Hsin-ch'eng, completed in 1978, links the east and west coasts via a heavily tunneled and costly line along the northeastern coast. Of special significance to Taiwan's railroad history is the current electrification of the main north-south line.

### ***The Spatial Context***

Before 1874, roads on Taiwan served merely to connect neighboring settlements. The inhabited plains and basins may be termed archipelagic in relation to one another. Subsequently, with Shen Pao-chen's decision to build roads over the Central Mountain Range, the development of the island's transportation systems moved to a stage of connecting regions. Liu Ming-ch'uan's later efforts to modernize Taiwan's transport were but a beginning that was superseded by the construction of north-south road and rail trunk lines during the Japanese occupation. Postwar Chinese efforts improved these developments, adding branches and making alterations that enabled the handling of increased traffic.

The preceding paragraphs have supplied some of the information we need for exploring the relationship between economic growth and the general evolution of transportation systems. In the pages which follow, it will become clear that local variations in the pace and nature of economic growth influenced the development of spatial linkages. Although there was no strong correlation in Taiwan between the degree of connectivity of a particular place and its size or growth rate, we will find that failure to achieve a rudimentary level of accessibility led to stagnation. For most of Taiwan's cities and larger towns, increased access has come to mean in recent years increased growth potential.

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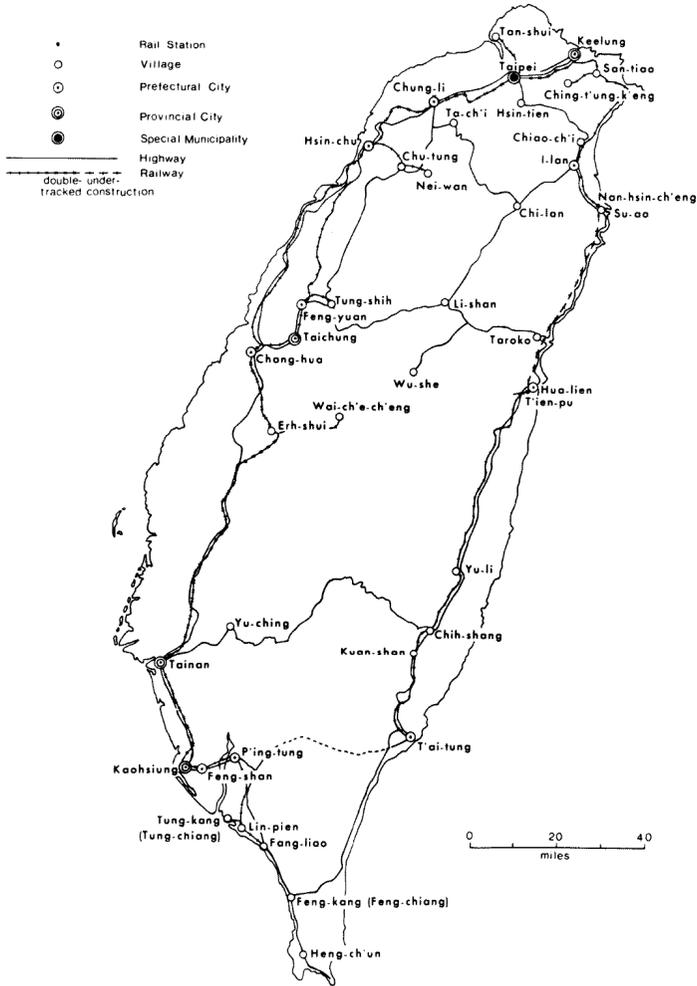


Figure 9-2. The transport network in 1972.

### CONNECTIVITY AND DEVELOPMENT

It is widely accepted that the development of a transportation network is deeply influenced by the level of regional development.<sup>17</sup> In this section, we use a connectivity index to measure transportation development and relate it to economic development on Taiwan.

A transportation network can be defined as a set of urban centers interconnected by a system of routes.<sup>18</sup> By using graph theory, one can simplify a complex transportation network into a set of vertices (nodes) and edges (routes). Mathematical theory then can be used to examine the relationship between nodes and routes. In this study, the vertices refer to selected Taiwanese urban places within the transportation networks and the edges refer to either highway or railway routes.

The connectivity index expresses the degree of direct linkage from one location to other locations on a transport network. It can be written as:

$$\text{Connectivity index} = \frac{V(V-1)/2}{e}$$

where  $V$  is the number of vertices or nodes in the network and  $e$  is the number of linkages.<sup>19</sup> Maximum connectivity is calculated as

$$\frac{V(V-1)}{2}$$

and minimum connectivity is  $V - 1$ . The value of the connectivity index varies between unity and half the total number of  $V$ . If the network is fully connected, the index is equal to 1:

$$\frac{V(V-1)/2}{V(V-1)/2}$$

If the network is the least connected, the index can be as large as  $V/2$ .<sup>20</sup> The minimum connectivity ratio is

$$\frac{V(V-1)/2}{V-1}$$

Since the networks in different time periods have different numbers of vertices, the connectivity values are transformed into percentages to facilitate temporal comparison. Thus if  $V = 9$  and  $e = 11$ , the maximum number of connections is 36; the minimum connectivity ratio is 4.5; and the maximum connectivity ratio is  $36/36 = 1.0$ . The actual connectivity ratio is  $36/11 = 3.27$ . To transform this ratio to percentage of maximum

connectivity, one sets the minimum ratio, 4.5, equal to zero. The maximum ratio is already 1.0 or 100 percent. By dividing the minimum ratio into the actual and subtracting from unity, one obtains the percentage of maximum connectivity. In our example, the calculations are

$$1 - (3.27/4.5) = 0.27 \text{ or } 27 \text{ percent.}$$

Since agriculture, mining, fishing, forestry, and manufacturing are major occupations on the island, the productivity of these activities is a reasonable indicator of Taiwanese economic development. Several different periods from the Ch'ing dynasty through Japanese occupancy to the present will be examined as we compare these economic activities with the development of the transportation network. The monetary units of the different periods have been converted into United States dollars to facilitate comparison. A stepwise multiple regression program was used to estimate the relation between the connectivity of the networks (dependent variable) and the production of these five sectors of the Taiwanese economy (independent variables). A sixth independent variable, population, was added to the analysis. Consumption is assumed to be proportional to population; therefore population growth can be treated as an indirect estimator of commercial activity.

### ***Highway Connectivity and Economic Growth***

Table 9-1 lists the highways completed on Taiwan between 1925 and 1972. A connectivity index was calculated for every year a new highway was connected to the Longitudinal Highway—the trunk line of the Taiwanese highway system. Ten connectivity indices were used in the stepwise regression analysis. Overall, the connectivity indices of the system increased from the 1920s to the 1970s with the growth and development of the highway network (Table 9-2).

Four variables—population, agriculture, industry, fishing and forestry—were significantly involved in the analysis of highway connectivity (Table 9-3); population was by far the most important as it alone accounted for 96.5 percent. Although gross agricultural production was the second most important variable, it increased the coefficient of determination only slightly. Industrial production, furthermore, increased the coefficient of determination only 0.88 percent. Fishing and forestry

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TABLE 9-1  
*Highways Completed between 1925 and 1972*

Highway	Origin	Destination	Year of Completion	Length (Miles)
Longitudinal Highway	Keelung	P'ing-tung	1925	264.09
P'ing-tung to T'ai-tung	P'ing-tung	T'ai-tung	1928	55.30
Su-ao to Hua-lien	Su-ao	Hua-lien	1932	74.50
Hsin-tien to Chiao-ch'i	Hsin-tien	Chiao-ch'i	1936	39.15
Nan-hwei	Kaohsiung	T'ai-tung	1939	120.74
Chung-li to Feng-yuan	Chung-li	Feng-yuan	1950	90.72
Hua-lien to T'ai-tung	Hua-lien	T'ai-tung	1958	117.44
East-West Cross Island	Tung-shih	Taroko	1960	120.67
Taipei to Keelung	Taipei	Keelung	1964	14.54
Northern Cross Island	Ta-ch'i	Li-shan	1966	103.52
Southern Cross Island	Yu-ching	Chih-shang	1972	113.47

*SOURCE: Republic of China, Taiwan Provincial Cultural Affairs Committee, T'ai-wan-sheng t'ung-chih [Gazetteer of Taiwan Province] (Taipei: Taiwan Provincial Government Press, 1969), sec. 4, pp. 22-23, 32-38; Republic of China, Taiwan Provincial Government, Department of Information, Kung-fu Erh-wu Nien [The twenty-fifth restoration anniversary] (Taichung: Taiwan Provincial Government Press, 1970), sec. 12, p. 7.*

was the fourth leading variable. The dominance of population probably reflects the significance of bus and automobile traffic and the relative unimportance of trucking.

The connectivity index increased along with the growing internal connection of the network and decreased with the network's outward expansion. Negative residuals suggest that the system is poorly connected. Positive residuals indicate that it is better connected than expected, given a particular economic development pattern. All the residuals, except for 1939, are within positive one and negative one standard error of es-

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*TABLE 9-2*  
*Connectivity Indices of the Highway Network and Standardized Residuals*

Year	Connectivity Index	Standardized Residual
1925	1.00	-0.21
1928	1.00	-0.12
1936	1.00	-0.92
1939	6.60	1.78
1950	6.60	-0.49
1958	11.76	-0.53
1960	16.69	0.26
1964	20.08	0.52
1966	22.32	-0.20
1972	24.28	-0.11

*TABLE 9-3*  
*Cumulative Multiple Coefficient of Determination of Highway Connectivity*

Dependent Variable	Population Index	Agriculture Index	Industry Index	Fishing and Forestry Index
$R^2$	96.46%	96.73%	97.61%	97.91%

timate (Table 9-2). After 1904, the revenue of the Governor-General of Taiwan was no longer subsidized by Japan.<sup>21</sup> To strengthen control and exploit the island, therefore, the military road which was built at the beginning of Japanese occupancy was improved and widened between 1916 and 1925. At that time, the island was served by a relatively complex railway network. In 1928, there was a small negative residual for connectivity. This residual suggests that highway development lagged behind population growth in that year. The lag in con-

struction was probably influenced by the island's decline in production due to the impact of economic depression in Japan proper from 1928. In 1936, there was a high negative residual in connectivity, suggesting less connection than expected within the network. In the 1930s, preparations for war stimulated the expansion of the economy and the transport network. The completion of the Hsin-tien to Chiao-ch'i Highway connected the Su-ao to Hua-lien Highway with the Longitudinal Highway system. It extended the network but did not increase the network's internal connection. The index had a positive residual in 1939, suggesting a better-connected network. To isolate China during the Second Sino-Japanese War, which broke out in 1937, the Japanese blockaded the coast of China. There is no doubt that ports in southern Taiwan were important bases at that time. The Nan-hwei Highway, from Kaohsiung through P'ing-tung and Feng-kang (Fengchiang) southward to T'ai-tung, not only expanded the whole network southward but also increased connection between the southern and eastern cities.

The negative residual for connectivity shown for 1950 indicates that the network was less well connected than expected. The damage to economic facilities during World War II had not been overcome by 1950. The P'ing-tung to T'ai-tung Highway was blocked by landslides during the war and was not repaired. Although the construction of the Chung-li to Feng-yuan Highway increased internal connection, the network as a whole was expanded more than the variables predict. Since the late 1950s economic development of the island has been extremely rapid. The residuals for connectivity changed from negative in 1958 to positive in 1960 and 1964 because the connectivity of the whole highway network improved as a result of the completion of the East-West Cross-Island Highway. In 1972 the network seemed to fit the needs of the population and major economic activities closely.

### ***Railway Connectivity and Economic Growth***

There are at present eleven rail lines on Taiwan (Table 9-4).<sup>22</sup> Inasmuch as the T'ai-tung Line is isolated from the others, the railway network in this analysis consists of only the ten connected railways. When a rail line was completed and opened to the public, the index for that year was calculated up until the completion of the North-South Main Railway in 1908. After 1908, only new railways which were connected to or expanded from the North-South Main Railway are included in the analysis.

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No new rail lines were added after 1958. In all, eleven connectivity indices were involved in the stepwise regression analysis.

The connectivity index remained unchanged after 1958 (Table 9-5). Tremendous changes in economy and population, however, occurred after that year. To measure the relationship between the connectivity index and the economic and demographic situation in 1972, a new regression Indentline involving twelve time periods was generated. Data for the twelfth time period were combined with the 1958 dependent variable and the 1972 independent variables. The result showed that the influence of the 1972 economic and demographic variables was so strong in determining the relationship between the dependent and independent variables—that is, the position of the regression line—that the relationships before 1972 were obscured. Therefore the overall analysis of railway connectivity is based on these results involving only the eleven time periods. The relationship including the 1972 time period is reported only as appropriate.

Over 44 percent of the total variation in railway connectivity is explained by four variables (Table 9-6). Industrial production is the most important variable, explaining 24.49 percent of the variation. Mining, the next most significant variable, increased the coefficient of determination by 15.25 percent. Fishing and forestry and agriculture are the next two most important variables. Population was not statistically significant as an independent variable.

Except for the Coastal Line, none of the rail lines was built to strengthen the connection between existing nodes on the network. Because of the extension of the network rather than its growth in connectivity, the index for the network remains low and actually decreases except for 1922. Topography hinders the construction of direct rail lines between major cities in the west and eastern cities. Therefore this regression analysis only partially explains the variation in network connectivity. If the 1972 data were involved in this analysis the coefficient of determination would decrease from over 44 percent to 14 percent.

Most of the residuals, as seen in Table 9-5, fall within positive one and negative one standard error of estimate except for 1908, 1922, and 1927. The residual for connectivity was negative in 1893. After the mid-nineteenth century, the lowland areas of Taiwan were rapidly settled. The social and economic situation on Taiwan probably justified a better transportation

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TABLE 9-4  
*Railways Completed between 1893 and 1958*

Railway	Origin	Destination	Year of Completion	Length (Miles)
North Section of North-South Main Railway	Keelung	Hsin-chu	1893	66.30
Tan-shui Line	Taipei	Tan-shui	1901	13.15
South Section of North-South Main Railway	Hsin-chu	Kaohsiung	1908	184.03
Coastal Line	Chu-nan	Chang-hua	1922	56.67
P'ing-tung Line	Kaohsiung	Lin-ping Tung-kang	1923	39.09
I-lan Line	Pa-tu	I-lan	1924	59.00
T'ai-tung Line	Hua-lien	T'ai-tung	1926	107.50
Chi-chi Line	Erh-shui	Wai-ch'e-ch'eng	1927	18.46
Nei-wan Line	Hsin-chu	Nei-wan	1951	17.36
P'ing-ch'i Line <sup>a</sup>	San-tiao	Ching-t'ung-k'eng	1952	8.03
Lin-pien Line	Lin-pien	Fang-liao	1953	6.88
Tung-shih Line	Feng-yuan	Tung-shih	1958	8.70

<sup>a</sup> The P'ing-ch'i (Pinchi) Line, completed in 1929, was initially constructed by the T'ai-yuan Mineral Company as a coal carrier; the Chinese government bought it to serve the public in 1952.

## Chapter 9

*SOURCE: Republic of China, Taiwan Provincial Cultural Affairs Committee, T'ai-wan-sheng t'ung-chih [Gazetteer of Taiwan Province] (Taipei: Taiwan Provincial Government Press, 1969), sec. 4, p. 139.*

TABLE 9-5  
*Connectivity Indices of the Railway Network and Standardized Residuals*

Year	Connectivity Index	Standardized Residual
1893	1.00	-0.47
1901	1.00	-0.54
1908	1.00	-1.19
1922	7.07	1.25
1923	5.21	0.17
1924	4.50	-0.28
1927	4.30	1.42
1951	4.13	0.10
1952	3.96	0.17
1953	3.81	-0.60
1958	3.67	-0.03

network during this time. Backward government officials, however, delayed the development of a modern transportation network until Governor Liu took charge of the island in 1884.

There were negative residuals for connectivity in 1901 and 1908. Since Taiwan was ceded to Japan, the Japanese were determined to control the island and extended the railway network toward the interior of the island. In the 1920s, the expansion of the empire stimulated the development of the island. During this decade both outward expansion and internal connections were strengthened; therefore positive residuals for connectivity

# CHINA'S ISLAND FRONTIER

*TABLE 9-6*  
*Cumulative Multiple Coefficient of Determination of Railway Connectivity*

Dependent Variable	Industry Index	Mining Index	Fishing and Forestry Index	Agriculture Index
$R^2$	24.49%	39.74%	43.85%	44.54%

are found in association with the strengthening of internal connections. The opposite is true for years when expansion was occurring.

In 1951 the residuals were positive. The economy, because of bombing destruction during World War II, lagged behind the rail system which had been constructed before the war as Japanese influence had expanded. After the outbreak of the Korean War in 1950, U.S. aid helped in the restoration of the economy. A negative residual for connectivity in 1953 suggests that a better-connected network was needed. In 1958, the network was well adjusted to the level of development. If one extends this regression line to 1972, the residual for the connectivity index is -8.05 standard errors of estimate. When the 1972 data are added, the residuals for each time period deviate much more from the actual values.

### **Summary**

There is little doubt about the important role of agriculture in the Taiwanese economy during the Japanese regime and the early stage of restoration. Population growth, industrialization, and agricultural development strengthened the internal connection of the network, and these three elements show up strongly in the analysis of highway and railway connectivity.

The five independent variables used in this analysis were strongly related to highway connectivity. By contrast, topography increased the difficulty of constructing new rail lines to improve the internal connection of the railway network. Moreover, government policy has been to increase the number of train runs instead of building new lines.<sup>23</sup> Railway connectivity, unlike highway connectivity, has not been strongly related to economic growth.

*NODAL ACCESSIBILITY AND CONNECTIVITY*

With the extension of a transportation network, the nodes on the network may change their levels of accessibility and connectivity.<sup>24</sup> Graph theory, a branch of topology, provides a mathematical tool to simplify the complex properties of actual networks so that one may study their basic structure. By applying graph theory, two indices, nodal accessibility and connectivity, can be used to examine the geometric structure of the network—that is, the network as a set of points and lines on a two-dimensional plane. According to graph theory, the center of the network will have the highest accessibility and connectivity index values. In the present analysis, these two indices are used to determine whether the structural centers of networks of different times are coincident with the actual economic or political centers. Our research covers the period from 1893 to the present for both the highway and railway networks.

If a transportation network is treated as a set of points and lines on a two-dimensional plane, an array of numbers—a matrix—can be constructed to describe the entire network. The matrix is known as a connectivity matrix: the rows are ordered as the origins and the columns as the destinations of the network. Unity is entered in the cell if there is a direct connection between origin and destination; otherwise a zero is entered. The connectivity matrix records only the direct connections between nodal pairs. But since the linkages of large urban centers always pass through intermediate centers, the indirect connections are also important in measuring the accessibility and connectivity of individual nodes. To involve all the indirect connections between nodal pairs, the connectivity matrix is powered by matrix multiplication. The nodal connectivity index is defined as the summation of rows of the connectivity matrix powered to the diameter number of the network. The accessibility matrix is defined as the summation of the respective cells in the connectivity matrix at the first order (1s and 0s) and at each subsequent power up to and including the diameter power. Nodal accessibility is defined as the summation of rows of this accessibility.<sup>25</sup>

Duane F. Marble has developed a computer program, called NODAC, to calculate the nodal accessibility index for transportation networks based on the definition of Shimbel and Katz.<sup>26</sup> It is available for networks with up to sixty-four nodes. The basic input is the connectivity matrix of the network. The program assumes that a place is connected to itself—that is, 1 rather than

0 will be entered in the diagonal of the matrix. Since this assumption differs from the ordinary definition,<sup>27</sup> minor changes were made to calculate connectivity and accessibility indices for this study in order to satisfy the usual definition of zeros in the principal diagonal.

### ***The Highway Network***

The highway network to be examined is the network formed by the Longitudinal Highway and all the highways connected with it. Whenever the network was expanded, a connectivity matrix for that time was constructed. These matrices became the inputs to the NODAC program. The nodal accessibility and connectivity indices for the nodes were generated for the following ten years: 1925, 1928, 1936, 1939, 1950, 1958, 1960, 1964, 1966, and 1972.

The nodes for this analysis were the major urban centers located on the network in the year examined.<sup>28</sup> The number of nodes changed with the expansion of the network—from nine nodes in 1925 to twenty-five in 1972 (Figure 9-3). The index value of a node corresponds to the diameter number of the network for that year, as the diameter changes with the expansion of the network. Therefore the absolute index values of the same node at different times are not meaningful for comparison between different years. To measure the relative accessibility and connectivity of the nodes through time, we obtained the percentage values of these indices.

During Japanese occupancy the highway network of Taiwan grew rapidly from 1925 to 1939 but remained unchanged from 1939 to 1945. From 1925, the date of the completion of the Longitudinal Highway, to 1939, the date of the completion of the Nan-hwei Highway, both the high accessibility and connectivity values underwent a shift from nodes in the center of Taiwan toward nodes first in the north and then in the south (Tables 9-7 and 9-8). In 1925, the Longitudinal Highway itself constituted the highway network. The center of the network—the urban center with the highest percentage values on both accessibility and connectivity indices—was Feng-yuan. The completion of the P'ing-tung to T'ai-tung Highway in 1928 did not greatly change the indices of accessibility and connectivity of the nodes. Taichung and Feng-yuan were the best connected as well as the most accessible urban centers.

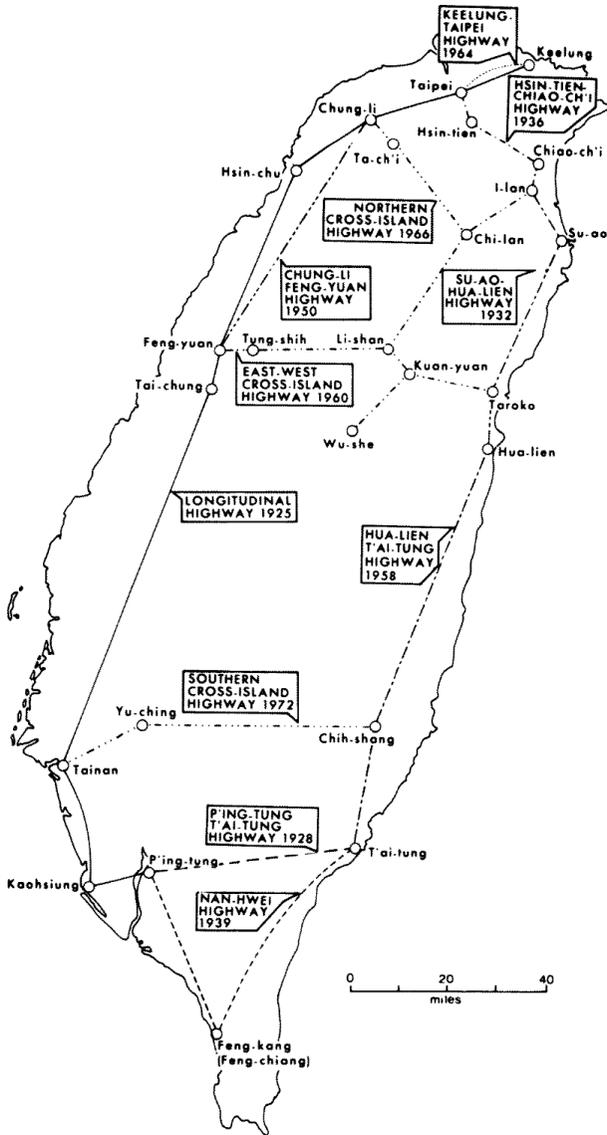


Figure 9-3. Topological map of the highway network.

The completion of the Hsin-tien to Chiao-ch'i Highway in 1936 connected the isolated Su-ao to Hua-lien Highway with the Longitudinal Highway. Taipei, the conjunctive point of these

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*TABLE 9-7*  
*Nodal Accessibility Indices of Taiwan's Highways*

Node	1925	1928	1936	1939	1950	1958	1960	1964	1966	1972
1. Keelung	5.11	4.20	6.67	2.90	5.04	4.30	2.27	8.26	7.21	6.57
2. Taipei	9.42	8.05	13.27	5.83	12.15	10.56	6.00	12.24	10.84	9.31
3. Hsin-tien			10.73	4.64	6.57	5.97	3.47	5.39	4.69	4.29
4. Chiao-ch'i			8.05	3.46	3.58	3.88	3.21	3.47	3.09	2.79
5. I-lan			6.37	2.73	2.05	2.80	4.64	3.69	3.92	3.69
6. Su-ao			4.54	1.94	1.18	2.39	3.72	2.76	2.45	2.50
7. Taroko			3.08	1.31	0.67	2.18	4.85	3.44	2.71	2.90
8. Hua-lien			1.50	0.64	0.30	2.13	2.59	1.82	1.35	1.97
9. Chung-li	12.93	10.89	11.04	5.03	17.89	14.98	9.65	10.56	11.59	10.66
10. Ta-ch'i									5.98	5.32
11. Hsin-chu	14.73	12.97	8.69	4.39	14.39	11.98	8.03	7.63	7.45	6.75
12. Feng-yuan	15.64	13.89	7.40	4.51	17.01	14.30	11.59	10.48	9.90	9.01
13. Tung-shih							6.85	5.53	5.16	4.89
14. Li-shan							6.67	4.96	4.99	4.64
15. Chi-lan							4.34	3.25	5.25	4.96
16. Kuan-yuan							5.27	3.77	3.26	3.32
17. Wu-she							2.18	1.54	1.24	1.22
18. Taichung	14.73	13.89	5.99	5.14	9.03	7.77	5.38	4.49	4.00	4.24
19. Tainan	12.93	12.97	4.96	6.86	4.82	4.66	2.77	2.17	1.76	2.71
20. Yu-ching										1.89
21. Kaohsiung	9.42	10.89	3.79	10.04	2.65	3.13	1.54	1.13	0.85	1.45
22. P'ing-tung	5.11	8.05	2.62	15.59	1.46	2.50	1.12	0.79	0.55	0.92
23. Feng-kang				12.50	0.79	2.22	1.00	0.70	0.47	0.87
24. T'ai-tung		4.20	1.33	12.50	0.35	2.14	1.14	0.80	0.53	1.20
25. Ch'ih-shang						2.11	1.63	1.13	0.78	1.94

highways, became the most connective and accessible center. The population of this city increased from 233,744 in 1928 to 310,320 in 1936.<sup>29</sup> Moreover, the urban centers in northern

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*TABLE 9-8*  
*Nodal Connectivity Indices of Taiwan's Highways*

Node	1925	1928	1936	1939	1950	1958	1960	1964	1966	1972
1. Keelung	5.11	4.05	6.99	2.88	5.09	4.34	2.27	8.20	7.23	6.68
2. Taipei	9.12	8.07	12.93	5.41	12.13	10.94	6.15	12.96	11.21	9.36
3. Hsin-tien			11.19	4.58	6.60	5.94	3.57	5.34	4.68	4.45
4. Chiao-ch'i			7.81	3.18	3.51	3.87	3.15	3.52	3.11	2.77
5. I-lan			6.53	2.64	2.01	2.60	4.67	3.63	3.82	3.62
6. Su-ao			4.37	1.76	1.11	2.20	3.56	2.61	2.36	2.44
7. Taroko			3.08	1.24	0.63	1.93	4.85	3.35	2.61	2.73
8. Hua-lien			1.44	0.58	0.27	1.88	2.44	1.67	1.25	1.89
9. Chung-li	13.40	10.73	11.52	5.00	18.12	15.37	9.79	10.59	11.65	11.02
10. Ta-ch'i									6.10	5.33
11. Hsin-chu	14.60	13.14	8.46	4.18	14.47	12.41	8.19	7.82	7.59	6.88
12. Feng-yuan	16.06	14.01	7.57	4.51	17.07	14.83	11.99	10.84	10.10	9.08
13. Tung-shih							6.82	5.46	5.13	4.99
14. Li-shan							6.84	4.99	4.98	4.55
15. Chi-lan							4.21	3.12	5.17	5.00
16. Kuan-yuan							5.09	3.55	3.14	3.27
17. Wu-she							2.21	1.52	1.20	1.16
18. Taichung	14.60	14.01	5.79	5.14	9.08	7.91	5.38	4.46	4.00	4.33
19. Tainan	13.14	13.14	4.91	6.97	4.80	4.71	2.83	2.21	1.76	2.56
20. Yu-ching										1.84
21. Kaohsiung	9.12	10.73	3.63	10.27	2.62	3.00	1.46	1.05	0.80	1.41
22. P'ing-tung	5.11	8.07	2.52	15.98	1.41	2.34	1.04	0.73	0.49	0.83
23. Feng-kang				12.84	0.76	1.99	0.90	0.61	0.40	0.77
24. T'ai-tung		0.45	1.27	12.84	0.33	1.89	1.03	0.70	0.46	1.11
25. Ch'ih-shang						1.85	1.55	1.05	0.71	1.74

Taiwan, such as Hsin-tien and Chung-li, became more accessible and connected than other urban centers. In 1939, with the completion of the Nan-hwei Highway, cities south of Tainan

became better connected and had higher accessibility indices than cities in the rest of the island. Kaohsiung became the geometric center of the network of that time.

The shift of centers with high indices as the network expanded may reflect Japan's governing policy toward Taiwan. The Japanese regime may be separated into two components: the military and the civil administrations. Both viewed Taiwan as a potential base for southward expansion of the Japanese empire.

In 1898, the year that Lieutenant-General Kodama Gentaro was appointed governor-general of Taiwan, the military administration and civil administration were divided. The construction of highways after 1898 was to benefit both the island's economy and its defense. Therefore the military roads which the Japanese completed at the beginning of their occupancy were improved and renamed the Longitudinal Highway. This highway not only connected north and south but also passed through the agriculturally productive plains along the western coast. The center with the highest index values in 1925 was Feng-yuan, a small community between the interior foothills and the coastal plain in the middle part of Taiwan. During the end of the nineteenth and the beginning of the twentieth centuries, the political center of the island was at Taipei in the north; the economic center was south around the city of Tainan. The network gradually expanded with political and economic developments on the island. The completion of the Hsin-tien to Chiao-ch'i Highway in 1936 shifted the highest accessibility center to Taipei; and the completion of the Nan-hwei Highway in 1939 shifted the center to Kaohsiung, the heavy industrial center of that time.

After the return of Taiwan to China, the centers with highest accessibility and connectivity shifted northward. The completion of the Chung-li to Feng-yuan Highway in 1950 made the northern cities more accessible and interconnected than those in the south. Chung-li, at the origin of this highway, became the geometric center of the network; Feng-yuan, the terminus, had the second highest accessibility and connectivity indices. Hsin-chu, connecting Chung-li on one side and Feng-yuan on the other, was the third most connected and accessible center. Taipei ranked fourth, on each index.

The around-the-island highway system was completed in 1958 with the construction of the Hua-lien to T'ai-tung Highway. The importance of the Chung-li to Feng-yuan Highway continued to influence the entire network significantly. As a result,

Chung-li, Feng-yuan, Hsin-chu, and Taipei all became better connected and had easier access to other cities. The nodes in the middle part of Taiwan became more connected and improved their accessibility with the completion of the East-West Cross-Island Highway in 1960. Feng-yuan, the intersection of the Longitudinal Highway and the East-West Cross-Island Highway, became the center of the network at that time.

By 1964 the completion of the Taipei to Keelung Highway shifted the geometric center to Taipei. Major nodes, such as Keelung and Hsin-chu, Chung-li and Feng-yuan, had significantly higher accessibility and connectivity indices with this network change. The completion of the Northern Cross-Island Highway in 1966 and the Southern Cross-Island Highway in 1972 did not greatly change the nodal accessibility and connectivity indices. Keelung, Taipei, Chung-li, Hsin-chu, and Feng-yuan had significantly higher indices; furthermore, Chung-li became the geometric center of the networks in both 1966 and 1972.

Since 1945, the year that Taiwan was returned to China, the emphasis on the area of highway construction has shifted from south to north. Now that Taiwan is no longer a colony, the island's economic development has become more independent. In 1949, the Nationalist government moved to Taiwan due to political changes on the China mainland. To promote economic self-sufficiency, the government paid considerable attention to agricultural as well as industrial development. Industrial development was heavily dependent on foreign countries to supply raw materials. Northern Taiwan, despite few natural resources, has dominated the industrial activity of the island since the 1950s—especially Taipei, the political and financial center, and Keelung, one of the best natural harbors on the island. Despite the rapid growth of Kaohsiung, five of the six major industrial zones are in northern Taiwan: The Ting-kau Industrial District in Taipei *hsien*, the Kuei-shan Industrial District in T'ao-yuan *hsien*, the First and Second T'ou-fen Industrial Districts in Miao-li *hsien*, and the Liu-tu Industrial District in Keelung City. Even three of the four developing industrial parks are also in the north: The Second Kuei-shan Industrial District and Nei-li Industrial District in T'ao-yuan *hsien* and the Third T'ou-fen Industrial District in Miao-li *hsien*. Therefore the construction of the highway network was coincident with the development of the north.

During the Japanese occupancy, then, all of the nodes—Kao-hsiung, P'ing-tung, Feng-kang, and T'ai-tung—with both accessibility and connectivity indices within the first quintile (highest 20 percent) were in southern and southeastern Taiwan (Figure 9-4). But in 1972, four of the five nodes in the first quintile were in the north and the fifth was in the middle part of Taiwan. It seems that this shift of geometric centers in the network between Japanese occupancy and the return to China is a good indicator of political and economic changes.

### *The Railway Network*

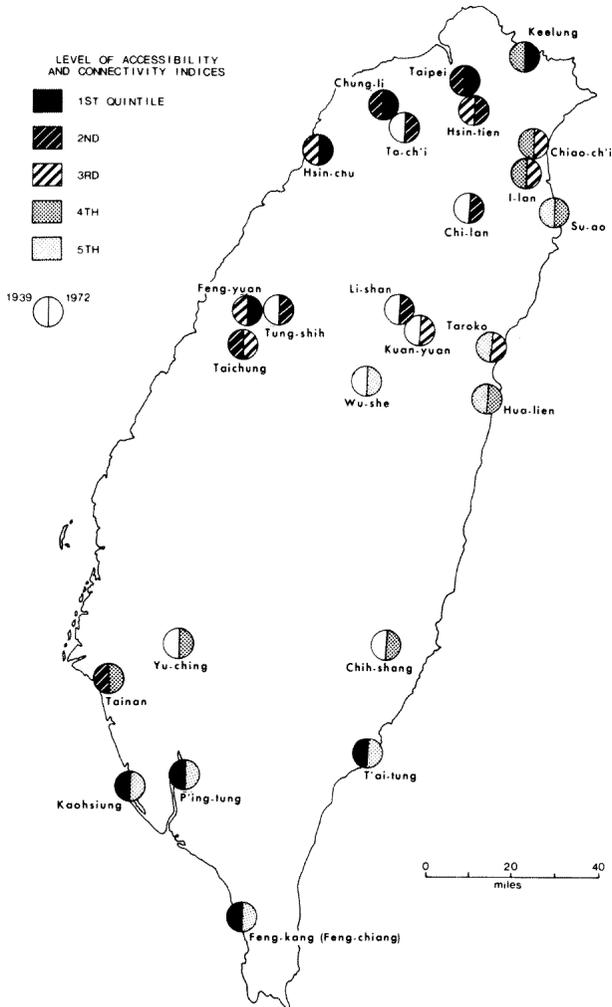
The railway network to be examined is the network formed by the North-South Main Railway and all the lines extending from it. The procedure used to calculate the nodal accessibility and connectivity indices of the highway network is repeated here for the railways. In all, the railway network has expanded eleven times: 1893, 1901, 1908, 1922, 1923, 1924, 1927, 1951, 1952, 1953, and 1958.

The nodes to be considered in this analysis are the special municipality (*yuan-hsia-shih*), all provincial cities (*sheng-hsia-shih*), all prefectural cities (*hsien-hsia-shih*), and communities of prefectural administration of present-day Taiwan which the rail lines pass through.<sup>30</sup> The nodes at the intersection of the North-South Main Railway and the new lines, as well as the destinations of the new lines, are involved as well. The number of nodes changed from four in 1893 to twenty-nine in 1958 (Figure 9-5).

Examining both the nodal accessibility and the connectivity indices shown in Tables 9-9 and 9-10, we can see that the shift of the geometric center of the railway network has been from northern to middle Taiwan. Taipei and T'ao-yuan were the centers of the network in 1893 when only the northern section of the North-South Main Railway line was completed. When the Tan-shui Line was completed in 1901, Taipei became the undisputed geometric center of the system.

In 1908 the North-South Main Railway line was completed, and the center of the network shifted to T'ao-yuan. All the nodes from T'ao-yuan to Yun-lin had significantly higher indices. Earlier, the coastal plains between Hsin-chu and Chang-hua had been difficult to defend, especially during the Sino-French War in 1885, because of the lack of bridges in an area of complex drainage. Governor Liu, moreover, predicted in 1886 that the completion of the North-South Main Railway would strengthen

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*Figure 9-4. Nodal accessibility and connectivity of Taiwan's highways: 1939 and 1972.*

Chinese control of this area if the army could be quickly dispatched by rail. The Japanese believed this as well and began construction in 1899 with a budget of 28.8 million yen.

The completion of the Coastal Line, from Chu-nan to Chang-hua in 1922, increased the accessibility and connectivity indices of nodes between Hsin-chu and Erh-shui and shifted the center from T'ao-yuan to Chang-hua and Chu-nan. New lines were

# CHINA'S ISLAND FRONTIER

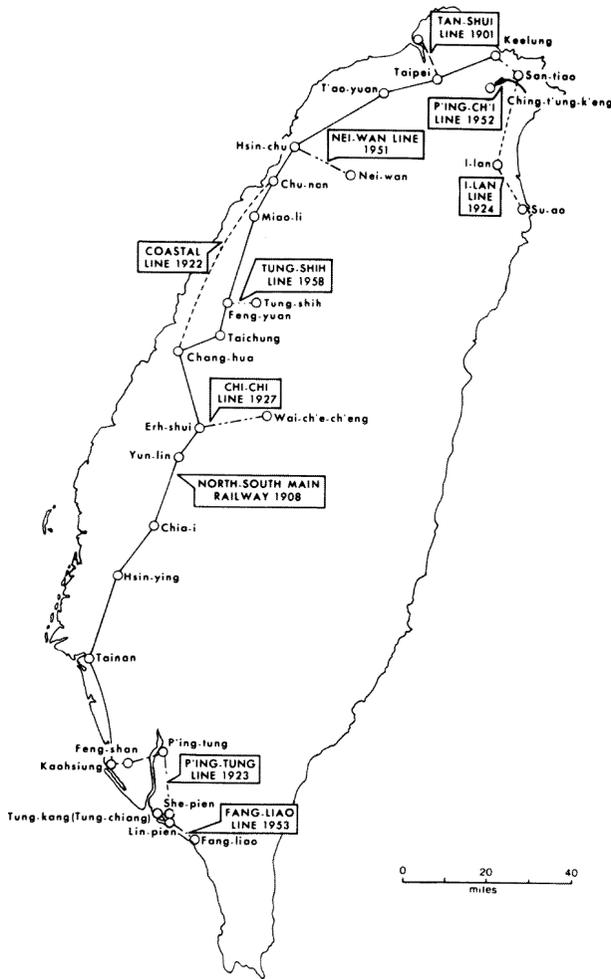


Figure 9-5. Topological map of the railway network.

added to the North-South Main Railway during the Japanese regime and after the return to China: the P'ing-tung Line in 1923, the I-lan Line in 1924, the Chi-chi Line in 1927, the Nei-wan Line in 1951, the P'ing-ch'i (Pinchi) Line in 1952, the Lin-pien Line in 1953, and the Tung-shih Line in 1958. Nevertheless, all the nodes from Hsin-chu to Erh-shui had very high values on both indices. The geometric center of the network from 1922 to 1958 remained at the same places, Chang-hua and

Chu-nan, both of which had similarly high values. Neither the political center, Taipei, nor the principal nodes in major economic areas, the southern plains during the Japanese regime and northern Taiwan after the return to China, have had significantly high index values since 1922.

Individual nodes with high accessibility and connectivity indices have not changed greatly since 1922 (Figure 9-6). Most of the new lines added to the North-South Main Railway line were merely short branches. There was no railway corresponding to the East-West Cross-Island Highway to connect the east and west sides of the island. The Central Mountain Range has acted as a major barrier to the development of the railway network. The T'ai-tung Line, the main north-south railway of eastern Taiwan, was isolated from the rest of the network until late 1979 when Hua-lien was linked with Su-ao. As part of Taiwan's ten major construction projects for the 1970s, this 88 kilometer line through rugged terrain cost US\$140 million. Twelve new capital construction projects for the 1980s include the completion of the round-the-island railway network with the construction of a link between T'ai-tung and P'ing-tung by mid-1980. Such lines will increase the accessibility and connectivity indices for centers east of San-tiao and south of Chia-i.

In summary, then, the urban centers in the northern and central parts of Taiwan have higher accessibility indices on both highway and railway networks than the rest of the island. Centers such as Chung-li, Hsin-chu, Chu-nan, Miao-li, and Feng-yuan have relatively high accessibility and connectivity indices, but they were more important militarily than economically in the past. They are located between the rolling hills in northern Taiwan and the western coastal plains and between the interior foothills and the western coastal plains. Military considerations influenced the location of transportation routes on the island. Nevertheless, the improvements in accessibility and connectivity in transportation attracted enterprising capitalists to locate their plants in these centers during the 1960s when the space around Taipei City was saturated. One finds an endless strip of factories along the Longitudinal Highway and the North-South Main Railway as one travels from suburban Taipei City to Chung-li in T'ao-yuan *hsien*.

The nodes in southern Taiwan are less connected and accessible to both the highway and railway networks, especially Kaohsiung. Since the 1950s Kaohsiung has been the biggest international harbor on the island in terms of volume of cargo handled. It became more important to the island's economic de-

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*TABLE 9-9*  
*Nodal Accessibility Indices of Taiwan's Railways*

Node	1893	1901	1908	1922	1923	1924	1927	1951	1952	1953	1958
1. Keelung	18.75	15.38	4.35	1.95	1.63	2.79	2.71	2.31	2.85	2.57	2.27
2. San-tiao						1.64	1.26	1.26	2.06	2.09	1.72
3. Ching-t'ung-k'eng									0.95	0.86	0.71
4. I-lan						0.95	0.71	0.69	1.18	1.07	0.87
5. Su-ao						0.42	0.31	0.19	0.49	0.49	0.40
6. Taipei	31.25	32.69	8.15	4.48	3.76	4.52	3.67	4.03	4.30	4.37	3.79
7. Tan-shui		15.38	4.35	1.95	1.63	2.03	1.60	1.75	1.90	1.80	1.56
8. T'ao-yuan	31.25	23.08	8.55	5.73	5.09	5.55	4.67	5.60	5.66	5.48	4.97
9. Hsin-chu	18.75	13.46	8.00	8.77	8.06	8.01	7.20	9.02	8.78	8.88	8.31
10. Nei-wan								3.84	3.76	3.68	3.41
11. Chu-nan			8.21	14.03	13.17	12.98	12.06	12.20	11.76	11.61	11.38
12. Miao-li			7.78	9.79	9.26	8.97	8.23	7.84	7.51	7.57	8.07
13. Feng-yuan			7.82	8.42	8.00	7.76	7.16	6.58	6.29	6.28	8.00
14. Tung-shih			3.31								
15. Taichung			7.48	9.68	9.18	8.91	8.54	7.80	7.45	7.42	7.95
16. Chang-hua			7.32	14.05	13.23	12.71	12.99	11.93	11.40	11.49	11.27
17. Erh-shui			6.86	8.35	7.83	7.53	9.59	8.55	8.17	8.10	7.68
18. Wai-ch'e-ch'eng							4.14	3.58	3.41	3.43	3.21
19. Yun-lin			6.35	5.22	4.86	4.50	5.54	4.72	4.49	4.50	4.17
20. Chia-i			5.50	3.34	3.16	2.82	3.20	2.68	2.55	2.53	2.28
21. Hsin-ying			4.48	2.20	2.24	1.88	2.00	1.59	1.51	1.49	1.31
22. Tainan			3.13	1.37	1.79	1.35	1.28	1.00	0.95	0.96	0.81
23. Kaohsiung			1.64	0.66	1.52	1.10	0.96	0.73	0.69	0.69	0.56
24. Feng-shan					1.47	0.94	0.75	0.56	0.53	0.59	0.47
25. P'ing-tung					1.36	0.91	0.69	0.51	0.48	0.54	0.43
26. She-pien					1.42	0.84	0.62	0.45	0.43	0.59	0.46
27. Tung-kang					0.67	0.44	0.32	0.23	0.22	0.28	0.22
28. Lin-pien					0.67	0.44	0.32	0.23	0.22	0.36	0.28
29. Fang-liao										0.18	0.14

velopment after the completion of the Export Processing Zone around the harbor area in the mid-1960s. Its accessibility to other nodes on the highway network, however, is less than that of Su-ao, one of the fishing centers in northeastern Taiwan. Its accessibility to other nodes on the railway network is lower than that of I-lan, a *hsien* (county) seat in the northeastern part.

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*TABLE 9-10*  
*Nodal Connectivity Indices of Taiwan's Railways*

Node	1893	1901	1908	1922	1923	1924	1927	1951	1952	1953	1958
1. Keelung	18.75	14.29	4.63	1.83	1.59	2.79	2.14	2.33	2.90	2.56	2.18
2. San-tiao						1.58	1.22	1.21	1.93	2.12	1.74
3. Ching-t'ung-k'eng									0.96	0.81	0.67
4. I-lan						0.95	0.69	0.70	1.20	1.00	0.82
5. Su-ao						0.40	0.30	0.28	0.45	0.50	0.40
6. Taipei	31.25	35.71	7.65	4.51	3.83	4.43	3.63	3.94	4.16	4.45	3.84
7. Tan-shui		14.29	4.63	1.82	1.59	2.04	1.59	1.77	1.94	1.75	1.51
8. T'ao-yuan	31.25	21.43	9.05	5.56	5.06	5.61	4.65	5.66	5.76	5.40	4.90
9. Hsin-chu	18.75	14.29	7.65	8.93	8.22	8.01	7.26	8.97	8.70	9.04	8.42
10. Nei-wan								3.89	3.82	3.65	3.39
11. Chu-nan			8.57	14.06	13.25	13.15	12.08	12.33	11.93	11.60	11.38
12. Miao-li			7.60	9.97	9.43	9.03	8.31	7.85	7.51	7.68	8.16
13. Feng-yuan			8.02	8.55	8.11	7.84	7.23	6.63	6.35	6.32	8.06
14. Tung-shih			3.34								
15. Taichung			7.38	9.77	9.28	9.03	8.57	7.86	7.53	7.46	7.99
16. Chang-hua			7.38	14.30	13.48	12.78	12.16	11.95	11.41	11.64	11.40
17. Erh-shui			6.75	8.34	7.87	7.62	9.57	8.62	8.25	8.12	7.69
18. Wai-ch'e-ch'eng							4.20	3.59	3.41	3.47	3.24
19. Yun-lin			6.32	5.20	4.90	4.50	5.62	4.73	4.49	4.54	4.20
20. Chia-i			5.34	3.23	3.12	2.81	3.15	2.67	2.54	2.53	2.27
21. Hsin-ying			4.41	2.07	2.17	1.85	2.00	1.58	1.50	1.48	1.29
22. Tainan			3.01	1.26	1.72	1.28	1.22	0.96	0.91	0.94	0.79
23. Kaohsiung			1.60	0.59	1.37	1.06	0.94	0.70	0.66	0.64	0.53
24. Feng-shan					1.39	0.83	0.66	0.49	0.46	0.55	0.44
25. P'ing-tung					1.16	0.87	0.66	0.48	0.45	0.48	0.37
26. She-pien					1.35	0.72	0.52	0.38	0.36	0.55	0.42
27. Tung-kang					0.56	0.42	0.30	0.22	0.21	0.24	0.18
28. Lin-pien					0.56	0.42	0.30	0.22	0.21	0.31	0.24
29. Fang-liao										0.17	0.31

At present, northern Taiwan is becoming saturated with industrial development. In central and southern Taiwan, by contrast, one can find isolated factories surrounded by farmland along transportation arteries. Hence it is likely that the flat central and southern parts of the island will be the areas for future development. The southern part of Taiwan was highly developed during the late nineteenth and early twentieth cen-

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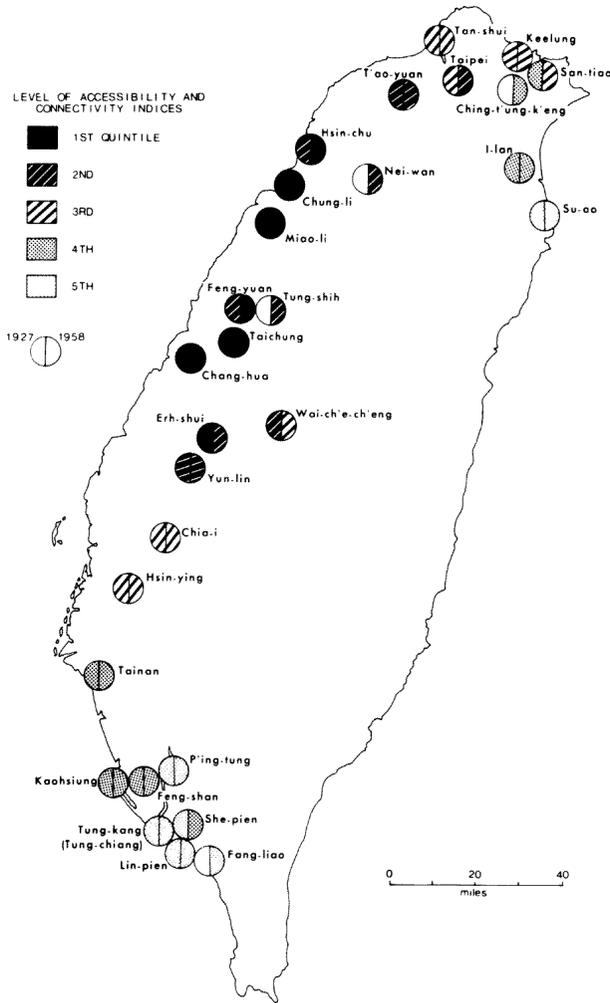


Figure 9-6. Nodal accessibility and connectivity of Taiwan's railways: 1927 and 1958.

turies and still supplies most of the island's food. Yet the mathematical analysis in this study shows that the nodes in the south are poorly connected to the rest of the island. To meet the needs of future development, the existing transportation network will need some adjustments such as those now being carried out as part of Taiwan's major capital construction projects.

## *CONCLUDING COMMENTS*

This study has focused on three aspects of Taiwan's transportation system. We began by examining the salient temporal changes in the highway and rail transportation networks from the 1600s to the present. Then we analyzed the connectivity of the highway and rail networks in this century and investigated the relationship between network connectivity and the level of regional economic development. Finally, we analyzed the accessibility and connectivity of urban centers, or nodes, on the highway and rail networks to examine in greater detail the spatial relationships between nodal location on a network and the level of economic growth at the urban center.

This research is set within a broad literature treating the interdependencies between transport and regional growth. It adds an empirical dimension to that literature by analyzing and interpreting the changing structure of Taiwan's transportation system. Some brief concluding comments are offered here to place these empirical findings within a conceptual framework.

The analysis and interpretation of transportation investment and development in Taiwan reveal parallels with the country's regional growth. It has not been possible at this level of study to establish the exact causal links between transport change and economic growth. It is nevertheless clear—whether for the Taiwan road and rail networks as a whole or for spatial variation within those networks on Taiwan—that expansion of transportation is associated with changing economic conditions on the island, especially in urban areas. The relationships, however, are not so invariant as to permit precise statistical prediction. Based on historical-geographical evaluation and quantitative analysis, this study demonstrates both where and why transportation development has taken place in Taiwan.

Since the late nineteenth century the transportation sector in Taiwan has been a major beneficiary of an investment pattern of capital improvement. Since the investments tended to be at nodal points, transportation could be said to have stimulated development because locations with high connectivity and accessibility were seen as more attractive. At the same time, investments at nodal points generated demands for improvements in transportation services and facilities. With the transformation from an agricultural to a commercialized economic system, transport not only served the urban nodes in their exchange patterns with one another. Agriculture also benefited. As market access for agricultural products was increased, agri-

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culture underwent certain changes and agricultural materials were more easily transported. Rural market centers began to flourish and in turn became more closely integrated economically and linked by transport to bigger cities. Although the development of transportation on Taiwan has been complex, this sector has interacted with other economic sectors in both a push and pull fashion. It comes as no surprise, then, that the structure of the transportation network at any given time has been a reflection of the interplay of economic, administrative, and social forces in a specific geographical setting.

# 10

## Push Car Railways and Taiwan's Development

*RONALD G. KNAPP*

Japan's acquisition of Taiwan in 1895 linked an island of substantial economic potential to a fledgling colonial empire. By almost any measure, considerable economic development took place throughout the following fifty years of Japanese occupation. During this period an economy that had been fragmented and largely subsistence oriented was transformed into one which was increasingly integrated and produced a considerable export surplus. Although industrial development occurred, Japanese colonial policy principally stimulated agriculture, orienting this sector to serve domestic needs on the home islands. The infusion of Japanese capital—in human and material terms—resulted in time in a modernized transportation system and communications system, a pervasive educational system, and a highly productive agricultural system based on technological and institutional improvements that were the envy of other colonial powers. The story of this achievement is well known and need not be elaborated here.<sup>1</sup>

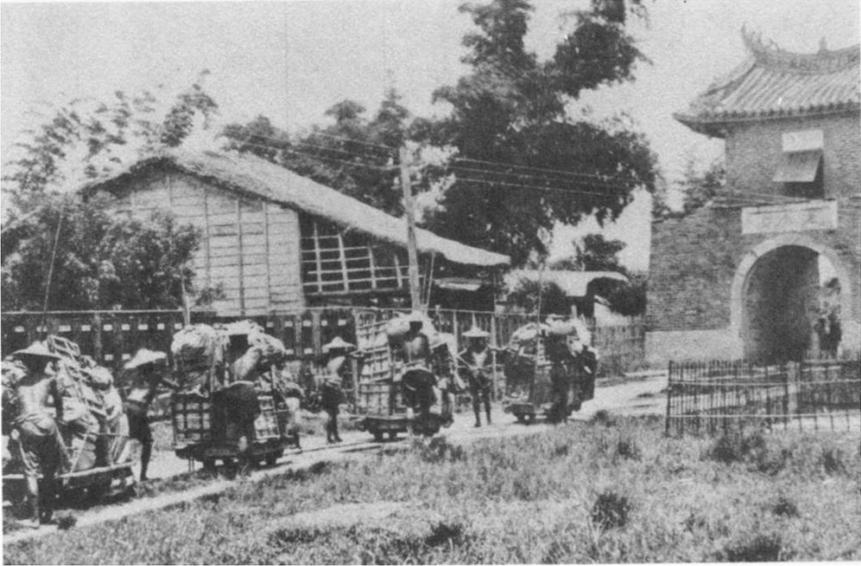
At the core of the Japanese development program was the creation of a transport network that would permit the permeation of colonial military and civilian control to the local level and, as well, facilitate the outward movement of agricultural goods. The Japanese inherited a skeletal transport system that had evolved during more than two hundred years of Chinese occupancy of the island, a topic described in the preceding chapter. The overall sequence of Taiwan's network development was essentially similar to that documented elsewhere in the colonial and then developing world.<sup>2</sup> Indeed, James Wheeler and Clifton Pannell have suggested the Taiwan example as having specific utility in verifying the generalized Taaffe model.<sup>3</sup> Ports, roads, and steam railway lines were universal components of these network sequences. In the case of Taiwan, these elements were supplemented by a distinctive and imaginative

transport innovation: the push car railway. This important and short-lived form of intermediate technology has been ignored by most writers as a factor which stimulated the agricultural sector to produce a marketable surplus. Although it is not possible to measure the role played by push car railways, it seems certain that the small farm-holding system could not have been so quickly articulated without them.

Narrow gauge push car railways were introduced to the island in the months immediately after Taiwan was ceded to the Japanese. Over the next fifty years, they brought quasi-modern freight and passenger service to rural and urban settlements throughout the coastal plains which rim Taiwan. In most cases, this innovation preceded roads into rural areas and provided feeder service to the north-south trunk steam railway which was completed during the first decade of the Japanese occupation. With minimum capital investment and maximum flexibility, push car railways stimulated the transformation of an underdeveloped agricultural sector into a productive one. Moreover, they provided an effective integrating mechanism for administrative control. This chapter places the push car railway in the context of transport development in Taiwan. It focuses on the nature and extent of the lines and examines their role in the articulation of the fragmented markets inherited by the Japanese.

### THE EQUIPMENT

Push car railways were called *daisha* in Japanese; because of their significance during the Japanese period this name will be used rather than the Chinese pronunciation of the same characters, *t'ai-ch'e*. The name literally indicates a platform car somewhat like the trams used in early coal and ore mines. Unlike the pump handcar used widely on western American railways during the late nineteenth century and to which the *daisha* is a crude kin, a *daisha* was propelled from behind by one or two persons who pushed on vertical poles extending above the platform. A narrow ledge at the rear enabled the pushers to gain a toehold respite on downhill runs. Loads of up to 450 pounds could be transported on each platform car (Figure 10-1). Modified with benches and a covering awning, passenger *daisha* could carry up to four riders (Figures 10-2 and 10-3). Light 12-pound rails were either screwed or spiked to small-diameter unfinished logs laid on a crude roadbed. The

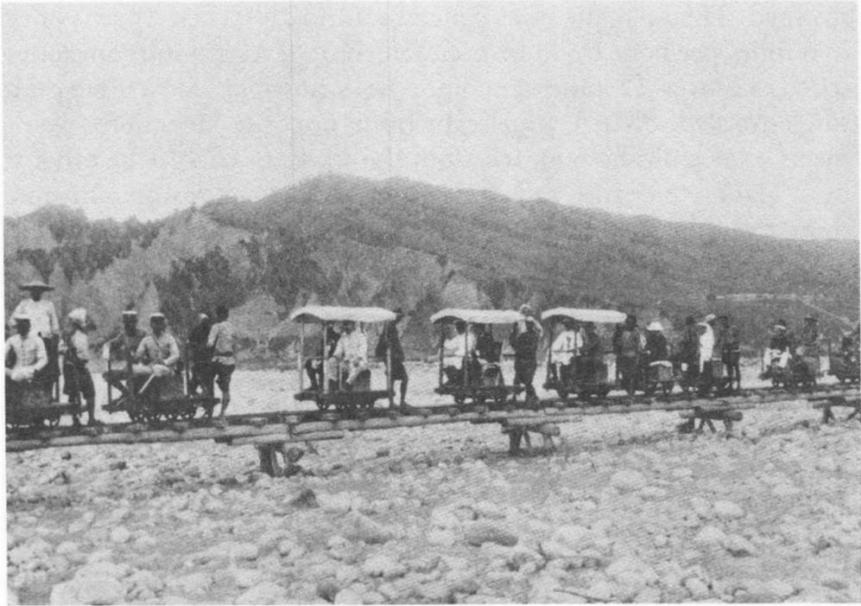


*Figure 10-1. Moving freight by daisha. [From Alice Ballantine Kirjassoff, "Formosa the Beautiful," National Geographic Magazine 38(March 1920).]*

rail gauge was generally 18 to 20 inches. Speeds of up to 6 miles per hour could be maintained on level ground; on slopes, speeds of over 12 miles per hour were possible. Most lines were single-tracked. When push cars from opposite directions would meet, one would be removed from the tracks to enable the other to pass. Elaborate trestles and bridges were built to cross the numerous short rivers of the western coastal plain which frequently flooded (Figure 10-4).

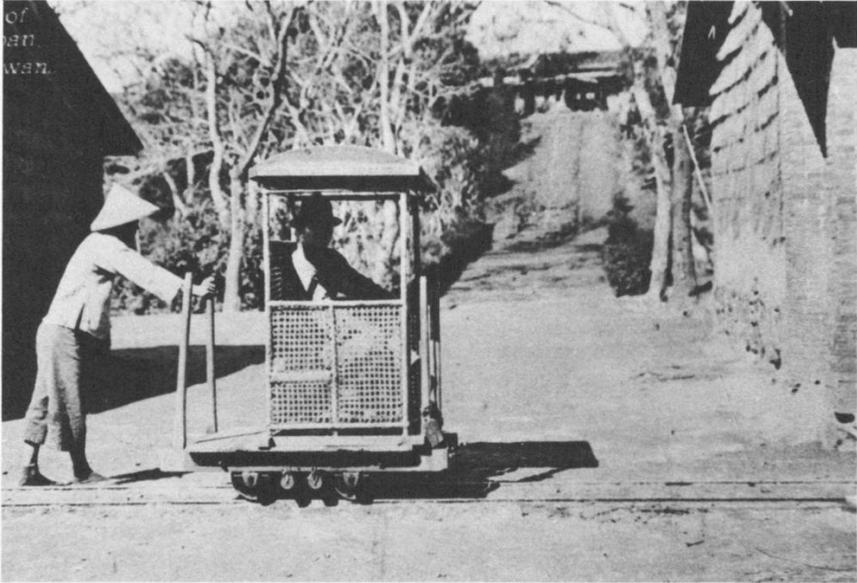
### *THE INHERITED TRANSPORTATION PATTERN*

In the decades prior to the Japanese arrival in 1895, north-south travel was slow and tedious in spite of a Chinese imperial roadway which linked the administrative subcenters and market towns of the western coastal plain. Along this route post stations were sited to provide shelter and meals for officials in transit as well as for couriers transmitting documents. Some indication of the quality of the imperial road is suggested by the fact that dispatch service in Taiwan was only on foot whereas



*Figure 10-2. Passenger traffic across one of Taiwan's rubble-strewn riverbeds. [From Yosaburo Takekoshi, *Japanese Rule in Formosa* (New York: Longmans, Green, 1907).]*

routes on the mainland were usually serviced by mounted courier.<sup>4</sup> The overland journey from Tan-shui to T'ai-wan-fu (now Tainan), about 350 kilometers apart, took as many as nineteen days as one nineteenth-century English traveler noted.<sup>5</sup> Difficulties encountered in moving bulk shipments of rice from one part of the island to another frequently necessitated transporting the staple by junk from one Taiwan port to Amoy or Foochow on the mainland and then transshipping it back to another island port.<sup>6</sup> Within the constricted hinterlands of market towns and ports or coastal anchorages, Chinese settlers moved by foot along paths which followed streams or ran along narrow embankments separating one paddy field from another. Since the geometry of these embankments was irregular, the shortest traveling distance between settlements was less likely a straight line than a zigzag route enforced by plot margins. Locally, the shoulder pole was used for carrying goods. Coolie-borne palanquins carried travelers from one area to another.



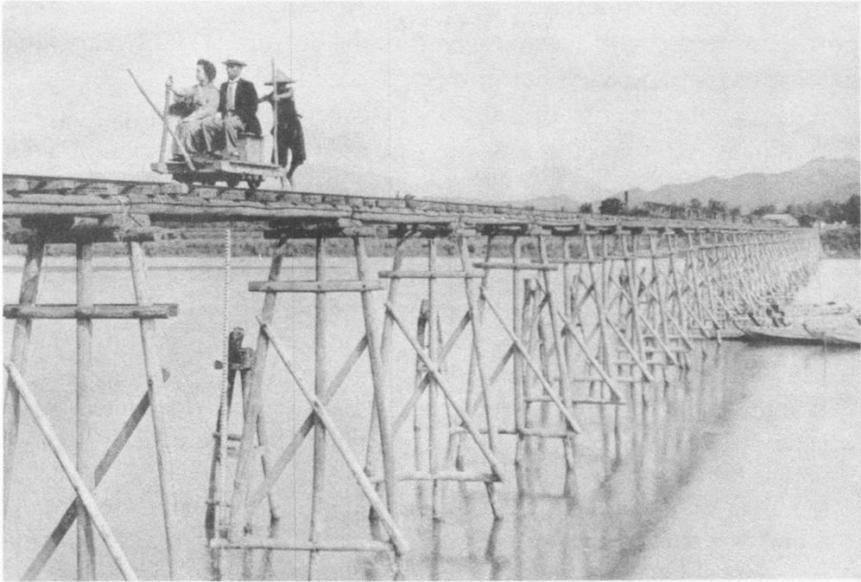
*Figure 10-3. Passenger daisha at Mt. Kappan (Chiao-pan-shan). [From the collection of Professor Michael Finnegan.]*

Taiwan languished fairly remote from imperial authority and systematic development until the island was elevated to provincial status in 1887. The appointment of an able governor led to dramatic improvements in the modernization and economic integration of the island.<sup>7</sup> Prominent among his efforts was a steam rail line that stretched southward from the port of Keelung through Taipei to a temporary railhead at Hsin-chu. Beset by labor and construction difficulties, this 80-kilometer line took six years to lay. Poor land transport frustrated the provincial government during its final years, and in 1895 the Japanese fell heir to a fragmented economy.

Japanese judgments of turn-of-the-century transport in Taiwan were harsh. After visiting Taiwan, one member of the Japanese Diet wrote of

the difficulty of traveling from one part to another, there being nothing in the island worth calling a road. There were paths leading from village to village; there were some country roads connecting the towns with the surrounding villages; but it was impossible to find anything like a State or Government road from

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*Figure 10-4. Passenger traffic across a high trestle. [From Joseph Ballantine, "I Lived on Formosa," National Geographic Magazine 87(January 1945).]*

town to town.... State as well as commercial relations were confined within very narrow limits, the villages depending on some small town which they had taken as their center. Even the country roads above mentioned which ran from village to village were not like those in Japan, but were rather boundary lines round the farms, being in most cases little more than a foot wide. Travelers were obliged, therefore, either to walk or go in chairs.<sup>8</sup>

Inadequate transport was both a cause and a result of the low productivity of agriculture. "The economy," say Chang and Myers, "was basically subsistence oriented, made up of numerous insulated markets that had little possibility of expanding or integrating without major improvements in communications, transport, and financing."<sup>9</sup> Great intraisland disparities in commodity prices resulted from this restricted market situation (Table 10-1). It would be wrong to suggest that changes in communications, transport, and financing alone expanded markets and stimulated agricultural productivity. They were crucial,

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TABLE 10-1  
*Market Price Comparisons (in Yen): ca. 1907*

Market	Unhulled Rice (5 bushels)	Sweet Potatoes (100 <i>chin</i> ) <sup>a</sup>	Fowl (100 <i>chin</i> )	Coal (100 <i>chin</i> )
Taipei	5.36	0.96	26.87	0.35
Hsin-chu	4.92	0.75	23.00	—
Miao-li	3.93	0.66	—	—
Tainan	5.10	0.62	22.50	1.00
Chia-i	3.20	0.55	18.75	1.00

<sup>a</sup> 1 *chin* equals 0.5 kilogram.

SOURCE: *Yoszbuto Tikekoshi, Japanese Rule in Formosa* (New York: Longmans, Green, 1907), p. 270.

however, and together with institutional and scientific improvements led to rapid and sustained agricultural growth over a three-decade period.<sup>10</sup>

### JAPANESE IMPROVEMENTS

The Japanese occupation authorities acknowledged these inadequacies and disparities, but initially they spurred transportation improvements only to secure order. During the early months of the occupation, pacification efforts were challenged by bands of brigands roaming the island. From 1897 to 1901, according to a Japanese visitor, “no government official or rich man could travel any distance without police protection. Within three or four miles of the capital travelers had to defend their lives with swords and pistols.”<sup>11</sup> The American consul on Taiwan accompanied Japanese troops on some maneuvers and offered an account of the wearisome single-file marches of infantry who were unaccustomed to the “blazing sun and hot, damp nights” of the subtropics.<sup>12</sup> As insurgency turned to outright rebellion and general lawlessness, it became necessary to move increasing numbers of troops and ordnance. This need spurred the building of the first push car railway on Taiwan. Like the ricksha, which had been introduced into Japan in the mid-nine-

teenth century, reportedly by a western missionary, the push car railway proved an especially suitable innovation in transport technology.<sup>13</sup>

In December 1895, only eight months after Japan had proclaimed sovereignty over the island, a light push car railway was completed between Tainan and Kaohsiung.<sup>14</sup> By February 1898 this line had been extended northward to Hsin-chu where it joined the steam railroad. In 1899, work was begun on rebuilding the Chi-lung to Hsin-chu steam line itself, which had suffered from poor engineering when it was originally built by the Chinese. At this time, there were 359 kilometers of push car railways and 97 kilometers of steam railway lines on the island.<sup>15</sup> Over the next four decades, steam railroad trackage increased steadily to 910.7 kilometers.<sup>16</sup> Push car railways, on the other hand, experienced a varied pattern of punctuated growth and decline vis-à-vis steam railways (Figure 10-5).

In most cases *daisha* routes preceded steam railroad lines and improved roads, providing a relatively inexpensive and easily constructed transportation mode. During the formative period of modern transport development, the *daisha* served as a flexible means for the articulation of fragmented markets and enabled the immediate penetration of Japanese civil and military authority to many inhabited areas. Along the coastal plain the combined *daisha*/steam railway lines formed the backbone of the trunk route until the completion of the all-steam trunk line. Indeed, an English-language handbook for travelers compiled at the turn of the century recommended the "narrow-gauge tramway ... consisting of open trucks furnished with seats and pushed by men."<sup>17</sup> These combined routes allowed a traveler to make it between Taipei and Tainan in two days. The extension of the steam railhead southward rendered a parallel push car line obsolete and as a result the redundant light tracks were torn up. By the time steam locomotives reached Kaohsiung in 1905, Taiwan was firmly under Japanese control and the military need for the push cars had lessened. Because of these changes and consequent abandonment of routes, the remaining short and unconnected *daisha* lines added up to only 267 kilometers in 1909. Such a low figure was not to be seen again until the 1950s. Steam railroad trackage, on the other hand, increased meanwhile to 436 kilometers. Moreover, parallel to the railroad "a good wide carriage road" passable in all seasons was available, having been completed in late 1904.<sup>18</sup>

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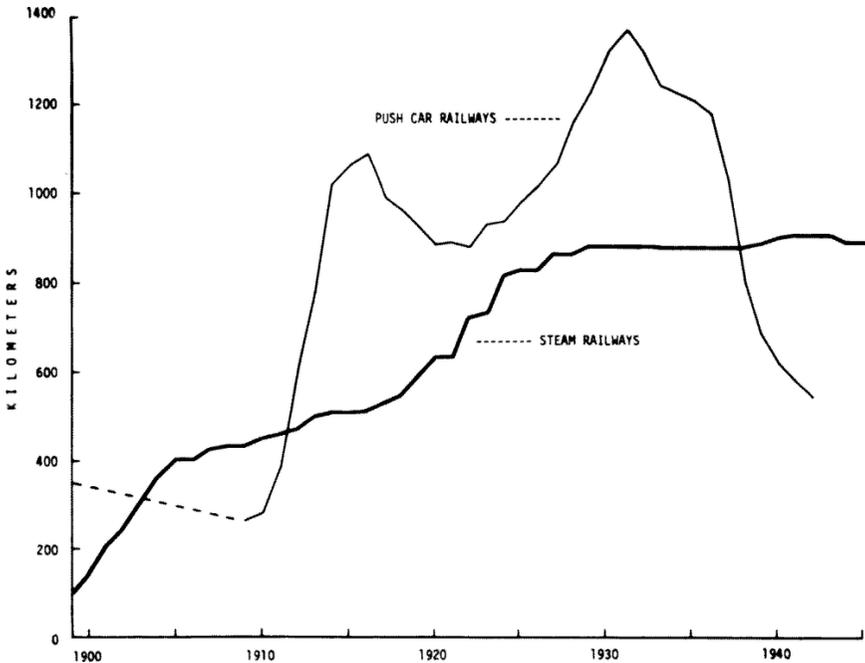


Figure 10-5. Patterns of push car and steam railway development.

Much of the abandoned military *daisha* trackage and equipment came into the hands of private entrepreneurs who recognized the push car lines as an appropriate means to open up the potentially productive local hinterlands of market towns strung out along the trunk road and steam rail lines. *Daisha* routes, in this way, preceded local roads and competed only with narrow intervillage paths. *Daisha* as a simple transport mode generated bulk goods traffic that would otherwise have been carried on shoulder poles or in push or pull carts. Over the next forty years, centripetally oriented systems of access routes evolved which are seen today in the extant road pattern. Such local radial systems focused on specific market centers that were themselves interconnected by the longitudinal trunk lines. Later in this chapter I assess the role of *daisha* in a local area.

Total island-wide *daisha* trackage reached 1,087 kilometers in December 1916. The *daisha* vehicles themselves increased from 1,902 units in 1909 to 5,913 units in 1916; moreover, they continued to increase to more than 7,000 in 1919. By then,

however, total trackage had decreased—primarily because of consolidation and the elimination of unprofitable lines. A revision of government regulations regarding privately operated *daisha* routes in 1922 stimulated freight and passenger traffic. Trackage again was expanded, reaching 1,367 kilometers in 1931. Freight revenues swelled to 1,670,000 yen in 1927; by then the annual volume of freight carried reached more than 840,000 metric tons. Passenger traffic peaked in 1928 at a figure of more than 5,300,000.<sup>19</sup> Subsequent declines in trackage, units, and volume of passenger and freight traffic resulted from the improvement of roads and the competition of trucks and buses.

### THE DAISHA AND LOCAL DEVELOPMENT

In 1934, sixty-two regionally restricted companies operated push car lines on the island, with company trackage varying from 1.2 to 104 kilometers. Some companies operated with as few as 3 *daisha*; one had 550. As a means of transport, the *daisha* took on different meaning from one district to another (Table 10-2). Total trackage was greatest in the Hsin-chu district, where the coastal plain is framed on the east by numerous jutting tablelands and cut by several streams which flow westward to the Straits of Taiwan. When expressed as a ratio, passenger per kilometer loads were highest in the Taipei district. Freight, as well, was greatest in the Taipei district, feeding coal to the trunk steam line and camphor and tea to the refineries at the capital. The principal company in this district carried almost half a million passengers as well as 150,000 metric tons of freight during 1934 on its 45 kilometers of light track.<sup>20</sup>

At this point it will be useful to change the scale of the discussion and examine the role played by *daisha* in one part of Hsin-chu district. On the T'ao-yuan alluvial fan it is possible to examine the changing fortunes of the *daisha* companies in relation to alternative transportation modes. An analysis of the evolving network provides insights into the process of transport improvement and its complementarity with local development.

Throughout the eighteenth and nineteenth centuries, arduous reclamation by migrants from the mainland transformed the T'ao-yuan into productive wet rice fields.<sup>21</sup> The settlers moved on foot and, as elsewhere on the island, narrow paths followed shallow stream banks or ran along the narrow em-

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TABLE 10-2  
*Daisha Statistics for 1934*

	Taipei District	Hsin-chu District	Taichung District	Tainan District	Other
Number of companies	8	17	18	14	5
Trackage (km)	147	400	365	261	72
Number of <i>daisha</i>	572	1,772	1,628	767	193
Passengers	948,533	701,849	966,475	346,071	123,059
Freight (metric tons)	226,278	215,531	170,497	58,266	5,126

SOURCE: Tseng Wang-yang, *T'ai-wan chiao-t'ung shih (Taipei: T'ai-wan yin-hang, 1955)*, pp. 66-67.

bankments that separated paddy fields. The area had no imperial administrative capital to which economic functions could gravitate. Agriculture was subsistence oriented and production never in sufficient abundance to nurture long-distance trade. Economic development during this period depended more upon the growth of population and expanding reclamation of land than it did upon commercialization. Stimulated by increased world demand for tea and the existence of an open port in northern Taiwan, European and American concerns in the latter half of the nineteenth century encouraged the market-oriented cultivation of tea on the acidic hillsides that framed the upstream areas of the T'ao-yuan plain. By 1887, some 86 percent of the value of Taiwan's total exports was from these northern tea fields.<sup>22</sup> Although camphor manufacturing had had a long history on the island, the natural stands of camphor on hill lands to the east of the T'ao-yuan plain were only exploited from 1887. In that year, the governor nationalized camphor gathering and processing, making it a government monopoly, and established bureau headquarters at Ta-k'o-k'an (subsequently renamed Ta-

ch'i). As an active river port, Ta-k'o-k'an grew so rapidly that by 1900 it had a population greater than that of any town on the T'ao-yuan plain.<sup>23</sup>

By this time, however, the Tan-shui River which linked Ta-ch'i with the Taipei basin and the ports of northern Taiwan had increasingly become clogged with silt and was unusable even by shallow-draft vessels. To compensate for the silting of a primary trade route, a 14-kilometer *daisha* line was built from the former river port to the steam railway station at T'ao-yuan town.<sup>24</sup> Meanwhile, in other areas of the island the revenue potential that could be derived from tapping the surplus produce of Taiwan's peasants drew private capital into this transport sector. In the decade after 1909, *daisha* trackage burgeoned.

Increased *daisha* trackage on the T'ao-yuan plain, however, was delayed because natural rather than technological factors conspired to retard agricultural productivity. The principal impediment had been the year-to-year variability of rainfall, a condition which eighteenth and nineteenth-century pioneers had contended with by building shallow ponds and limited canals.<sup>25</sup> Nowhere else on the island were ponds found in such numbers; by the twentieth century some eight thousand ponds of various sizes occupied 9 percent of the T'ao-yuan alluvial plain.<sup>26</sup> In spite of these efforts and careful tillage, the population-supporting capacity—and therefore the potentiality of a large agricultural surplus—lagged behind other areas until the water problem could be thoroughly resolved.

A major drought in 1913 and the desire of the government to stimulate rice production in areas closer to the colonial capital at Taipei prompted a decision to build the T'ao-yuan irrigation canal with funds allocated from the colonial treasury. Construction began in 1916 and was completed in 1928. Water was drawn from the Tan-shui River above Ta-ch'i and carried through a tunnel for 16 kilometers before it was distributed by a number of subsidiary canals.<sup>27</sup> Simultaneously, local efforts were encouraged to undertake improvements in the distribution and size of ponds. The full impact of these changes occurred at elevations below 100 meters. Irrigated acreage increased by 28 percent overall, although in some areas it exceeded 50 percent. Double-cropping was assured. Per hectare yields between 1921 and 1925, even before the project was fully operational, increased 50 percent on the alluvial plain as a whole. In some townships increases exceeded 100 percent.<sup>28</sup> Meanwhile, the T'ao-yuan area was joined with the Hsin-chu area in 1920 to form the large prefecture of Hsin-chu. Farmers' as-

sociations were prodded by the government to increase their investment in extension and demonstration work. In 1922, a high-yield variety of rice, *horai (p'eng-lai)*, especially preferred by Japanese consumers was introduced to the peasants of Hsin-chu through the farmers' associations. Newfound rural prosperity evidenced itself in reduced tenancy, small increases in farm size, and proportionally greater household expenditures for housing, clothing, and other nonfood items.

The proximity of the T'ao-yuan plain to the colonial capital as well as the prospects of heightened prosperity there brought entrepreneurs to the area, perhaps none of whom anticipated the magnitude of the commercialization of agriculture which was to come during the 1920s and 1930s. Between 1912 and 1919 fourteen *daisha* routes were added to the original T'ao-yuan/Ta-ch'i route which had been built in 1904 (Table 10-3 and Figure 10-6). Operated by three companies, each focusing on one market town along the trunk steam line, these *daisha* routes facilitated the profound changes which were to take place in the T'ao-yuan countryside. Passenger and freight traffic on these routes swelled. Annual passenger traffic increased to 354,829 in 1921 and peaked at a figure of 396,016 in 1928. Freight, principally agricultural produce, reached 62,134,160 *chin* in 1921, almost tripling to 168,204,800 *chin* in 1928. Without the *daisha* it is unlikely that agriculture would have become so commercialized so quickly because peasants would have been unwilling to produce a surplus unless it could be moved to market.

The monopoly on the transport of goods and passengers enjoyed by the *daisha* companies was altered ultimately, however, by the government's decision to spur the construction of roads in rural areas. Having completed at the expense of the colonial treasury the principal arteries of Taiwan's transportation network by 1925, the governor-general's transportation bureau charged each of its prefectural and subprefectural units with the capitalization of local roads of varying widths, some to carry motor vehicles and others only pedestrians and animal-drawn carts. Aware of the traffic generated by *daisha* between certain points, motor feeder routes were built parallel to the profitable private *daisha* lines. Such public roads undercut *daisha* advantages and brought about competition. The decline in *daisha* traffic was not precipitous but it was certain, as less costly bus and truck transport took to the roads that were being laid out at government expense alongside the *daisha* tracks (Table 10-4). By 1935, fourteen prefectural roads with widths between 7.4 and 11 meters had been built between T'ao-yuan, Chung-li,

## CHINA'S ISLAND FRONTIER

TABLE 10-3  
*Daisha Routes on the T'ao-yuan Plain*

Route	Length of Track (km)	Date Established	Date Curtailed
<i>T'ao-yuan Push Car Company (33 stations; 340 daisha)</i>			
T'ao-yuan to Ta-ch'i	14.2	1904	n.a.
T'ao-yuan to Ta-yuan	16.1	1912	1939
T'ao-yuan to Nan-k'an	6.4	1913	1939
T'ao-yuan to Hsin-chuang (via Ling-ting)	15.1	1912-14	n.a.
T'ao-yuan to Chu-wei	11.3	1919	1939
Pa-kuei-ts'o to Chung-li (Keng-liao-chiao-Ch'ing-pu)	16.3	n.a.	1939
Ta-ch'i to Chiao-pan-shan	22.9	n.a.	1953
<i>Chung-li Push Car Company (22 stations; 223 daisha)</i>			
Chung-li to Lung-t'an	n.a.	1918	1935
Chung-li to Kuan-yin	n.a.	1918	1953
San-ts'o-wu to Hsin-wu	n.a.	1918	1935
Chung-li to Tung-shih	n.a.	1918	1935
Hsin-p'o to Ts'ao-lo	n.a.	1918	1935
<i>Yang-mei Push Car Company (16 stations; 74 daisha)</i>			
Hsin-wu to Shih-lei-tzu	n.a.	1918	1939
Yin-ying-wo to Ta-p'o	31.9	1918	1939
Yang-mei to K'an-t'ou-ts'o	n.a.	1918	1939

SOURCE: *T'ao-yuan hsien-chih, chuan szu, ching-chi-chih, hsia [T'ao-yuan hsien gazetteer, vol. 4, economics], pp. 57-61*

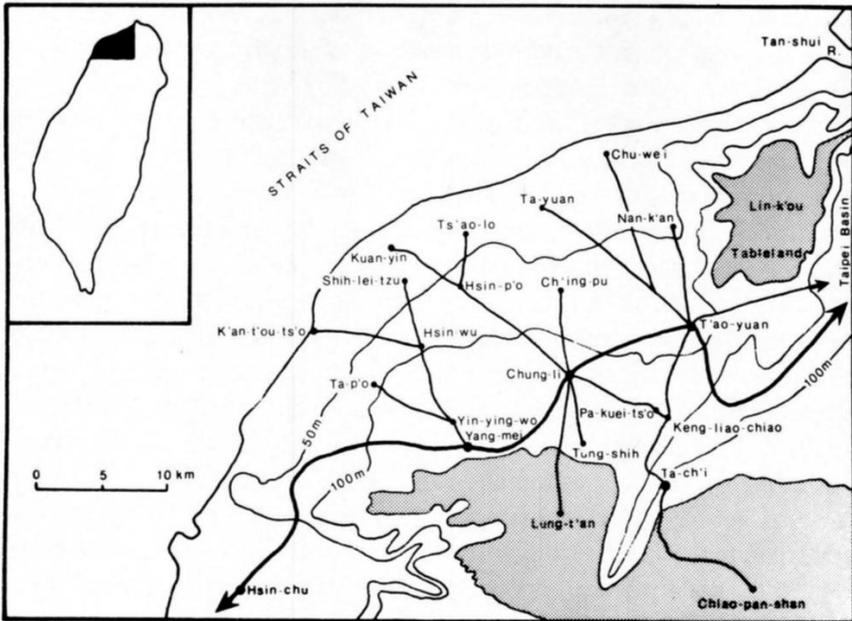


Figure 10-6. Push car railway development on the T'ao-yuan plain ca. 1930.

Yang-mei, and the outlying township seats.<sup>29</sup> Intending to monopolize passenger revenue, the T'ao-yuan Push Car Company organized a bus company in 1923 whose service ran parallel to its own *daisha* route between T'aoyuan and Ta-ch'i. Similar competing service developed between other pairs of towns throughout the 1920s and 1930s. Thus the push car companies were able to introduce buses over routes which were to supplant their original *daisha* routes with little loss of passenger service to their rural patrons. The shift in passenger service was direct and rapid. By 1939, passenger traffic on *daisha* had decreased by 96 percent over the 1921 statistic.

On the other hand, freight traffic on *daisha* increased throughout the 1920s by almost three times before declining. Even in 1939, *daisha* were carrying nearly one-third the freight carried in 1921. For the most part, there was no dramatic shift in this sector to a modern twentieth-century mode of vehicular transport in the moving of agricultural produce. Although the roads were not built for their special benefit, peasants took to the roads, using slack-season labor to transport much of

## CHINA'S ISLAND FRONTIER

TABLE 10-4  
*Daisha Traffic on the T'ao-yuan Plain*

Year	Passengers	Index	Freight ( <i>chin</i> )	Index
1921	354,829	100.00	62,134,160	100.00
1928	396,016	111.60	168,205,800	270.71
1933	171,358	48.29	55,391,680	89.15
1935	224,941	63.39	70,390,380	113.29
1938	90,804	25.59	38,223,180	61.52
1939	13,330	3.76	22,083,860	35.54
1942	57,818	16.29	5,074,849	8.17

SOURCE: *T'ao-yuan hsien-chih, chuan szu, ching-chi chih. hsia, [T'ao-yuan hsien gazetteer, vol. 4, economics], p. 59*

their own produce to market. During the 1920s and 1930s, improved oxcarts—some with rubber tires—increased islandwide to 65,000 in 1935. Furthermore, the number of bicycles, most with a freight platform on the rear, increased from 32,140 in 1922 to 248,328 in 1935.<sup>30</sup> Beyond doubt there was a marked heightening of accessibility for even a runner with a carrying pole as straight and level routes took the place of winding paths. Although comparative haulage costs are not available for trucks or carts in contrast to push car railways, figures are obtainable that place the *daisha* at a clear time and cost disadvantage when compared to motorized buses in carrying passengers (Table 10-5). This information indicates the ability of bus lines to offer lower fares and cut the travel time by over 50 percent.<sup>31</sup> *Daisha* fares, moreover, generally varied with the terrain and the weather. By the mid-1950s, *daisha* passenger fares averaged 0.07 yen per mile as compared to 0.05 yen per mile for buses. Average per mile fares on ordinary trains were 0.065 yen for first class, 0.045 yen for second class, and 0.025 yen for third class.<sup>32</sup>

The *daisha* had become extravagant relicts past their peak utility. On the T'ao-yuan plain, *daisha* lines were curtailed one by one beginning in 1935. By 1940, most had been abandoned and the traffic absorbed on the roads. During World War II a cu-

rious revival occurred because of gasoline shortages, but this recovery was shortlived. Some of the lines were dismantled and taken into the rugged interior where they constituted the sole means of advanced transport until there, too, roads penetrated.

### SUMMARY

The factors involved in the elaboration of a transportation network are indeed complex. Improved transport not only stimulates geographic change; it is itself altered by the cumulative dynamics of that change. Moreover, although a basic transportation network assumes integrity in its wholeness, it must not be forgotten that most networks evolve in piecemeal fashion. The interdependency among existing transport modes and their aggregate impact on economic development can seldom be precisely discerned. In Taiwan the creation of an articulated multimodal transportation infrastructure was a necessary prerequisite to effective colonial control and exploitation. Over a period of half a century, the island was not only physically integrated through the expansion and upgrading of transport linkages. It was also transformed into a productive agricultural appendage of Japan.

Push car railways played a signal role in this development. As a flexible, low-cost mode of passenger and freight transport, *daisha* served well as the predecessor of the road and the railroad. Push car lines, furthermore, provided an efficient, centripetally oriented system of access routes radiating from market centers that were themselves interconnected by the north-south road and steam railway which terminated at the ports. They were instrumental in articulating the insular economies inherited by the Japanese. A unique component in the sequence of transportation development in Taiwan, *daisha* routes were later undercut by the development of feeder roads that not only enabled the passage of motorized vehicles but offered as well a surface favorable to carts drawn by people or animals. The overall technical improvements initiated by the Japanese during their colonial venture stressed the use of those factors which were abundant and untransferable with little opportunity cost. *Daisha* typified this use of limited technology in stimulating productivity and commercial accessibility in rural areas. This innovative transportation mode was land-saving and labor-intensive, it was compatible with a small-scale agricultural system, and it did not put demands on the scarce factors

## CHINA'S ISLAND FRONTIER

TABLE 10-5  
*Fare and Running Time Comparisons between Buses and Daisha*

Route	Daisha Service		Bus Service	
	Running Time (minutes)	Fare (yen)	Running Time (minutes)	Fare (yen)
T'ao-yuan to Nan-k'an	40	0.29	25	0.24
T'ao-yuan to Ta-ch'i	120	0.58	40	0.45
Chung-li to Kuan-yin	60	0.79	60	0.60
Chung-li to Lung-t'an	90	0.45	30	0.35
Yang-mei to K'an-t'ou-ts'o	90	0.45	45	0.45

SOURCE: *Taiwan (Formosa) Shinchiku Province, Civil Affairs Handbook (Washington: Office of the Chief of Naval Operations, Navy Department, 1944), p. 24; after Taiwan Tetsudo Annal (Taiwan railway guide] (Taihoku: n.p., 1932).*

of the economy. Today only vestiges of this intermediate technology are found in the high mountain core of the island and in the vicinity of several aboriginal villages visited by tourists.

# 11

## Sugar: The Sweetener in Taiwan's Development

JACK F. WILLIAMS

Francois Valentyn, in his seventeenth-century study *Oud en Nieuw Oost-Indien*, described the economy of Taiwan during the Dutch period: "The Chinese ... occupied themselves in trade and agriculture, by which latter means much rice and sugar was produced here, so that whole shiploads were annually sent to other places."<sup>1</sup> In that brief statement one has a succinct and accurate description of the economy that characterized Taiwan for most of the several centuries of the island's existence as a subregion of Chinese settlement and development. Rice, the dominant food crop, was used by the farmers for their sustenance, for sale on the local market, and for shipment to the mainland. Rice largely set the character of the rural landscape and agrarian cycle.

But also prominent in that landscape was sugar cane, the principal cash crop, grown by farmers as a main source of extra income. Sugar sold to middlemen eventually found its way on ships to foreign markets, earning much, in some periods most, of the foreign exchange for Taiwan. But even beyond export earnings, sugar was indeed a sweetener in the island's development. The growing, processing, and marketing of cane sugar had a profound and in many respects positive impact on various elements of the economy and agrarian structure—land use practices, agricultural modernization, farm prices and incomes, and employment. At the same time, however, the spread of cane cultivation and the growth of the sugar industry, especially during the Japanese colonial era, had a number of deleterious effects on the same agrarian structure and economy. Taiwan underwent an economic transformation after 1950: the relatively simple agrarian economic system based on the two cornerstones of rice and sugar evolved into a system that was highly diversified and industrialized. Still, although the relative position of sugar was diminished, the product remained a major element in Taiwan's

economic and cultural landscape. In short, no discussion of Taiwan's historical geography would be complete without reference to the role of the sugar industry.

### *THE INDUSTRY BEFORE 1895*

No one has yet been able to pinpoint the exact beginnings of sugar cane cultivation in Taiwan. The Chinese historical records are imprecise on this point. All that is certain is that sugar cane was already growing on the island when the Dutch arrived in 1624. It may be surmised that the Chinese immigrants who began to settle the island before the Dutch got there brought cane seedlings with them from their native provinces of Fukien and Kwangtung, historic areas of cane cultivation on the mainland. As pioneers setting off for what was then a little known and forbidding frontier island, the settlers brought with them seed for crops they were used to growing in their native areas, but without really knowing, in all probability, the suitability of Taiwan for the crops. With sugar cane, at least, there was no problem, as the island had a subtropical climate similar to that of Fukien and Kwangtung, one well suited to cane growing.<sup>2</sup> Cane flourished from the beginning, albeit on a small scale. By 1624, sugar was already a principal export item. In fact, the first difficulties between the arriving Dutch and the Chinese and some Japanese colonists already on the island arose from Dutch efforts to impose an export duty on sugar and rice.<sup>3</sup>

#### *The Dutch and Sugar*

The Dutch era was but a brief interlude in Taiwan's long history and left remarkably little permanent imprint on Taiwan's landscape. The Dutch entered Taiwan only as a second choice anyway, because of their being denied access to the mainland. But once established in their little toehold on the southwest coast of Taiwan, the Dutch set about making the most of their opportunities. Apart from their vigorous missionary activities, the Dutch aggressively promoted agricultural development in the limited areas under their control. This endeavor included the promotion of sugar cane, which the Dutch recognized as a profitable commodity for trade via their Dutch East India Company. Sugar exports rose, as a result, from a relatively low volume of 120,000 to 300,000 catties (79-197 tons) in 1636 to

a high of 2 million catties (about 1,300 tons) in 1660.<sup>4</sup> Ch'en Cheng-hsiang gives an even higher production figure of 6,000 metric tons of sugar by 1650, but, as James Davidson suggests, a figure of even 5,000 tons was probably exaggerated in view of the small area planted in cane at that time.<sup>5</sup> More significant is the fact that two-thirds of Taiwan's sugar was already going to Japan—a trading pattern established very early in the sugar industry's history.<sup>6</sup>

The Dutch impact, while of some consequence in helping spread the cultivation of cane and the growth of the sugar industry, should not be exaggerated. As Wen-hsiung Hsu notes in Chapter 1, there is some disagreement over the Chinese population on the island. Most of the island was under the control of non-Chinese aborigines who were outside the authority of the Dutch. George Candidius, the first Dutch missionary on the island, did write, however, that the aborigines close to the Dutch on the southwest coast had acquired at least some agricultural practices, including the planting of rice and sugar.<sup>7</sup> Nevertheless, the aborigines had little if anything to do with the sugar industry then; nor were they involved in succeeding periods right up to the present time. The Dutch enclave was a small territory less than the size of the present Tainan *hsien*. Control extended only sporadically and weakly beyond their enclave. Still, by encouraging Chinese immigration to the island, and by promoting the advantages of sugar cane in cropping systems, the Dutch at least set the initial pattern that was to be expanded upon in succeeding periods.

### ***The Cheng Period and Sugar***

Dutch plans for Taiwan were thwarted by the conqueror Cheng Ch'eng-kung (Koxinga) and his plans to use Taiwan as an economic and military base in his campaign to retake the mainland from the Manchus. Cheng also recognized the merit of vigorous sugar exports to help spur the economic revitalization of his island retreat. Hence he gave great impetus to the sugar industry, introducing large quantities of seed plants from Fukien, expanding the area under cane cultivation, and generally trying to modernize operations (by the standards of that day).<sup>8</sup> Cheng's son, Cheng Ching, paid even greater attention to the industry. By the close of the century, just after the Manchu government finally gained control over Taiwan, sugar exports had reached as much as 18,000 metric tons a year.<sup>9</sup>

*Ch'ing Rule and Sugar*

For slightly over two centuries following the collapse of the Cheng family rule on Taiwan (1683-1895), the island was ruled as a somewhat ill-regarded appendage to the mainland. The well-documented neglect of Taiwan during the Ch'ing dynasty, the longest continuous period of rule in Taiwan's history, extended to the sugar industry as well. The administration of the island reverted, in effect, to the various Chinese local groups. Operation of the sugar industry likewise reverted largely to private enterprise. Thousands of farmers continued to grow cane, and the milling and marketing of sugar continued on through the eighteenth century much as had been the practice before then. In the mid-1700s, Luchow, the famed Chinese statesman, noted the thousands of Taiwanese engaged in the sugar industry and remarked on the fact that a large share of the sugar consumed in China's northern provinces came from Taiwan. In 1833 the *Canton Register* recorded over twenty junks arriving at the port of Tientsin loaded with sugar from Taiwan.<sup>10</sup>

It was the stimulus of the western colonial powers in the nineteenth century, however, that sparked a considerable expansion of the sugar industry toward the close of the Ch'ing era on Taiwan. In 1856, Robinet & Company, an American firm, became the first westerners to have commercial operations on the island since the Dutch left almost two centuries earlier. The firm set up shop in the port of Takao (Kaohsiung) to handle exports of sugar (among other things)—principally brown sugar bound for Japan and both white and brown sugar destined for the China mainland. Before 1870, total exports of sugar had never exceeded 18,500 tons in any year. But then in 1870, due to growing demand in Australia, exports shot up to a record 37,000 tons. The years following 1870, however, up to 1895, were marked by extreme fluctuations in foreign demand for Taiwan's sugar as well as political complications such as the Sino-French War of 1884. The unstable demand had profound effects on domestic sugar production, a pattern that was to be repeated many times in the ensuing century. The vagaries of world supply and demand for sugar led to the elimination of the Australian market by 1875, leaving only Japan and California as major foreign buyers. The latter dropped out shortly thereafter when it passed a tariff law on Formosan sugar which made it uncompetitive against the growing American sugar industry.<sup>11</sup> Thus, by the early 1880s, Japan was the chief foreign customer

for Taiwan's sugar, belying the notion that Japan created an artificial colonial relationship with Taiwan insofar as sugar was concerned. In other words, Japan was a natural market for Taiwan sugar. Not only did Japan's rapid modernization and industrial growth lead to an increase in sugar consumption, but the source of that sugar was fairly close. In all likelihood, Japan would have become Taiwan's principal market for sugar even if Japan had never colonized the island.

The impact of Ch'ing administration (or rather the lack of it) was minimal on the sugar industry. The industry grew during the two hundred years of that rule, but its growth was largely initiated by private interests, stimulated toward the end by foreign intervention in China and the Far East and the rising industrial state of Japan. Nonetheless, the sugar industry was still very small at the turn of the century. Just as the Japanese were about to launch their massive expansion of the sugar industry in Taiwan, the total planted area in cane was not more than 14,000 hectares, over 80 percent of which was located in Tainan prefecture.<sup>12</sup> Yields were averaging anywhere from about 25 up to 50 tons per hectare—respectable figures for that period but quite low by modern standards.<sup>13</sup> Myers calculated that during the 225 years from the end of Dutch rule to the beginning of Japanese rule, sugar production on Taiwan increased about fiftyfold, or an annual growth rate of 1.75 percent, quite within the capabilities of the limited agricultural system of the time. But also significant was the fact that this increase was achieved almost entirely by expansion in the cultivated area of cane, not by increased productivity.<sup>14</sup>

The characteristics of the cane growing system in nineteenth-century Taiwan are important also. Davidson, who wrote at the turn of the century, described the system well.<sup>15</sup> The chief characteristic was the many forms that the system took. In the northern part of the island several types prevailed. Sugar factories (really just small primitive mills) were often owned by one man who obtained his cane supply from the private growers in the neighborhood. Sometimes a miller would handle all operations from cutting to selling the raw sugar, paying the cane farmers half the total receipts from the sale of the sugar. There were other arrangements as well. Sometimes sugar millers would loan farmers the money to cover costs of cultivation and then deduct that amount from the receipts of the sale of the sugar before paying the farmers.

In the southern part of the island, the contract system was highly developed. There land was almost all owned by powerful Chinese capitalists and landlords. They leased the land to farmers, taking as rent a share of the sugar equal to 15 to 20 percent of the land value. Farmers could apply for a production loan from one of the Chinese sugar merchants; in return the farmer had to agree to sell the lender his entire crop at the regular market price. Harvesting and milling of the cane were sometimes done by a group of farmers jointly erecting a co-operative mill. More commonly, however, milling was done by the moneylenders or a syndicate of brokers representing them. The farmers had to send their cane to the mill controlled by the moneylender, who kept 7 percent as payment for milling plus other deductions (for production loans and so forth). In yet another variation, the moneylender would estimate in advance the production of a field and make an offer to the farmer; if the offer was accepted, the mill would send laborers to harvest and transport the cane to the mill. This was a gamble for the mill owner that, depending on events between planting and harvesting of the cane crop, could pay well or boomerang.

The mills themselves were modest operations indeed. The typical factory was a small, crude structure, with traditional machinery and facilities that were very inefficient in their recovery rate of sugar from the cane. The average mill had ten to fourteen workers plus perhaps seven coolies to transport the cane and sugar. It was estimated that there were 1,400 of these tiny Chinese traditional mills in operation when the Japanese took over.<sup>16</sup>

These complex variations in the cane growing system grew haphazardly out of the give-and-take of a relatively free market economy. Yosaburo Takekoshi, writing about the same time as Davidson, but much more critically of the pre-Japanese era, noted that in the typical situation in the south, the sugar factory owners reaped exploitative profits. Factory owners took 15 to 20 percent of the cane as rent from tenant farmers, another 14 to 24 percent as interest on money loaned for production costs or other purposes, and as much as 50 percent to cover the expenses of the factory.<sup>17</sup> Whether exploitative or not, this system bore a number of similarities to the cane growing system developed during the Japanese and Nationalist periods and indicates not only the continuity of economic and cultural systems on the island through successive and quite different regimes but also the early origins to which present features of those systems can be traced.

As interesting as the pre-1895 period may be, it is the years after 1895 that are important as far as the sugar industry is concerned. For it was during this time that the industry underwent its greatest growth, took the form it still largely has today, and had the greatest impact on the island's economy and rural landscape.

### *THE MODERN SUGAR INDUSTRY*

The basic statistics vividly indicate the remarkable growth of the sugar industry during the past eighty years or so of Japanese and Chinese rule. Sugar production increased from a few thousand tons yearly around the turn of the century to a peak during the Japanese era of over 1.4 million tons in 1939. Following recovery from the war, production rebounded to an average level of about 800,000 tons a year up to the present time (Figure 11-1). Likewise, the area planted in cane expanded greatly and reached a peak during the Japanese era of over 169,000 hectares in 1940—about one-fifth of all the agricultural land in Taiwan at that time (Figure 11-2). Concurrently, exports of raw sugar increased even more dramatically, reflecting the fundamental role of sugar in the economy. Sugar exports accounted for about 65 percent of all exports (by value) in 1920 and a staggering 80 percent of all exports in 1950 (Figure 11-3).

These figures show the growth. The question then is: How did it take place and what were the consequences? Rather than treat the Japanese and Chinese eras separately in a traditional historical approach, it is appropriate to trace the essential patterns, characteristics, and impact of the sugar industry through the eighty-year period after 1895. This approach emphasizes the basic thesis that the character of the industry, in practically all respects, was established under Japanese rule, not in the Nationalist era which followed.

#### ***Centralized Control***

One of the most significant features of the sugar industry since the Japanese era has been its highly centralized, monopolistic organization. In keeping with its modernization strategy in the home islands of Japan, the Japanese government adopted a paternalistic pattern of guidance and cooperation with private Japanese companies in the development of the sugar industry in Taiwan.

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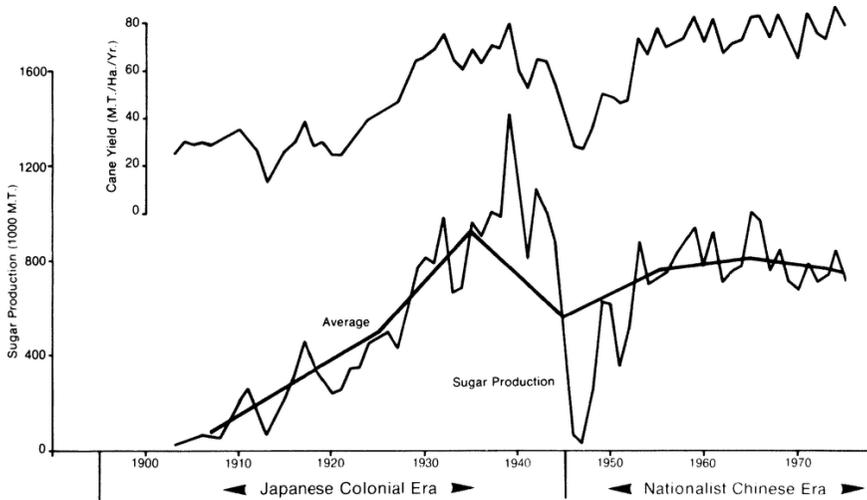
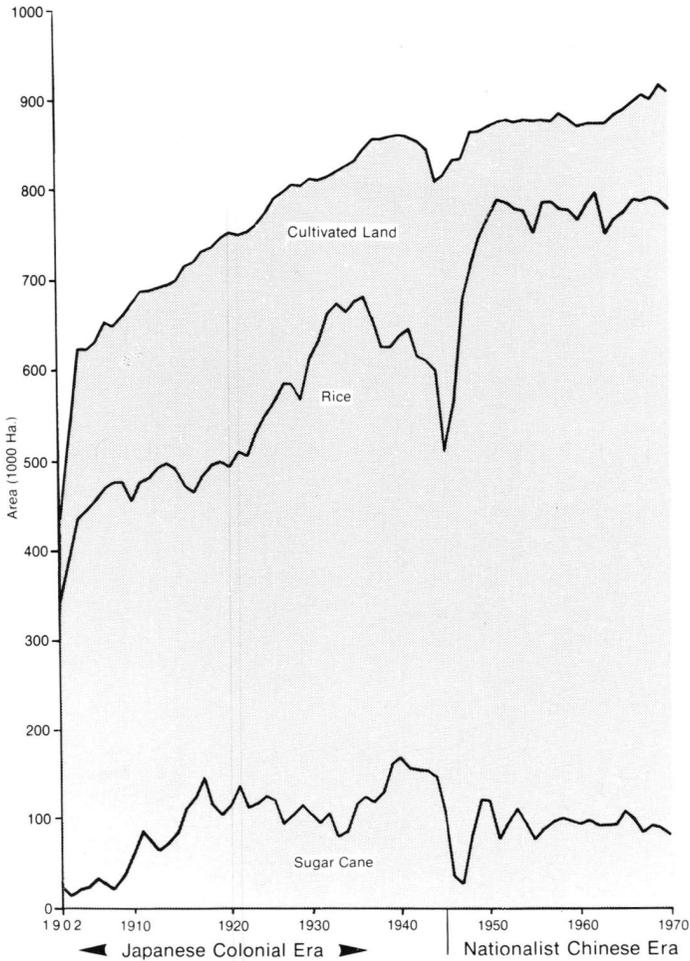


Figure 11-1. Cane yield and sugar production: 1903-1975. [Data for 1903-1945 from Chou Hsien-wen, *Jih-chu shih-tai T'ai-wan ching-chi shih* (Taipei: 1958); data for 1946-1975 from Taiwan Sugar Corporation (unpublished data).]

Certainly the demand was there in Japan for all the sugar Taiwan could produce. In 1888, Japan consumed 200,000 tons of sugar, or about 5 pounds per capita. By 1897 the figure had risen to 10 pounds; by 1903 it stood at 12 pounds. (The current figure is over 55 pounds.) The country was spending 20 to 30 million yen a year on sugar imports, and sugar was one of the five most important import commodities for Japan (Figure 11-4).<sup>18</sup> One of Taiwan's roles, therefore, was obvious: to become the sugar bowl for the mother country. To do that, the Japanese government vigorously promoted the growth of the industry.

In 1896, Dr. Nitobe Inazo, a graduate of Johns Hopkins University in the United States and Halle University in Germany, and one of the brilliant architects of Japan's colonial plans for Taiwan, was sent to the island to head the newly created Bureau of Industry, which included agriculture and forestry. During his five years in that post, Nitobe laid the foundation for the colony's economic development and expansion of the sugar industry. His plans consisted of an elaborate organization of agricultural laboratories, field stations, and experimental farms for rice and sugar cane, the development of improved breeds of

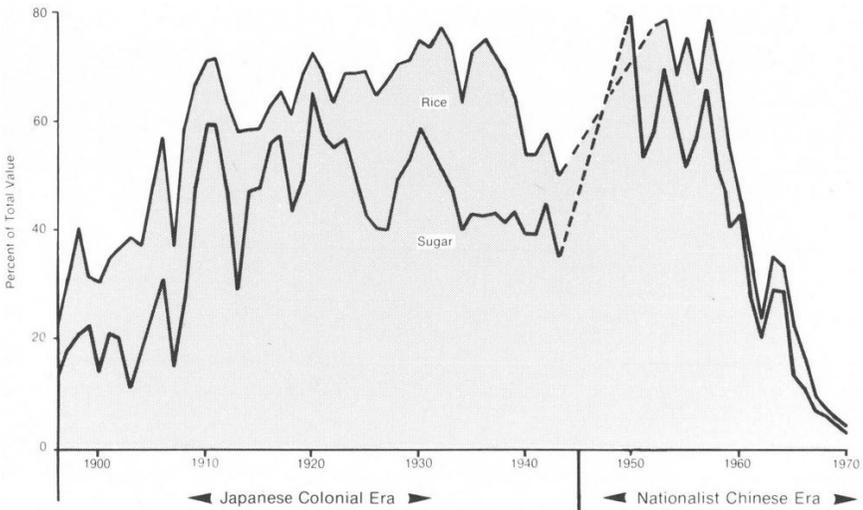
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*Figure 11-2. Sugar cane's share of cultivated land: 1902-1970. [Data from Taiwan Agricultural Statistics: 1901-1965 (1966); A History of the Taiwan Sugar Corporation's 30 Years (1976).]*

poultry, pigs, cattle, tea, vegetables, and fruits, and the testing of fertilizers and irrigation techniques. An extensive farm agent system was also set up to ensure that every farmer would understand instructions and be encouraged to increase production, an important feature that had special bearing later on cane cultivation.<sup>19</sup>

## CHINA'S ISLAND FRONTIER



*Figure 11-3. Sugar's share of total exports (by value): 1896-1970. [Data from Chou (1958) and Taiwan Sugar Corporation (unpublished data).]*

The Japanese regarded the sugar industry as a “hothouse product”—meaning that it needed protection and assistance in getting a healthy boost. Thus in June 1902 came the first wave of regulations, the “Measures for Promotion of the Sugar Industry,” which specified the precise manner in which the government would assist private capitalists from Japan in setting up operations in Taiwan.<sup>20</sup> These elaborate measures covered all aspects of the industry from land acquisition and other production costs to the final marketing of raw sugar. The forms of assistance were manifold: direct subsidies to private companies, tax benefits, loans, protective tariffs and a guaranteed market in Japan, aid in construction of modern sugar mills, cane railways, and other production facilities, and access to the latest research developments through the establishment of what was to become one of the world's foremost sugar experiment stations—at Tainan in the heart of the old cane region.<sup>21</sup>

Japanese capitalists responded enthusiastically. The first of the Japanese sugar companies, the Formosan Sugar Company (also known as the Taiwan Sugar Corporation, no kin to the present TSC) was formed in 1900 with a capital of 1 million yen (including a government subsidy of 6 percent of total capital

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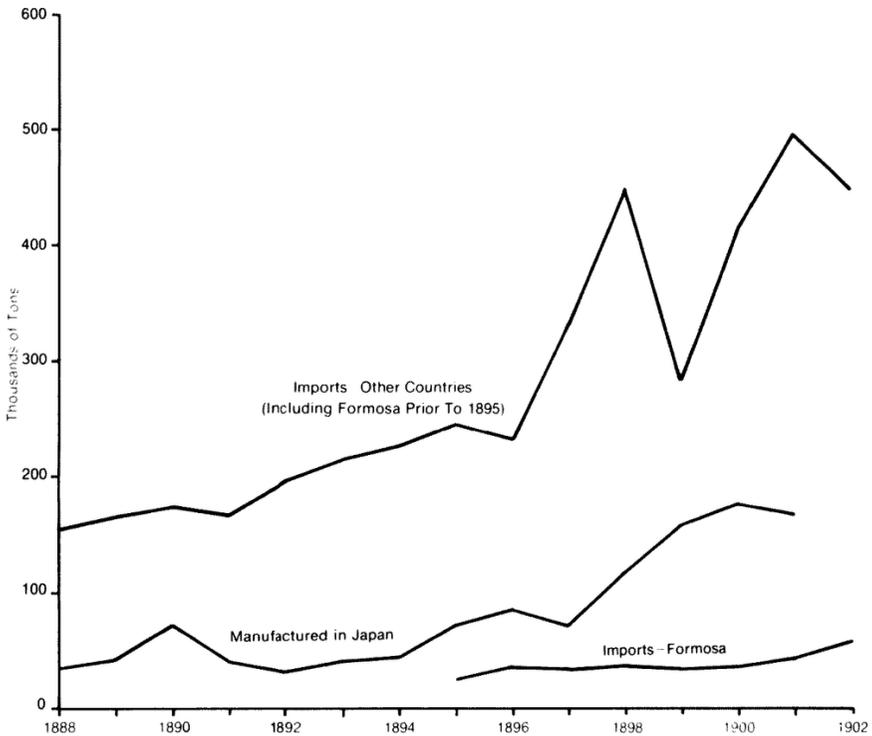


Figure 11-4. Japan's sugar supply: 1888-1902. [Data from Yosaburo Takekoshi, *Japanese Rule in Formosa*, p. 246.]

investment). Among the principal investors were Prince Mori, the Mitsui family, and the imperial household. The company built its sugar mill at Kyoshito (Chao-tse-tao) on the railway between Tainan and Takao (Kaohsiung).<sup>22</sup> Starting operations in late 1901, this was the first modern Japanese sugar mill to be built in Taiwan and was a harbinger of things to come. Other Japanese entrepreneurs moved in shortly after. Vast tracts of land on the island were opened up under government direction and turned over to the sugar interests.<sup>23</sup>

In 1909 the government helped organize the Sugar Industry Association of Taiwan (later reorganized in 1920 as simply the Sugar Industry Association and in 1935 renamed the Sugar Industry Association of Japan). This body, under whatever name, became in effect a giant trust that controlled the entire sugar industry. The various sugar corporations operating in Taiwan reached collective agreement, through the association, on the

prices to be paid farmers, production and supply of cane to mills, marketing of sugar, and other matters related to the sugar industry.<sup>24</sup>

Centralized control also meant the eventual elimination of native Taiwanese participation in the industry beyond the growing of cane. Through the monopolistic and exclusionist practices of the sugar association, the primitive small-scale Chinese sugar mills that dominated the industry at the turn of the century had almost disappeared by 1920. Production was taken over by the growing number of large, modern Japanese mills that first appeared in 1901. By 1940 there were fifty of these mills handling virtually all the production for the industry. Not only were the Taiwanese squeezed out of business, but along with them went the weaker Japanese firms that could not stand the competition (or, more properly speaking, the collusionist policies of the colonial government that favored certain firms over others).<sup>25</sup> Hence by 1940 four Japanese corporations—Taiwan, Meiji, Nitto Kogyo, and Enshuiko—dominated the industry.<sup>26</sup>

Centralized control remained a principal feature of the sugar industry after the Japanese left. In 1945, when Taiwan was returned to China, mainland administrators and military personnel took over virtually all important government posts, excluding native Taiwanese at the higher levels, in a manner that has been likened by some critics to a sort of second colonial period for Taiwan.<sup>27</sup> This takeover extended to the sugar industry as well. The collective assets of the confiscated Japanese sugar corporations included: forty-two modern sugar factories with a total daily grinding capacity of 65,000 metric tons, and of which only eight had escaped the war with no damage; fifteen alcohol distilleries; 114,000 hectares of land; over 3,000 kilometers of narrow-gauge railway; and administrative staffs totaling 5,000 plus an additional 19,000 workers.<sup>28</sup>

Initially, sugar production was resumed in 1945 on a sort of ad hoc basis. Government personnel were assigned to run the former Japanese mills as individual units and to reconstruct damaged facilities. The former Japanese managers were even retained to smooth the transition. The government quickly consolidated operations, however. In May 1946, the Taiwan Sugar Corporation (TSC), no relation to the former Japanese sugar corporation, was created out of the combined Japanese assets. This government-owned corporation was founded on capital invested by the National Resources Commission of the Executive Yuan and the Office of the Governor of Taiwan (plus some minor

private capital). The former four Japanese corporations became four branches of the TSC. The headquarters was set up in Taipei with branches at major mills centrally located in the southwest cane region—at Hu-wei, Ma-tou, Hsin-ying, and P'ing-tung (Figure 11-5).<sup>29</sup> The TSC became the sole organization with authority to handle all phases of the sugar industry from initial growing through harvesting, milling, and marketing. The TSC set the farm price for sugar (and largely controlled the domestic retail price as well) and decided who would grow cane. Unfortunately (from the government's perspective), the TSC did not have the authority to set export prices. In some respects, the TSC acquired greater monopolistic power than existed during the Japanese era. There were important differences, however, as we will note later.

### *The Regional System*

Another feature of the sugar industry dating from the Japanese era and retained under the Chinese has been the system of cane supply regions. This system evolved early in the Japanese era because of fierce competition among Japanese sugar mills for the supply of cane. At first, farmers were free to sell their cane to whatever mill they desired. But that haphazard system led to extreme imbalances in supply and demand for cane. Factories competed strenuously among themselves. To alleviate this problem and stabilize the industry, the government issued in 1905 its "Restrictive Measures for Sugar Factories." Under these measures, the cane growing region was divided up into a number of supply districts, one for each sugar mill. Each mill was required to obtain cane only from its district—the movement of cane from one district to another was forbidden—and had to guarantee that it would buy all the cane grown in its district. Since each mill had to announce in advance the price it would pay farmers for their cane, farmers were theoretically free to grow cane or not. Moreover, sugar factories could not be established without permission from the government.<sup>30</sup> The result of all these measures was to set the spatial character of the sugar industry on Taiwan: some fifty (at their peak) sugar districts, each with a central mill run by a Japanese company, drawing upon cane produced mostly by Taiwanese farmers. While this system made sense for the stability of cane supply and production, it nevertheless had the effect, in concert with

# CHINA'S ISLAND FRONTIER

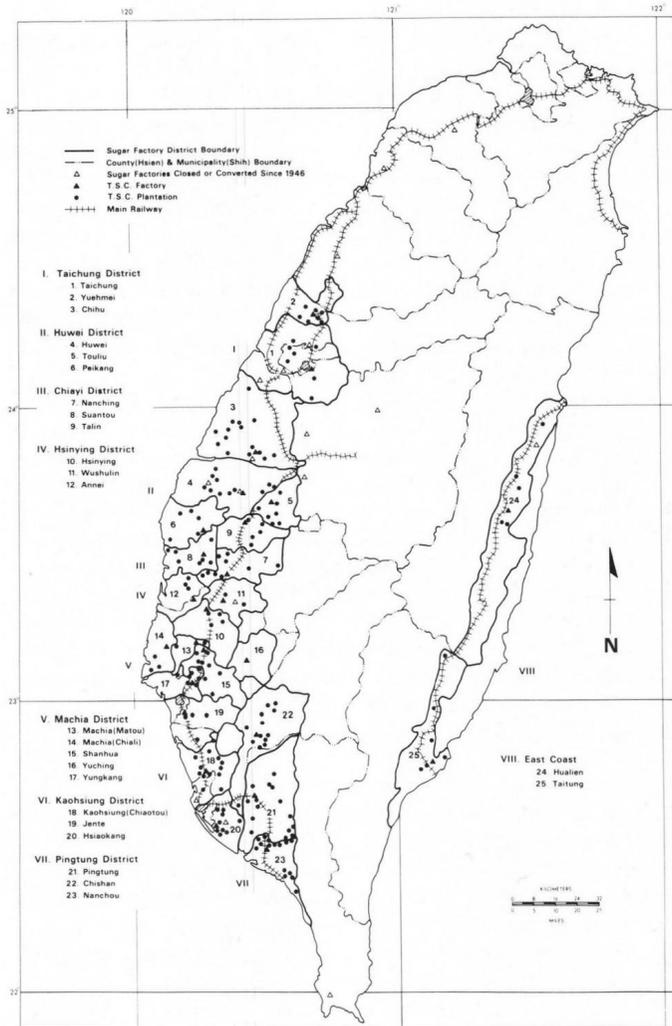


Figure 11-5. Taiwan Sugar Corporation plantations and cane regions: 1976.

the cane growing system, of restricting the farmer's freedom of action. In a sense, then, one could quite properly describe the system as semi-feudalistic.

Under the Chinese, the system of cane supply regions has been retained virtually unchanged since the Japanese era. The one exception is the reduced number of regions (and hence

greater average size of the regions) as the number of sugar factories declined after 1950 due to further consolidation, modernization, and a general reduction of the sugar operations of the industry. Today there are twenty-five sugar districts grouped into eight large regions; each region contains about three mills and districts. As Figure 11-5 shows, the former sugar factories closed or converted to other uses since 1946 were located primarily in the northern half of the island, where cane growing conditions are less favorable than in the south. The same restrictions that the Japanese formulated in 1905, in terms of the supply of cane for each district, still apply today.

### ***The Role of the Farmer***

Apart from the cane supply regions, the basic structure of the sugar industry at the farmer's level was also set during the Japanese era by the cane contracting system that evolved. At first one might think it odd that the Japanese sugar companies, which eventually owned well over 100,000 hectares, or about 10 percent of all the farmland in Taiwan, grew only a small portion (about 20 percent on average) of the cane supply for their mills. The remaining 80 percent was grown in a typical year by about 130,000 small Taiwanese farmers, each growing an average of only one-half hectare. This is still the pattern today. Why this small-scale approach? The basic answer is that it simply was cheaper to operate this way. Through the monopolistic controls of the sugar association, the Japanese sugar companies and mills were able to set the terms of cane growing so that it was very favorable financially for the companies, much more so than if they grew their own cane.

The central mill in each sugar district would announce a buying price at the start of each season, before the cane was even planted, indicating what the mill would guarantee to pay for farmers' cane after harvesting. The farmers, in turn, were theoretically free to accept the mill's offer or not and to grow other crops if they pleased. In fact, however, the sugar mills developed a system of advances that effectively deprived the farmers of freedom of choice. Andrew Grajdanzev, who studied this matter closely in the early 1940s, demonstrated that without question the system worked to the farmer's disadvantage.<sup>31</sup> In the first place, much of the land owned by the companies was rented out to farmers on the condition that they grow cane. Moreover, water from the extensive irrigation systems developed by the government was made available to

the farmers on the condition that prescribed portions of the land had to be planted in cane. This was particularly true in the Chia-nan irrigation district in the southwest. George Kerr, another authority on the Japanese era, vividly describes how the Civil Administrator's Office in Taipei would, at the request of the sugar companies, instruct local policing agencies in the cane region to harass small farmers who showed reluctance to sell land to the companies or to sign contracts binding them to supply sugar cane to certain mills at prices set by the mill owners. "The Nitobe Plan in action raised the total output [of sugar] and improved quality, but it reduced the farmer in the sugar regions to a state of helpless dependence upon agencies operating beyond his control."<sup>32</sup>

Much of the land owned by the sugar companies was acquired as a result of the extensive land survey of the island carried out by the Land Commission in the early 1900s. Landownership was often hard to prove because of the imprecise land records maintained under Ch'ing administration. If a Taiwanese claimant to land was unable to prove ownership within a certain period of time, his land was automatically confiscated by the government and put up for sale. Much of this land was obtained by the sugar companies. Many farmers, moreover, found themselves unable to support their families on the tiny plots they could prove ownership for and were financially compelled to sell or lease their plots to others—such as the Japanese corporations just beginning to set up large sugar estates.<sup>33</sup>

This exploitation of the farmers extended to the prices that mills offered them for their cane. The purchase price for cane had nothing to do with the price of sugar; rather, it was set according to the prevailing market price of rice, the principal competitor crop of sugar cane. The trouble with this pricing scheme was that the production costs of the two crops were completely different. Ch'en notes that there was roughly a 2:1 ratio in the production costs between sugar cane and rice, respectively, in the late 1930s.<sup>34</sup> As Table 11-1 shows, in the same period, at the peak of the industry, with an average of 7.6 metric tons sugar produced from a hectare of cane, the average cost for the sugar company came to 1,336 yen, which, after deducting from gross income of 2,058 yen for the sugar, left the company with a net profit of 722 yen. The cane farmer, who received 524 yen, had to deduct his production expenses from that amount before obtaining his net profit. Those production costs were estimated at an average of 400 yen per hectare, leaving the farmer with a

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TABLE 11-1  
*Costs and Profits of Sugar Production: Taiwan Late 1930s*

Costs and Profits	Average per Hectare (yen)
Paid to farmer for cane	524
Milling costs	112
Consumption tax	445
Transportation and storage	255
Total production costs	1,336
Gross income from sale of sugar	2,058
Net profit to sugar company	722

*NOTE: Figures are based on average yield of 7.6 metric tons of sugar per hectare.*

*SOURCE: Ch'en Cheng-hsiang, Taiwan (Taipei: 1963), p. 316.*

mere profit of 124 yen, about one-seventh that earned by the sugar company. A well-known saying during this era, with considerable justification, was: "Sweet is Taiwan sugar, but bitter is the life of a cane farmer."<sup>35</sup>

After the Chinese took over the industry in 1945, they had to revitalize it from the ruins of wartime destruction. The government desperately needed the cash income from sugar exports, about the only thing Taiwan had to sell abroad. The government also recognized the need for land reform, however, for political and economic reasons. As a result the TSC had to sell off all but about 40,000 hectares of its holdings in the land reform programs of the early 1950s. To maintain the level of sugar production (and exports) as high as possible, the TSC was thus forced to continue the contract farming system of the Japanese era, albeit with modifications. Ever since, the TSC has been dependent on contract farmers for two-thirds to three-fourths of its raw cane supply.

Although the farmers are in truth much freer to plant cane or not than they were during the Japanese era, there are those who argue that the policies of the TSC do not differ all that much from those of the Japanese. Certainly the TSC is able to

coerce or at least encourage farmers to plant a crop that is usually less profitable than rice or other crops.<sup>36</sup> The inducements are varied and complex.

### *The Guaranteed Price System*

One of the chief measures for stabilizing the supply of cane is the guaranteed price system, which is simply an elaboration of the system developed during the Japanese era—mainly in the form of safeguards to protect the interests of both farmers and government.<sup>37</sup> In the early 1950s, the price that contract farmers received for their sugar depended solely on the international sugar price. After the Korean War, sugar prices plummeted and caused a near collapse of the sugar industry in Taiwan. Thus in 1954–1955 the TSC inaugurated the guaranteed price system, which was designed to put a floor under the price farmers could expect to receive for their sugar. Each year a sample survey of some two thousand cane farmers in five main production areas is carried out to determine the costs and returns of cane's competitor crops. Since about 60 percent of all contract farmers are located in the three main sugar districts of Hu-wei, Hsin-ying, and Ma-chia, the guaranteed price for all Taiwan is based on the opportunity cost of cane in those areas.

The guaranteed price is supposed to yield each contract farmer a net profit at least equal to the net profit he could earn if he grew other crops suitable for the same piece of land. In actual fact, however, the TSC has never paid the calculated guaranteed price because the opportunity cost of cane production is too high in relation to export prices of sugar. In 1966, for example, the average export price of Taiwan sugar was about US\$54 per ton. The calculated guaranteed price for that year was NT\$5,700 (about US\$127) per ton. If the TSC had paid that price to farmers, it would have lost US\$73 on every ton of sugar. For 200,000 tons of sugar purchased from contract farmers, the total loss would have amounted to over US\$14 million. The TSC obviously could not afford to operate at such a loss.

The solution to the problem has been to offer a guaranteed price considerably below the recommended one while making up the loss to the farmers by maintaining artificially high farm prices for their sugar sold domestically. In 1966, for example, the actual guaranteed price was only US\$96 whereas the domestic price received by farmers was US\$162. Even with the reduced guaranteed price, however, the TSC still lost money

during most of the 1960s on sugar produced by contract farmers. There have been only three really profitable periods for the sugar corporation since 1950: in 1957, in the period 1962-1964, and in the abnormal period 1973-1974.

In the past, whenever the export price was higher than the guaranteed price, the farmers were paid according to the export price. This arrangement produced a windfall for the cane farmers but was undesirable from the government's viewpoint because it encouraged too many farmers to grow cane when prices were favorable. Too many cane farmers are almost as bad as too few—mainly because the TSC may then end up with more sugar than it can handle in relation to Taiwan's export quota and domestic market. In the late 1960s, therefore, the TSC put into operation a sugar stabilization fund. Whenever the international sugar price is higher than the domestic guaranteed price, a portion of the difference of the two is put into the stabilizing fund to be used as a buffer when world prices plunge below the guaranteed price.

The guaranteed price has had no marked impact on increasing cane production, but it has helped prevent sharp drops in production.<sup>38</sup> Moreover, the stabilization fund has helped prevent an excessive shift to cane cultivation in times of high international sugar prices. Both policies have helped to moderate use of agricultural resources.

The correlation between the international sugar price and the number of contract farmers stands out clearly in Figure 11-6. Generally, there has been a two-year lag between the two—that is, the peak sugar price is generally followed two years later by a peak of contract farmers. This correlation reflects the long response time for sugar cane, one of the crop's greatest deficiencies. The most recent plunge in prices and numbers of farmers came in 1965 when sugar prices fell to record lows. As a result large numbers of farmers abandoned cane cultivation. The total area planted in cane fell to less than 47,000 hectares by 1969-1970 and the number of cane farmers dropped to about 110,000—the lowest levels in over twenty years. Sugar prices began rising again in 1969, and the number of contract farmers began to increase by 1970. The huge sugar price increases of 1973-1974, which peaked at nearly US\$0.60/pound (but fell back to a more normal US\$0.06/pound by the end of 1976), caused another upward surge in numbers of cane farmers.

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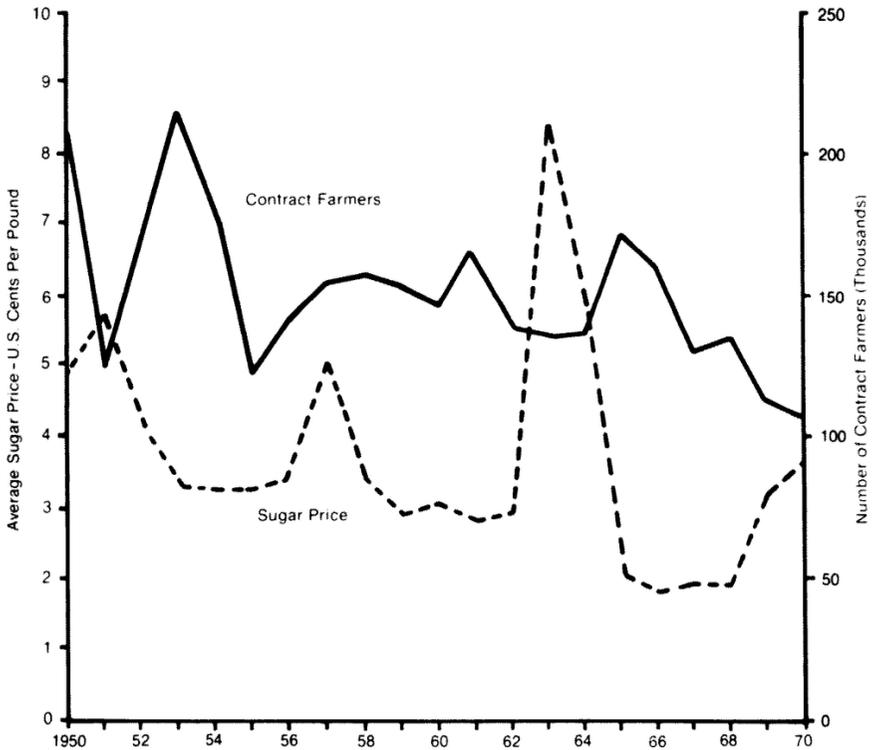


Figure 11-6. Correlation of world sugar prices and number of contract farmers: 1950-1970. [Data from Jack Williams, "The Conflict between Peasant and Public Interest in a Developing Country," 1973.]

### ***The Sugar Sharing System***

Another of the TSC's efforts to stabilize the supply of cane is the sugar sharing system. Basically, this system involves the division of the processed sugar, according to a ratio, between the contract farmers and the TSC. Its purpose is to make cane growing profitable for farmers.

The average contract farmer grows only about 0.4 hectare of cane, which will yield on the average about 40 metric tons of cane per crop.<sup>39</sup> When the cane reaches the mill, the mill calculates the amount of sugar produced from that cane according to the average value of commercial sugar yield during the milling period. Hence during the milling period (which generally runs

from early December to late April or early May), all the farmers delivering cane to the mill will be paid according to the same rate. This is essentially the way the Japanese did it too.

The present sugar sharing ratio is 45:55. This means that after the contract farmer's cane is processed at a mill, 45 percent of the sugar is kept by the TSC as payment for transporting and milling the cane. The farmer keeps the other 55 percent, of which a fixed portion must be sold to the TSC at the guaranteed price. This portion is now 45 percent; the remaining 55 percent can be freely sold by the farmer on the domestic market. Thus a farmer who delivers 40 tons of cane to a mill, from which 4.4 tons of sugar is produced (the current average of 11 percent sugar yield), would receive back 2.42 tons of sugar (TSC would keep 1.98 tons), of which 1.09 tons (45 percent) would be sold to the TSC at the prevailing guaranteed price and 1.35 tons (55 percent) would remain for the farmer to sell on the domestic market. In 1970 the average price received by the farmer on the domestic market was US\$160 per ton—about \$64 more than the farmer received for his sugar that was compulsorily sold to the TSC under the guaranteed price. The higher domestic price for farmers' sugar is thus maintained by the government's restricting the amount of sugar that can be sold in Taiwan.

The sugar sharing ratio itself is determined according to the production costs of both parties—the farmers and the TSC. The production costs vary from mill to mill, but the costs for all twenty-five mills are averaged together to produce a single sugar sharing ratio for use in the twenty-five districts. The sugar sharing ratio has changed over the years. When first adopted in 1946–1947, the ratio was 52:48 in favor of the TSC. Extreme land-use competition from other crops since then has forced the government to increase the farmer's share gradually until the ratio is now 45:55 in the farmer's favor. Likewise, the percentage of the farmer's share of sugar that could be sold domestically has also changed over the years. Before 1965–1966, the amount was 35 or 40 percent of the farmer's 55 percent share of the sugar. This proportion rose to 44 percent in the late 1960s, to 50 percent in 1970–1971, and to 55 percent today, reflecting the growing domestic consumption of sugar.<sup>40</sup>

Most of the sugar sold domestically in Taiwan comes from the contract farmers. Sugar produced from the TSCs plantations and obtained from the TSCs 45 percent portion of the sugar sharing system is used to meet export quotas. The TSC has exclusive control of all sugar exports. Sometimes the TSC

is unable to dispose of all its sugar overseas and then markets the surplus domestically. Much of this goes to food processing factories, such as pineapple canneries. This surplus supply has amounted to about 13 percent of the sugar marketed annually within Taiwan.<sup>41</sup>

How does the farmer sell his sugar domestically? Taking our average cane farmer again, of the 1.35 tons he receives from the TSC to do with as he pleases, he takes about 5 percent in the form of sacked sugar for his own use. The remaining 95 percent, approximately 1.28 tons, is kept by the TSC in free storage as a fringe benefit to the farmers. The farmer is given a sugar deposit certificate stating that the TSC has on storage 1.28 tons of his sugar. The farmer can leave it in storage for up to a year, but most farmers dispose of their sugar long before then by selling their certificates to sugar dealers and agents for cash. In fact, most farmers do so immediately after receiving their certificates. Not only are they anxious to get cash for spring tillage and to pay farm taxes but they are also spared the problem of trying to sell the sugar themselves.

### ***Extension Activities***

The TSC has several ways of strengthening the relationship between itself and the cane farmers. One of the most effective is through extension activities. In this respect the policies of the TSC and the former Japanese colonial rulers differ sharply. There are a wide variety of these activities, many of which are handled under the aegis of the Taiwan Sugar Cane Growers Association, a cooperative organization, founded in 1955, with a membership of over 100,000 farmers.

Through the Taiwan Sugar Cane Growers Association, cane study groups are organized to help the farmers improve their cultivation techniques and hence their yields. High-yield contests are run regularly, with cash awards to the top contestants, as a means of stimulating productivity. Yields as high as 430 tons of cane per hectare have been achieved in this way.<sup>42</sup> The government also has its own demonstration fields scattered throughout the sugar cane districts. On these fields, the TSC lavishes fertilizer, water, and care to produce yields of 400 tons per hectare or more. The object is to show the farmer what is possible with optimum production inputs, though average yields could never get that high. (The average yield is normally under 80 tons; see Figure 11-1.) The TSC also helps farmers with diversification programs such as cooperative hog raising and

small-scale beef cattle raising.<sup>43</sup> Various fringe benefits are also provided to cane farmers, among them insurance, production loans, education, and health care benefits.

The sum of all these programs and incentives aimed at the cane farmer is a concerted effort by the government to stabilize the supply of cane through essentially noncoercive measures, quite unlike the Japanese policies to induce farmers to grow cane. And although the farmer today receives undoubtedly a fairer share of the profits from sugar production, cane cultivation remains less profitable than most other crops.<sup>44</sup> That farmers are still willing to grow cane suggests the influence of motives other than profit in their decision making, including such elements as security (a guaranteed profit) and the fringe benefits and extension services provided by the TSC. While an economist might argue that the TSC is promoting less than maximum efficient use of land and other resources, one cannot discount the human side of the equation: the positive effects on the lives of cane farmers. All things considered, it would be difficult to describe the life of cane farmers today as bitter.

### ***Impact on Land Use***

Given the scale and complexity of the sugar industry on the island, it is not surprising that sugar has had a profound impact on land use. During the Japanese era, sugar cane was grown on about one-fifth of the total cultivated land of Taiwan, peaking at about 169,000 hectares in 1938–1939. Cane's physical presence was all the more obvious from the numerous sugar mills and facilities that dotted the rural landscape and the hundreds of miles of narrow-gauge railway lines that were built specifically to transport cane to the mills and that only now are gradually being supplanted by trucks. Even today, one can quickly detect the presence of the sugar mills, often long before sighting them, by the sickly sweet odor from the exhaust stacks that permeates the air.

Under the Chinese the area of land devoted to cane has decreased but nonetheless still totals between 80,000 and 100,000 hectares each year—in other words, a decrease of nearly one-half from the peak Japanese level. The population of Taiwan has doubled since 1950, however, while the total cultivated area has been expanded only slightly. Most of the increased agricultural production since then has come from improved yields and more intensive use of the land. Thus the fact that sugar cane still occupies as much as 11 percent of the cultivated land in some

years has important implications. In fact, the cultivated area actually planted to cane is even greater than 11 percent in terms of crop production potential. Since cane is a long-term crop, it occupies the land for at least 12 to 18 months, during which time several food crops could be grown on the same ground.

Most of the cane is grown by an average of 125,000 farmers each year on tiny plots averaging only 0.4 hectare. The remainder is grown by the TSC itself on its own 180 or so plantations that average a few hundred hectares each at best. All these fields are scattered over a large area throughout the coastal plain. Hence the physical appearance of cane cultivation is one of small isolated patches of cane interspersed among the much greater area of rice fields. One does not get the same visual impression of large-scale sugar cane cultivation as one does in Hawaii. Moreover, the relative importance of the sugar industry in the rural landscape and lives of the farmers is not readily apparent.

Spatially, the area devoted to cane is now concentrated in the southern half of the island. From the original hearth in the dry uplands of the southwest coastal plain near the present city of Tainan, cane expanded during the Japanese era as far north as the Taipei basin, a very marginal physical environment for cane, and into the east coast valley. Davidson describes fields of cane that he observed on both banks of the Tamsui River near Taipei at the turn of the century—fields that have long since been converted largely to urban/industrial uses (Figure 11-7).<sup>45</sup> At the same time, a major share of the cane was grown on irrigated paddy land, displacing in many cases irrigated rice. The competition with rice became so keen, in fact, that the Japanese developed the huge Chia-nan irrigation system after 1907 (completed in the 1920s) to turn thousands of hectares of drylands into rotation cropland where rice and sugar cane could coexist. Kerr relates how the government, by manipulating water supplies in the Chia-nan region, was able to impose a three-crop planting cycle over a vast acreage that is still followed today (Figure 11-8).<sup>46</sup>

Because of this rotation system, cane can compete with rice and other crops in the Chia-nan region, which remains the principal area for cane cultivation. After 1945, low yields, population pressure, and competition from other crops forced cane cultivation out of the northern half of the island, where it had been artificially maintained by Japanese colonial policies. Sugar mills closed in the north and cane cultivation retreated to the southern half of the island, where the crop's comparative ad-

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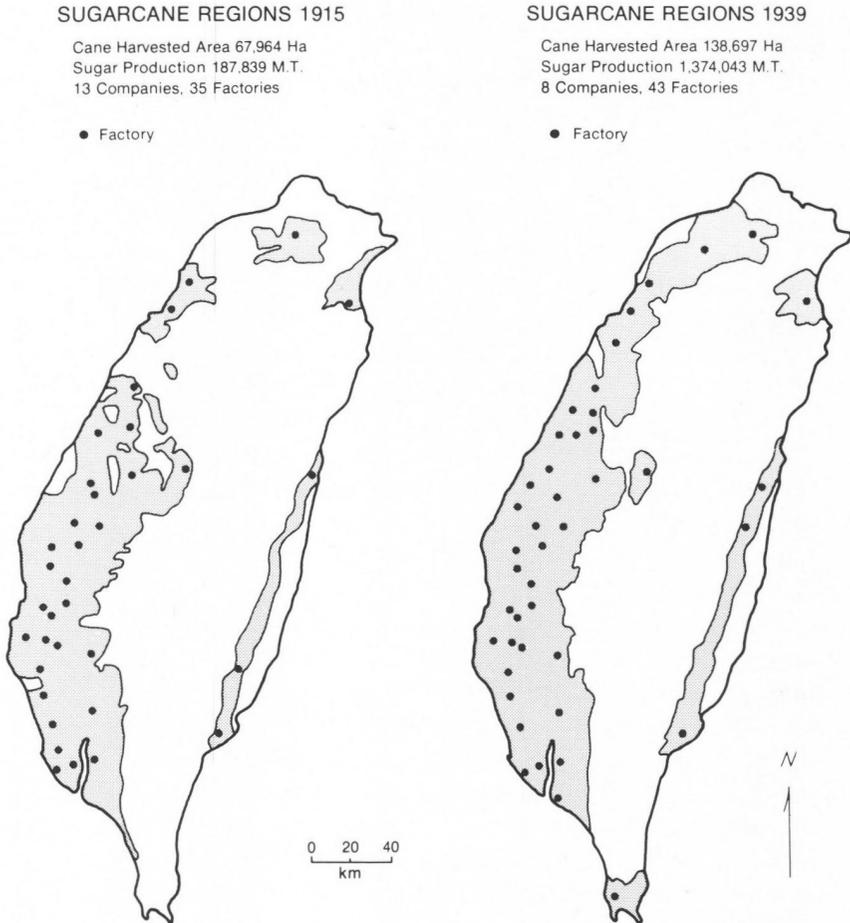


Figure 11-7. Changes in the sugar cane area: 1915-1960. [Data from Ch'en Cheng-hsiang, *Taiwan* (Taipei: 1963).]

vantage was much greater. Cane is now concentrated in the southwest coastal plain from Chang-hua *hsien* south to P'ing-tung *hsien*, but especially in the Chia-nan district. There is a minor secondary area of concentration in the narrow east coast valley.

The Chinese have expanded the cane area in a somewhat different manner than did the Japanese. Whereas the Japanese were involved primarily with opening up underutilized good agricultural land, the TSC since 1950 has been engaged in a

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## SUGARCANE REGIONS 1949

Cane Harvested Area 96,306 Ha  
Sugar Production 631,346 M.T.  
1 Corporation, 36 Factories

● Factory

## SUGARCANE REGIONS 1960

Cane Harvested Area 91,962 Ha  
Sugar Production 924,313 M.T.  
1 Corporation, 28 Factories

● Factory



strenuous program of reclaiming marginal lands that were previously unused for any productive purpose. Several thousand hectares of such land have been reclaimed, most of it in the east coast rift valley, and in the P'ing-tung/Kaohsiung area of the southwest. The lands reclaimed by the TSC have consisted principally of stony land in former alluvial fans, riverbeds, slopelands, saline lands, and tidal flats.<sup>47</sup> Although the cost of reclaiming these lands is almost as high as the cost of prime paddy land (and yields average less than half that of paddy land), the TSC still regards such reclamation as economically warranted because of the severe land-use competition on Taiwan and the difficulties of contracting the farmers to grow

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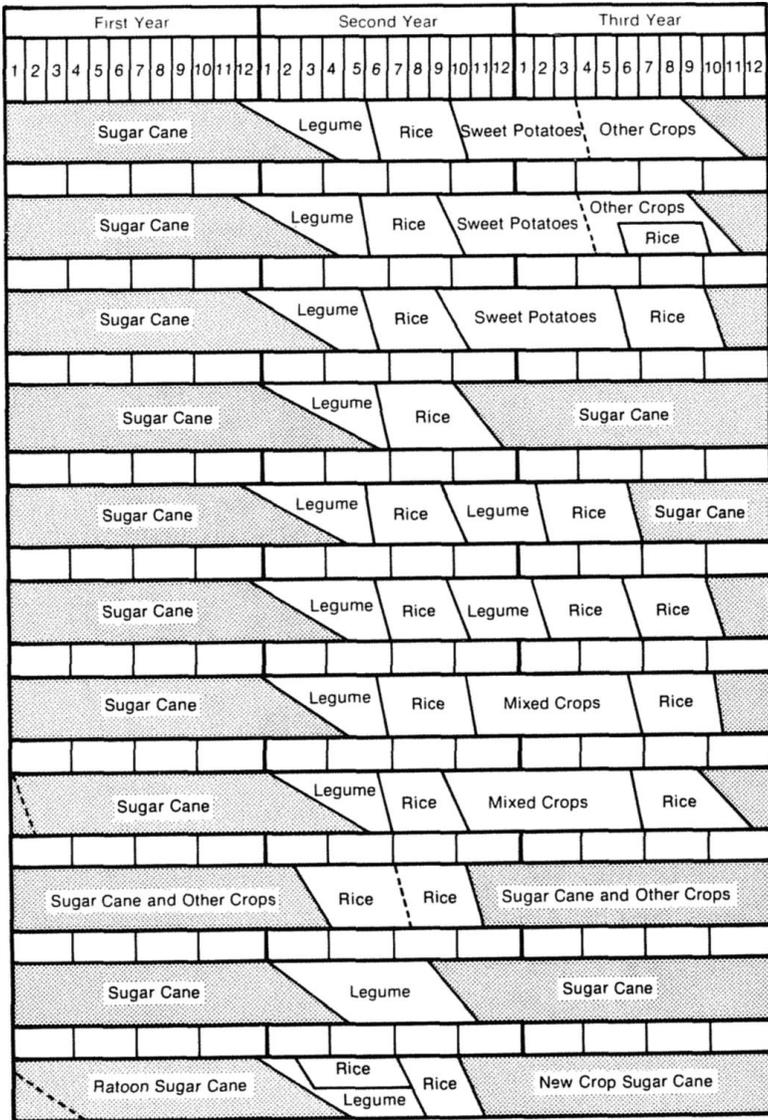


Figure 11-8. Cropping systems in the Chia-nan irrigation district. [Data from Chou (1958), p. 33.]

cane, even with the TSCs powerful arsenal of inducements. As a result, much of the development of the east coast valley in particular has been due to the efforts of the TSC, which has helped

greatly to soften the rugged frontier character of the east coast valley by opening it up to settled agriculture, a process first begun by the Japanese.<sup>48</sup> The TSC is now active in the reclamation of tidal flats—not for cane cultivation, though, but for the corporation's many diversified operations.<sup>49</sup>

### ***Impact on Agricultural Modernization***

Although the Japanese brought modern farm technology and operations to Taiwan, those innovations were introduced by coercion and a generally exploitative system. Certainly this was true of the sugar industry under the Japanese. During the Chinese era, the sugar industry has had an even wider and in many ways a more positive impact on agricultural modernization.

For one thing, the sugar industry has diversified tremendously, partly in response to the instability of world sugar prices, partly to take advantage of economic opportunities. The TSC now produces some fifteen or more products besides sugar; in fact, it is one of the most diversified sugar companies in the world. The main products are hogs and cattle. The TSC has led the massive increase of the livestock industry in the last twenty-five years. Although the move to livestock production has been criticized by some as an inefficient use of valuable feed and land, as well as a drain on the country's foreign exchange because of huge increases in imports of corn, soybeans, and other feed grains, at the same time the increased domestic production has contributed to a diet richer in protein for the average Taiwanese, it has reduced the volume of beef imports, and it has greatly increased the volume of pork and live hog exports, especially to Japan and Hong Kong. All of the TSC's diversified products have, in years of particularly low world sugar prices, kept the sugar industry in the black. Even in good years, the products contribute about half the income of the industry.<sup>50</sup>

Moreover, the TSC has been in the forefront of agricultural mechanization, expansion of chemical fertilizer production and consumption, land reclamation, groundwater development, and promotion of cooperative farming. Many of these developments were begun by the TSC and might never have entered the island's agricultural system without the TSC's efforts. Particularly noteworthy has been the corporation's promotion of cooperative and large-scale farming to overcome the limitations of the small family-farm system still dominant on the island. As part of the "Second Land Reform" for Taiwan, the promotion of

this kind of farming has been an uphill struggle pioneered by the TSC, but it offers great promise for the future of agriculture on the island.<sup>51</sup>

The TSC has also played an important role in the government's technical cooperation programs with other developing countries in Asia, Africa, and Latin America. Many TSC technical personnel participated in these projects, which had a marked impact on Taiwan's political standing in the world community for many years, although the goodwill effect of those efforts appeared to have worn off in a number of countries by the early 1970s. And with its mills scattered over the countryside and the need for courting the farmers to grow cane, the TSC has made many contributions to local investment projects—such as the construction of drainage ditches, village paths, irrigation canals, flood control dikes, and water supply installations for rural communities.

### ***Trade, Politics, and Sugar***

Even under the Japanese, in spite of various protective measures, sugar production tended to wax and wane in response to world sugar prices and domestic sugar prices in Japan. In the postcolonial period, as noted earlier, sugar production became even more closely affected by fluctuating world prices. With the closing of the mainland China market in 1949, Taiwan's sugar industry was exposed to the harsh realities of the unstable world sugar market. Only 3 or 4 million tons of sugar are marketed each year within the so-called free market.<sup>52</sup> It is in this very small fraction of the annual world sugar production of 70 to 80 million tons that Taiwan must maneuver in seeking markets. The island's share of this free market averages 15 to 20 percent each year, making Taiwan one of the largest traders in unprotected nonquota markets. Taiwan has been a member of the various postwar international sugar agreements, which have allotted the island over 600,000 tons as its yearly quota. Those agreements have had only a marginal effect, if any, in stabilizing world sugar prices, however, with the result that sugar producers such as Taiwan have suffered from the roller coaster trend of sugar prices. (See Figure 11-6.) One of the bleakest periods for Taiwan was 1965–1968 when average world prices bottomed at less than US\$0.02/pound. The TSC lost money on sugar exports during that period and was saved only by its still profitable diversification program. A truly sweet period was

1973-1975: sugar prices rose to their highest recorded level in this century (or ever), at nearly US\$0.60/pound earning Taiwan a record US\$250 million in 1975.

Along with wildly fluctuating earnings from overseas sugar sales, Taiwan also has experienced problems in its markets. In the late 1940s and 1950s, Taiwan exported sugar to many countries of the world, but gradually most of those markets dried up—either because of competition from other sugar producers, such as Thailand, Malaysia, and the Philippines, or because of the declining political fortunes of the Nationalist Chinese government. In recent years Taiwan has been selling its sugar primarily to just three customers: South Korea, Japan, and the United States, in that order of importance. The political ties between Taiwan and these three countries are no coincidence in relation to sugar sales, for all three countries pay premium prices above the world average for Taiwan's sugar. How much longer this preferential treatment can last is the question, given the political relations between the United States and the People's Republic of China.

While sugar prices and markets have had their ups and downs, the relative importance of sugar in Taiwan's export earnings has declined fairly steadily, reflecting the growth of Taiwan's economy. In 1950 sugar accounted for 80 percent of total exports of US\$93 million. By 1975 sugar exports were valued at US\$250 million, but they accounted for only about 5 percent of total exports of nearly US\$6 billion. Sugar is still important, in other words, but no longer the sustaining force for Taiwan's economy.

### ***The Role of the TSC***

We conclude this survey of the sugar industry with a brief summation of the role of the Taiwan Sugar Corporation in modern Taiwan's development. In spite of the relative decline of sugar as an individual commodity within Taiwan's economy, the TSC remains the single largest corporation in Taiwan (and one of the largest sugar corporations in the world), directly employing over sixteen thousand workers but with indirect employment and income effects on thousands of other workers in related industries and activities, not to mention the thousands of cane farmers. Hence the monetary benefits from sugar production go far beyond the easily measured dollars and cents from sugar sales abroad. Moreover, the TSC remains one of the main government organizations in Taiwan, a major force in the economic

structure and in policy decisions affecting agriculture, the farmers, and the economy in general. In some ways, one can see a distinct similarity to the old sugar association of the Japanese era in terms of economic and political power; but there the similarity ends, for the TSC is much more a positive than a negative force in modern Taiwan.

### *THE SUGAR INDUSTRY AND THE FUTURE*

The sugar industry has without question been a major force in Taiwan, especially since the early 1900s. During much of the industry's history, however, the benefits of sugar production have accrued mainly to the government, not to the farmers who grow the cane. Sugar has, in that sense, been a sweetener in the development plans various governments have proposed for the island, although the cane farmers today are probably better off than at any time in the past.

Likewise, the impact of the sugar industry on the rural landscape and economy has been great in terms of land use practices and the agricultural development of the island. Indeed, one might question what crop could have taken the place of sugar as the great cash crop of Taiwan, especially in the last eighty years. A number have come along, particularly since 1950, to provide competition to sugar, but none has had the permanence or broad appeal to farmers that cane has long had. The fact that over 100,000 farmers, or about one in every seven, consistently plant cane year after year says something about the permanent role that cane has acquired in the agrarian system.

Nevertheless, the profitability of the industry for the government, and of cane cultivation for the farmers, has been achieved only as the result of artificial price controls and subsidies—and even then the profit has been remarkable in only a few years out of the past quarter century. Without subsidization, sugar cane has a poor competitive position with other crops, and hence it could be argued that cane cultivation is not the highest and best use of Taiwan's limited and valuable agricultural land. This basic fact may be of increasing significance in the future if Taiwan's population and food resource balance continues its present trend from a surplus position to an increasing dependence on ever more expensive food imports. Sugar's days on Taiwan may, in fact, be numbered.

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# Notes

## ***Introduction***

1. Owen Lattimore, "The Frontier in History," in *Studies in Frontier History: Collected Papers, 1928-1938* (London: Oxford University Press, 1962), p. 477. Owen Lattimore's field experiences and scholarly research have for many years served as the springboard for examining this frontier experience. A bibliography of Lattimore's published materials is found on pp. 553-561 of his *Studies in Frontier History*.
2. Herold J. Wiens, *Han Chinese Expansion in South China* (New Haven: Shoe String Press, 1967). This book was originally published as *China's March to the Tropics* in 1954. Highly readable accounts of these movements include Keith Buchanan, *The Transformation of the Chinese Earth* (New York: Praeger, 1970), pp. 50-62, and Yi-fu Tuan, *China* (Chicago: Aldine, 1969), pp. 75-147.
3. Edward H. Schafer, *The Vermillion Bird: T'ang Images of the South* (Berkeley: University of California Press, 1967), p. 24. Among Schafer's other works is a study on Fukien in *The Empire of Min* (Rutland, Vt.: Tuttle, 1954) and a study on Hainan Island in *Shore of Pearls* (Berkeley: University of California Press, 1970). These books deal with the respective frontier areas. A meticulous study of great interest

- to the historical geographer is Evelyn Sakakida Rawski, *Agricultural Change and the Peasant Economy of South China* (Cambridge: Harvard University Press, 1972).
4. Tuan, *China*, p. 177.
  5. The intent to "liberate Taiwan" (*chieh-fang T'ai-wan*) is a recurring theme in the pronouncements of the People's Republic of China. Among the brief studies published on the mainland which touch on Taiwan's historical geography are Wu Chuang-ta, *T'ai-wan-te k'ai-fa* [The development of Taiwan] (Peking: K'o-hsueh ch'u-pan-she, 1958) and *Tsu-kuo-te pao-tao—T'ai-wan* [The motherland's treasured province—Taiwan] (Shanghai: Jen-min ch'u-pan-she, 1973). See also *T'aiwan—kuo-ch'u, hsien-tai yu chiang-lai* [Taiwan—the past, the present, and the future] (Hong Kong: Pan Ku Publishing Company, 1975).
  6. Among recent general studies of Taiwan's history not mentioned in other notes of this volume are Kao Chien-chih *T'ai-wan san-pai-nien shih* [Three hundred years of Taiwan's history] (Taipei: Ch'ung-wen t'u-shu kung-ssu, 1978); T'ai-wan shih-chi yen-chiu-hui, *T'ai-wan ts'ung-t'an* [Collected discussions on Taiwan] (Taipei: Chu-shih wen-hua shih-ye kung-ssu, 1977); Lin Heng-tao, *T'ai-wan ku-chi kai-lan* [Overview of Taiwan's ancient relics] (Taipei: T'ai-wan shih-chi ts'ung-shu, 1977); Johanna Menzel Meskill, *A Chinese Pioneer Family: The Lins of Wu-feng, Taiwan, 1729-1895* (Princeton: Princeton University Press, 1979). See also George H. Kerr's *Frontier Island* (forthcoming).
  7. Among the statements which call attention to Taiwan studies are Ronald G. Knapp, "The Geographer and Taiwan," *China Quarterly* 74(June 1978):356-368; Ralph Croizier, "Symposium: Taiwan in Chinese History," *Journal of Asian Studies* 34(February 1975):387-389; and Leonard H. D. Gordon, "Introduction: Taiwan and Its Place in Chinese History," in *Taiwan: Studies in Chinese Local History*, ed. Leonard H. D. Gordon (New York: Columbia University

Press, 1970). Professor Croizier's report resulted from a 1972 conference in which two unpublished papers not only review Taiwan studies but suggest as well many research themes: Ramon H. Myers, "Some Reflections on Taiwan Economic History," and William M. Speidel, "Ch'ing Taiwan: The State of the Field." An outgrowth of this meeting was the founding of a Committee for Taiwan Historical Studies within the Association for Asian Studies. The committee has issued a periodic newsletter since January 1974 and has begun publishing a source materials series for scholars interested in research topics on Taiwan. Useful research guides include: Wang Shih-ch'ing and William M. Speidel, "An Introduction to Resources for the Study of Taiwan History," *Ch'ing-shih wen-t'i* 3(December 1976):90-116; Wang Shih-ch'ing, *T'ai-wan yen-chiu Chung-wen shu-mu* [Chinese bibliography for Taiwan historical studies], Source Materials Series, Committee for Taiwan Historical Studies, Association for Asian Studies (Taipei: National Book Company, 1976).

***From Aboriginal Island to Chinese Frontier:  
The Development of Taiwan before 1683***

1. For the prehistory of Taiwan, see Kano Tadao, *Tōnan Ajia minzokugaku senshigaku kenkyū* [Studies in ethnology and archaeology of Southeast Asia], 2 vols. (Tokyo: Yashima shobō, 1946-1952); Lin Ch'ao-ch'ih, "Geology and Ecology of Taiwan Prehistory," *Asian Perspectives* 7(1-2)(1963):203-213; Chang Kwang-chih, "A Brief Survey of the Archaeology of Formosa," *Southwestern Journal of Anthropology* 12(4)(1956):371-386; Chang Kwang-chih, "Introduction to the Special Taiwan Section," *Asian Perspectives* 7(1-2)(1963):195-202; Chang Kwang-chih, *Fengpitou, Tapengkeng, and the Prehistory of Taiwan* (New Haven: Department of Anthropology, Yale University, 1969); George Grace, "Movement of the Malayo-Polynesians: 1500 B.C. to

- A.D. 500, the Linguistic Evidence," *Current Anthropology* 5(5)(1964):364, 368. Richard Pearson, "The Prehistoric Cultures of East Taiwan," in *Archaeology at the 11th Pacific Science Congress*, ed. Wilhelm G. Solheim, Jr., Asian and Pacific Archaeology Series, vol. 1 (Honolulu: Social Science Research Institute, University of Hawaii, 1967), pp. 25-31; Raleigh Ferrell, *Taiwan Aboriginal Groups: Problems in Cultural and Linguistic Classification*, Institute of Ethnology, Academia Sinica, Monograph no. 17 (Nankang, Taipei: 1969); Sung Wen-hsun, "Ch'ang-pin wen-hua, T'ai-wan shou-tz'u fa-hsien ti hsien-t'ao wen-hua" [Changpinian: the first discovered preceramic culture on Taiwan], *Chung-kuo min-tsu-hsueh t'ung-hsun* [Newsletter of Chinese Ethnology] 9(1969):1-27. See also the notes which accompany I-shou Wang's contribution to this volume (Chapter 2).
2. *San-kuo chih* [History of the Three Kingdoms]: *Wu-chih* [History of Wu] (Po na ed.), 2.212b, 15.6b-7a, 58.8b-9a.
  3. *Sui-shu* (Po-na ed.), 3.14b-15a, 64.13a-b, 81.11a-14a.
  4. *Ibid.*, 81.10b-13a.
  5. Liang Chia-pin, *Liu-ch'iu chi tung-nan chu-hai-tao yu Chung-kuo* [The Ryukyus, the islands in the East and South China Seas, and China] (Taichung: Tung-hai ta-hsueh, 1965), pp. 107-369, passim. For bibliographies of the works identifying Liu-ch'iu with Taiwan, see Shunzo Sakamaki, *Ryukyu: A Bibliographical Guide to Okinawan Studies* (Honolulu: University of Hawaii Press, 1963), pp. 67-72; Lai Yung-hsiang, *T'ai-wan chih yen-chiu* [Studies on the history of Taiwan] (Taipei: Published by the author, 1970), pp. 227-230.
  6. Liang, *Liu-ch'iu*, pp. 274-275, 295. For Chinese knowledge of the *kuroshio* current, see Joseph Needham et al., *Science and Civilization in China* (Cambridge: Cambridge University Press, 1971), vol. 4, pt. 3, pp. 548-549.

7. Lin Ch'ao-ch'i, "Kai shuo T'ai-wan ti-szu-chi ti ti-shih ping t'ao-lun ch'i tzu-jan-shih ho wen-hua-shih ti kuan-hsi" [A brief study on the Quaternary geohistory of Taiwan, with a discussion of relationships between natural and cultural history of Taiwan], *Bulletin of the Department of Archaeology and Anthropology, National Taiwan University* 28(1966):35; *T'ai-wan t'ung-chih kao* [Draft history of Taiwan], *chuan* 1, *ts'e* 1 (Taipei: T'ai-wan wen-hua wen-hsien wei-yuan-hui, 1957), p. 410; Sung Wen-hsun, "T'ai-wan hsi-pu shih-ch'ien wen-hua ti nien-tai" [Chronology of prehistoric cultures of western Taiwan], *T'ai-wan wen-hsien* [Taiwan historical studies] 16(4)(1965):153.
8. Lou Yao, *Kung-k'uei chi* [Collected writings of Lou Yao] (*Ts'ung-shu chi-ch'eng ch'u-pien* ed.), p. 1199. See also Ts'ao Yung-ho, "Tsao-ch'i T'ai-wan ti k'aifa yu ching-ying" [Development of Taiwan in early times], *T'ai-pei wen-hsien* [Taipei historical studies] 3(1963):12-14.
9. E. H. Blair and J. A. Robertson (eds. and trans.), *History of the Philippine Islands* (Cleveland: Arthur H. Clark Co., 1907), vol. 2, p. 113.
10. Lou, *Kung-k'uei chi*, p. 1199. Wheat was probably brought to P'eng-hu by the Chinese settlers. See also F. Hirth and W. W. Rockhill (trans.), *Chau Ju-kua: His Work on the Chinese and Arab Trade in the Twelfth and Thirteenth Centuries* (St. Petersburg: Imperial Academy of Science, 1911), p. 165; Chen Te-hsiu, *Hsi-shan hsien-sheng Chen Wen-chung-kung wen-chi* [Collected works of Chen Te-hsiu] (*Ssu-pu ts'ung-k'an* ed.), 8.161.
11. Wang Hsiang-chih, *Yu-ti chi-sheng* (1851-1861 *Yueh-ya-t'ang* block printed ed.), 130.4b.
12. For the campaigns against piracy, see Sogabe Shizuo, "Nan-Sō no boeki-kō Senshū no suigun to sono kaizoku bōeisaku" [Sea forces at Ch'uan-chou and the defense against piracy during the Southern Sung], *Tōhoku daigaku bungakubu kenkyū nempō* [Annals of the College of Liberal Arts, Tōhoku

- University] 5(1954): 64-80. By 1090 Chinese had used the mariner's compass in seafaring; see Chu Yu, *P'ing-chou k'o-t'an* [Miscellaneous notes on Kwangchou] (*Ts'ung-shu ch'i-ch'eng ch'u-pien* ed.), p. 18, and Needham, *Science and Civilization in China*, pp. 562-563. See also Wu Tzu-mu, *Meng-liang lu* [Miscellaneous jottings of Wu Tzu-mu] (*Ts'ung-shu ch'i-ch'eng ch'u-pien* ed.), p. 108; Kuwabata Jitsurō, "On P'u Shou-keng," *Memoirs of Research Department of the Toyo Bunko* 2(1928):68-69. For shipbuilding, see Shiba Yoshinobu, "Sōdai unsengyō no kiso kōzō" [Foundation of shipbuilding in the Sung dynasty], *Tōyōshi kenkyū* [Studies on East Asian history] 24(4)(1966):77-97. For the recent excavation of a Sung wooden sea vessel at Ch'uan-chou and related events, see *Wen-wu* [Cultural relicts] (Peking: October 1975), pp. 1-35.
13. Hirth and Rockhill, *Chau Ju-kua*, p. 75.
  14. Wada Hisanori, "Tōnan Ajia ni okeru shoki Kakyō shakai (960-1279)" [Early overseas Chinese communities in Southeast Asia, 960-1279], *Tōyōgakuhō* [Oriental studies] 42(1959):76-106.
  15. Many Northern Sung coins bearing the stamps of the T'ai-p'ing [hsing-kuo] (976-983), Chih-tao (995-997), Yuan-hsi (1017-1021), and Yuan-yu (1086-1093) periods were discovered in Taiwan during the last quarter of the eighteenth century. No modern archaeological findings, however, have yet corroborated that these coins were brought and used there during the periods in which they were minted. See Chu Shih-chieh, *Hsiao-liu-ch'iu man-chih* [Miscellaneous notes on Taiwan], T'ai-wan wen-hsien ts'ung-k'an, no. 3 (Taipei: T'ai-wan yin-hang, 1957), p. 65.
  16. Wang Ta-yuan, *Tao-i chih-lueh* [Brief accounts of island barbarians] (*Hsueh-t'ang ts'ung-k'an* ed.), la; trans. by Lawrence G. Thompson in "The Earliest Eyewitness Accounts of the Formosan Aborigines," *Monumenta Serica* 13(1964):167-168.

17. Hung Hsi-wen, *Hsu Hsuan-ch'ü chi* [Collected poems of Hung Hsi-wen] in *Yuan shih-hsuan ch'ü-chi* [First collection of Yuan poems], comp. Ku Ssu-li (1794-1798 *Hsiang-yeh-ts'ao-t'ang* ed.), *ts'e* 16, 4b-5a.
18. Wang, *Tao-i chih-lueh*, 1a; Chao Meng-fu, *Sung-hsueh-chai wen-chi* [Collected works of Chao Meng-fu] (*Su-pu ts'ung-k'an* ed.), 4.4b; Thompson, "The Earliest Eyewitness Accounts," p. 168.
19. *Yuan-shih* [History of the Yuan dynasty] (*Po-na* ed.), 97.15b-16a; 210.14a-15b.
20. Wang, *Tao-i chih-lueh*, 2b; Thompson, "The Earliest Eyewitness Accounts," pp. 168-169.
21. Ch'en Mao-jen, *Ch'uan-nan tsa-chih* [Miscellaneous notes on southern Ch'uan-chou] (*Ts'ung-shu chi-ch'eng ch'ü-pien* ed.), p. 17.
22. Ch'en Jen-hsi, *Huang-Ming shih-fa lu* [A collection of essays on Ming government] (Reprint of a Ming edition; Taipei: 1965), 75.11a.
23. A coin bearing the emblem of the Hung-wu period (1368-1398) was found by Ozaki Hotsuki in Ao-ti at the tip of northeastern Taiwan early in this century. But the connections, if any, between this Hung-wu coin and Chinese migration from P'eng-hu to Taiwan during the second half of the fourteenth century have yet to be established; see Kanaseki Takeo and Kokubu Naoichi, "Taiwan senshi kōkōgaku ni okeru kinnen no kōsaku" [Recent researches in the prehistoric archaeology of Taiwan], *Minzokugaku kenkyū* [Japanese journal of ethnology] 18(1-2)(1954):79.
24. *T'ai-tsung Yung-lo shih-lu* [Veritable records of Emperor Yung-lo] in *Ming shih-lu* [Veritable records of the Ming dynasty] (Nankang, Taipei: Chung-yang yen-chiu yuan, 1962-1966), 33.1a-b(pp. 564-566).
25. Wada Sei, "The Philippine Islands as Known to the Chinese before the Ming Dynasty," *Memoirs of the Research Department of the Toyo Bunko* 4(1929):134.

26. *Shen-tsung Wan-li shih-lu* [Veritable records of Emperor Wan-li] in *Ming shih-lu*, 26.2b.
27. Cheng Shun-kung, *Fu-hai t'u-ching* [Records of seafaring], in *Jih-pen i-chien* [A survey of Japan] (Negative microfilm of 1939 ed.), 2.1a. In referring to Taiwan, the Chinese, Japanese, and Koreans during the second half of the sixteenth century also used various names, most of them corruptions of Tayouan. See Arakawa Hidetoshi (ed.), *Nihon kyōryūhyōchaku shiryō* [Historical sources concerning drift to and from Japan] (Tokyo: Kishō kenkyūjo, 1962), p. 104; Nakamura Takashi, "Taiwan-shi gaiyō (kindai)" [Outline of the modern history of Taiwan], *Minzokugaku kenkyū* 181-182(1954):114.
28. Ch'en Mao-heng, *Ming-tai Wo-k'ou k'ao-lueh* [Studies on Japanese and Chinese piracy during the Ming dynasty] (Peking: Jen-min ch'u-pan she, 1957), pp. 103-119. See also So Kwan-wai, *Japanese Piracy in Ming China during the Sixteenth Century* (East Lansing: Michigan State University, 1975).
29. *Ku-chin t'u-shu chi-ch'eng* [Encyclopedia of books from antiquity to the present] (Taipei reprint, 1964), 1109.57; Thomas Astley (ed.), *New General Collection of Voyages and Travels* (London: Printed for T. Astley, 1747), vol. 4, p. 38b; *P'eng-hu chih-lueh* [Brief history of P'eng-hu], in *P'eng-hu T'ai-wan chih-lueh* [Brief history of P'eng-hu and Taiwan], *T'ai-wan wen-hsien ts'ung-k'an*, no. 104 (1961), pp. 28-30.
30. *Ch'ung-hsiu Fu-chien T'ai-wan fu-chih* [Gazetteer of T'ai-wan-fu in revised edition of the gazetteer of Fu-chien], *T'ai-wan wen-hsien ts'ung-k'an*, no. 74 (1961), p. 504; Jean Baptiste du Halde, *The General History of China* (London: J. Watts, 1736), vol. 1, pp. 181-182.
31. "The Relation of Fr. Martin de Rada," in *South China in the Sixteenth Century*, trans. and ed. C. R. Boxer (London: Hakluyt Society, 1953), p. 258.

32. *Shen-tsung Wan-li shih-lu*, 30.6a-b; Juan Gonzales de Mendoza, *The History of the Great and Mighty Kingdom of China and the Situation Thereof* trans. R. Parke and ed. George T. Staunton (London: Hakluyt Society, 1854), vol. 2, pp. 7-8; Ch'en Ching-ho, "Lin Feng hsi-chi Ma-ni-la shih-chien" [The incident of Lin Feng's attack on Manila] in *Ming-shih lun-ts'ung* [Collected papers on Ming history] (Taipei: Hsueh-sheng shu-chu, 1968), vol. 7, pp. 131-144; Boxer, *South China in the Sixteenth Century*, p. 257.
33. *Shen-tsung Wan-li shih-lu*, 44.8a, 45.7b.
34. "Bōkōtō enkaku-shi" [The development of P'eng-hu], *Taiwan kanshū kiji* [Studies in Taiwanese history and customs] 3(12)(1904):1111; *Lu-shih tsu-p'u* [Genealogy of Lu] (Chang-hua: n.d.), p. 8.
35. *Ming ching-shih wen-pien hsuan-lu* [Selections from the collected essays on the government of Ming], comp. Ch'en Tzu-lung, *T'ai-wan wen-hsien ts'ung-k'an*, no. 289 (1971), p. 43; Chang Hsieh, *Tung Hsi yang k'ao* [Verifications on the countries in the East and the West] (*Ts'ung-shu chi-ch'eng ch'u-pien* ed.), pp. 69-70; *Ming-shih* [History of Ming] (*Po-na* ed.), 323.17b-18a; Nakamura Takashi, "Nambu Taiwan no boragyō ni tsuite" [A study on grey mullet fishing in southern Taiwan], *Tenri daigaku gakuhō* [Journal of Tenri University] 5(1)(1953):20-22; Ts'ao Yung-ho, "Ming-tai T'ai-wan yu-yeh chih-lueh" [A brief account of Taiwan's fishing in the Ming dynasty], in *T'ai-wan ching-chi shih* [Economic history of Taiwan] (Taipei: T'ai-wan yin-hang, 1954), pp. 32-34.
36. Ku Yen-wu, *T'ien-hsia chun-kuo li-ping shu* [Writings on the advantages and disadvantages in the empire] (*Ssu-pu ts'ung-k'an* ed.), *ts'e* 26, "Fu-chien," 100a-b.
37. Ch'en Ti, "Tung-fan chih" [An account of the eastern barbarians], in *Minhai tseng-yen* [Essays and poems on the sea off Fukien], comp. Shen Yu-jung, *T'ai-wan wen-hsien ts'ung-k'an*, no. 56 (1959), pp. 26-27; Ho Ch'iao-yuan, *Min-*

- shu [History of Fukien] (1629 ed.), 38.22a; Sun Ch'eng-tse, *Ch'un-ming meng-yu lu* (*Ku-hsiang-chai hsiu-chen k'an-pen* ed.), 42.30a-b, 34b, 35b.
38. C. R. Boxer, *The Great Ship from Amacon: Annals of Macao and the Old Japan Trade* (Lisbon: Centro de Estudos Historicos Ultramarinos, 1951), p. 59. See also Boxer's *The Christian Century in Japan, 1549-1650* (Berkeley: University of California Press, 1951), p. 130.
  39. Ch'en Ti, "Tung-fan chih," pp. 26-27.
  40. Boxer, *Great Ship from Amacon*, p. 44; Iwao Seiichi, "Sekaishi jō no Taiwan" [Taiwan in world history], *Nihon rekishi* [Journal of Japanese history] 19(1949):12. Although long before the 1540s the Arabs and Europeans bypassed Taiwan, they used the Chinese name Liu-ch'iu (Lequcos) to refer to Taiwan and the Ryukyus. See Tomé Pires, *The Suma Oriental of Tome Pires*, trans. Armando Cortesao (London: Hakluyt Society, 1944), pp. 128-131, 525.
  41. Nakamura Tadayuki, "Jūroku shihchi seiki no chizu ni arewaretaru Taiwan" [Taiwan as shown in the maps of the sixteenth and seventeenth centuries], *Kagaku no Taiwan* [Scientific Taiwan] 9(3)(1941):13; Ts'ao Yung-ho, "Ou-chou ku ti-t'u shang chih T'ai-wan" [European maps of Taiwan in the sixteenth and seventeenth centuries], *T'ai-pei wen-hsien* 1(1962):3-4.
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### ***Cultural Contact and the Migration of Taiwan's Aborigines: A Historical Perspective***

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## Notes

1. Richard B. Stamps has surveyed the three commonly accepted explanations for the ethnographic and archaeological diversity of Taiwan in "New Light on Taiwan's Prehistory," *Asian Perspectives* 20(1979).
2. For detailed discussions on recent archaeological findings see Kwang-chih Chang, *Fengpitou, Tapenkeng, and the Prehistory of Taiwan* (New Haven: Department of Anthropology, Yale University, 1969); Kano Tadao, *T'ai-wan k'ao-ku-hsueh min-tsu-hsueh kai-kuan* [Outline review of the archaeology and ethnology of Taiwan], translated from the Japanese by Sung Wen-hsun (Taipei: T'ai-wan wen-hsien wei-yuan-hui, 1955); and Judith Treistman, "Prehistory of the Formosan Uplands," *Science* 175(January 1972):74-76.
3. Mabuchi Toichi has classified the lowland aborigines into ten groups in "Taka-sagozuku no bunrui: gakushi no kaiko" [Retrospect on the classification of the Formosan aborigines], *Minzo-kukaku kenkyu* 18(1/2)(1953):1-11. Raleigh Ferrell, using Dutch documents, has divided the Siraya group into five separate groups in "Aboriginal Peoples of the Southwestern Taiwan Plain," *Bulletin of the Institute of Ethnology, Academia Sinica* 32(Autumn 1971):217-235. For a further discussion of classification problems, see Ferrell's *Taiwan Aboriginal Groups: Problems in Cultural and Linguistic Classification*, Institute of Ethnology, Academia Sinica, Monograph 17 (Nankang, Taipei:1969).
4. Wang Jen-ying, *Population Change of Formosan Aborigines*, Institute of Ethnology, Academia Sinica, Monograph 11 (Nankang, Taipei:1967), p. 6.
5. Ch'en Cheng-hsiang, *T'ai-wan ti-chih, shang-ts'e* [A geography of Taiwan, vol. 1], Fu-min Geographical Institute of Economic Development, Research Report 94 (Taipei:1959), p. 23.

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6. Lawrence M. Hauptman and Ronald G. Knapp, "Dutch-Aboriginal Interaction in New Netherland and Formosa: An Historical Geography of Empire," *Proceedings of the American Philosophical Society* 121(April 1977):175 ff.
7. Ferrell, "Aboriginal Peoples of the Southwestern Taiwan Plain," p. 219.
8. Wei Hwei-lin and Wang Jen-ying, *A Survey of Population Growth and Migration Patterns among Formosan Aborigines*, Occasional Papers of the Department of Archaeology and Anthropology, National Taiwan University, no. 3 (Taiwan:1966), p. 14.
9. Ferrell, "Aboriginal Peoples of the Southwestern Taiwan Plain," pp. 219-223.
10. A good source for understanding Dutch missionary activity is the translations of Dutch and other records of the seventeenth century compiled in William Campbell (ed.), *Formosa under the Dutch: Description from Contemporary Records* (London: Kegan Paul, Trench, Trubner & Co., 1903). See also Hauptman and Knapp, "Dutch-Aboriginal Interaction in New Netherland and Formosa," pp. 179-180.
11. Ferrell, "Aboriginal Peoples of the Southwestern Taiwan Plain," p. 225.
12. Wen-hsiung Hsu, "Chinese Colonization of Taiwan," unpublished doctoral dissertation, University of Chicago, 1975, p. 218.
13. Ferrell, "Aboriginal Peoples of the Southwestern Taiwan Plain," p. 225.
14. Hsu, "Chinese Colonization of Taiwan," p. 218.
15. Wang Jen-ying, "Cultural Contact and the Change of Economic Life among the Aborigines of Taiwan," *Bulletin of the Institute of Ethnology, Academia Sinica* 22(1966):184.
16. This discussion of nineteenth-century aboriginal migrations follows that of Ch'en, *T'ai-wan ti-chih*, p. 248.
17. Hsu, "Chinese Colonization of Taiwan," p. 218.

18. Government of Formosa, Bureau of Aboriginal Affairs, *Report on the Control of the Aborigines in Formosa* (Taihoku: Government of Formosa, 1911), p. 5. During this period, the Japanese examined aboriginal policies elsewhere in the world for their applicability to Taiwan. Ronald G. Knapp and Lawrence M. Hauptman, "'Civilization over Savagery': The Japanese, The Formosan Frontier and United States Indian Policy 1895-1915," *Pacific Historical Review*, forthcoming.
19. For a detailed description of the guardline, see *Report on the Control of the Aborigines in Formosa*, pp. 10-19.
20. *Ibid.*, p. 44.
21. Martin A. Nettleship, "Externally Caused Change in Aboriginal Culture," *Bulletin of the Institute of Ethnology, Academia Sinica* 30(1970):85.
22. *Ibid.*, p. 87.
23. Wang, *Population Change of Formosan Aborigines*, p. 29.
24. Ch'en, *T'ai-wan ti-chih*, p. 254.
25. Wang, *Population Change of Formosan Aborigines*, p. 55.
26. Ch'en, *T'ai-wan ti-chih*, p. 1215.
27. *Ibid.*, p. 1230.
28. Wang, "Cultural Contact and the Change of Economic Life," p. 196. During the period between 1952 and 1964, for example, the Nationalist government spent NT\$33.8 million to construct or repair 331 bridges and 97 roads.
29. I-shou Wang, "Mountain People in the Lowlands: A Preliminary Report on the Migration of Formosan Aborigines," *Proceedings, Association of American Geographers* 7(1975):266.
30. *Ibid.*, p. 268.
31. Wei and Wang, *Population Growth and Migration Patterns*, pp. 38-39.
32. *Ibid.*
33. Wang, "Cultural Contact and the Change of Economic Life," p. 199.

### ***Settlement and Frontier Land Tenure***

This is an expanded version of a paper presented at the 73rd annual meeting of the Association of American Geographers in Salt Lake City, 25 April 1977. Some sections of this chapter have been extracted from Ronald G. Knapp, "Land Tenure in Eighteenth Century Taiwan," *China Geographer* 2(Fall 1975):39-48.

1. The English and Chinese-language treatments of these factors owe much to the work of the Japanese geographer Yoshiro Tomita, whose publications on Taiwanese topics during the 1930s and 1940s are the most systematic island-wide discussions of interest to the cultural geographer. Among these are "On the Rural Settlement Forms in Taiwan (Formosa), Japan," *Pacific Science Congress, Proceedings* (Canada.) 2(1933):1391-1395; "Taiwan nosonshuraku no keitai ni tsuite" [On the rural settlement forms in Taiwan], *Taiwan tigakukiji* 4(2)(1933):11-14 and 4(3)(1933):18-24; "Taiwan juraku no kenkyu" [A study of Taiwan's villages], *Taiwan bunka ronso* 2(1943):152 ff. Some of the derivative statements on Taiwan's settlement history are indicated in the notes which follow.
2. Ch'en Cheng-hsiang, "Population and Settlement in Formosa," *Tijdschrift voor Economische en Sociale Geographie* (Rotterdam), 9/10(September-October 1954): 180. These sections on the reasons for distinct settlement patterns were translated from his *T'ai-wan ti-chih, shang-ts'e* [A geography of Taiwan, vol. 1] (Taipei: 1959), pp. 258-260.
3. Chiao-min Hsieh, *Taiwan—Ilha Formosa: A Geography in Perspective* (Washington: Butterworths, 1964), p. 160; Yuchin Kang, "Taiwan," *Encyclopedia Britannica, Macropedia*, 15th ed., vol. 17, p. 998.
4. Yu Yung-ho, *P'i-hai chi-yu* [Journal of small sea travels], *T'ai-wan wen-hsien ts'ung-k'an*, no. 44 (Taipei: T'ai-wan yin-hang, 1959), p. 32.

5. This short passage was extracted from the *Chu-lo hsien-chih* [Chu-lo hsien gazetteer] and quoted in Lai Chang, *T'ao-yuan hsien t'u-ti li-yung chih yen-chiu* [Research into the land use of T'ao-yuan hsien] (Taipei: T'ai-wan shang-wu yin-shu-kuan, 1969), p. 29.
6. For a discussion of similarities and differences see Yoshiro Tomita, "Taiwan to minami-shina to no sonaku kyoju keikan no hikaku [A comparison of the rural residential landscapes of Taiwan and Southeast China], *Taiwan jihō* [Taiwan times], January 1936, pp. 37-42.
7. On the other hand, Hakka have a history of individual migration and dispersed settlement as well. See Myron Cohen, "The Hakka or 'Guest People': Dialect as a Sociocultural Variable in Southeastern China," *Ethnohistory* 15(1968):254-255.
8. The origin and nature of dispersed settlement in the Taipei basin are described in Ch'en Cheng-hsiang, "T'ai-pei p'en-ti chih san-ts'un" [Scattered settlements in the Taipei basin], National Taiwan University, Faculty of Agriculture, *Memoirs* 3(1953):35-44. An abridged English translation appears on pp. 45-48.
9. The patterns and conditions of Chinese settlement on the T'ao-yuan plain have been presented in Ronald G. Knapp, "Chinese Frontier Settlement in Taiwan," *Annals, Association of American Geographers* 66(March 1976):43-57, and "Land Tenure in Eighteenth Century Taiwan," *China Geographer* 2(Fall 1975):39-48.
10. *T'ao-yuan hsien-chih, chuan shou* [T'ao-yuan hsien gazetteer, vol. 1] (T'ao-yuan: T'ao-yuan hsien wen-hsien wei-yuan-hui, 1964), p. 34.
11. Tai Yen-hui, "Ch'ing-tai T'ai-wan chih ta-hsiao-tsu-ye" [The *ta-tsu* and *hsiao-tsu* system in Taiwan during the Ch'ing dynasty], *T'ai-wan wen-hsien* 4(June 1963):8.

12. Land tenure practices in Fukien are described by Evelyn Sakakida Rawski, *Agricultural Change and the Peasant Economy of South China* (Cambridge: Harvard University Press, 1972).
13. Among the English-language publications which discuss traditional land tenure practices in Taiwan are Okamatsu Santaro et al. (comp.), *Provisional Report on Investigations of Laws and Customs in the Island of Formosa* (Kyoto:n.p., 1902); Edgar B. Wickberg, "Late Nineteenth Century Land Tenure in North Taiwan," *Tai-wan: Studies in Chinese Local History*, ed. Leonard H. D. Gordon (New York: Columbia University Press, 1970); Shiro Kawada, "The Tenant System of Formosa," *Kyoto University Economic Review* 3(December 1928):86-146.
14. The subsoil was also termed *t'ien-ti* and *t'ien-ken*. The surface was also referred to as *t'ien-mien*.
15. *T'ai-wan chih shui-li wen-t'i* [The water conservancy question in Taiwan], *T'ai-wan yen-chiu ts'ung-k'an*, no. 4 (Taipei: T'ai-wan yin-hang, 1950), pp. 18-19-
16. Among contemporary studies of nucleated villages of this type are Ch'en Cheng-hsiang, *Hsiao Hsin Ying: A Typical Compact Village in Southern Taiwan* (Hong Kong: Geographical Research Centre, Graduate School, Chinese University of Hong Kong, 1971); Bernard Gallin, *Hsin Hsing, Taiwan: A Chinese Village in Change* (Berkeley: University of California Press, 1966); Sung-hsing Wang and Raymond Apthorpe, *Rice Farming in Taiwan: Three Village Studies* (Nankang, Taipei: Institute of Ethnology, Academia Sinica, 1974); Burton Pasternak, *Kinship and Community in Two Chinese Villages* (Stanford: Stanford University Press, 1972).
17. This and other sources of information about rural properties are described in Canute VanderMeer and Paul VanderMeer, "Land Property Data on Taiwan," *Journal of Asian Studies* 28(November 1968): 144-150.

18. *T'ao-yuan hsien-chih*, pp. 33-34. Most of the settlements are named in this source.
19. Governor-general of Formosa, *Taiwan zaiseki Kanminzoku gogan-hetsu chosa* [Investigation into the native places of the Han people of Taiwan] (Taihoku: Taiwan Sotoku Kanbo Chosa-ka, 1928). This survey has been examined by Ch'en Han-kuang, "Jih-chu T'ai-wan Han-tsu tsu-chi tiao-ch'a" [The Japanese investigation of the native places of the Han people of Taiwan], *T'ai-wan wen-hsien* 23(March 1972):85-104.
20. Knapp, "Chinese Frontier Settlement," p. 49.
21. Knapp, "Spatial Aspects of Economic and Social Behavior in T'ai-wan," unpublished doctoral dissertation, University of Pittsburgh, 1968, pp. 83-96.
22. The migrant peasants and their role in the agrarian system of eighteenth and nineteenth-century Taiwan have been sketched in Ramon H. Myers, "Taiwan under Ch'ing Imperial Rule, 1684-1895: The Traditional Economy," *Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong* 5 (1972): 379-383.
23. Wickberg, "Late Nineteenth Century Land Tenure," pp. 82-83.
24. For an interesting account of how wet-rice farmers in a nucleated village on the Chang-hua plain minimize farm plot dispersal, see Paul VanderMeer, "Pacifying Space in a Chinese Village," *China Geographer* 2(Fall 1975):27-37.

### ***The Chinese Settlement of the I-lan Plain***

This is a revised version of a paper entitled "I-lan in the First Half of the 19th Century" which was originally read at the conference on Taiwan in Chinese History, September 1972, and later published in *Bulletin of the Institute of Ethnology*, Academia Sinica (Taipei), 33(Spring 1972):52-71. I am grateful to Academia Sinica for permission to publish this revised version, to the East Asian Research Center of

Harvard University for a summer research grant in 1972, and to the Harvard-Yenching Library for access to its collection.

1. Ch'en Shu-chun (comp.), *Ko-ma-lan t'ing-chih* [Ko-ma-lan *t'ing* gazetteer] (reprint ed.; Taipei: T'ai-wan wen-hsien wei-yuan-hui, 1957), pp. 46-48.
2. The early history of the area is sketched in *I-lan hsien-chih, chuan shou, hsia* [I-lan *hsien* gazetteer, vol. 1, pt. 2] (I-lan: I-lan hsien wen-hsien wei-yuan-hui, 1960), pp.9-19.
3. *Wu-sha t'e-chi* [Special collection on Wu-sha](I-lan: Man hsien wen-hsien wei-yuan-hui, 1968), p. 14.
4. *Ko-ma-lan t'ing-chih*, p. 319.
5. Lien Heng, *T'ai-wan t'ung-shih* [General history of Taiwan] (1920-1921 reprint ed.; Taipei: Chung-hua ts'ung-shu wei-yuan-hui, 1955), p. 646.
6. *T'ai-wan t'ung-shih*, p. 647; *Ko-ma-lan t'ing-chih*, p. 320.
7. *T'ai-wan t'ung-shih*, p. 647; *Ko-ma-lan t'ing-chih*, p. 366.
8. *T'ai-wan t'ung-shih*, p. 648; *Ko-ma-lan t'ing-chih*, pp. 371-373.
9. Ke Pei-yuan (comp.), *Ko-ma-lan chib-lueh* [Summary gazetteer of Ko-ma-lan] (reprint ed.; Taipei: T'ai-wan yin-hang, 1961), pp. 131-150.
10. Harry J. Lamley, "The Formation of Cities: Initiative and Motivation in Building Three Walled Cities in Taiwan," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 161-168, 174, 180-182, 192-196, 202-203.
11. *Ibid.*, pp. 192 ff.
12. *Ko-ma-lan t'ing-chih*, pp. 355-359.
13. *T'ai-wan sheng t'ung-chih kao* [Draft gazetteer of Taiwan province] (Taipei: T'ai-wan sheng wen-hsien wei-yuan-hui, 1968), vol. 2, p. 266.
14. Ping-ti Ho, *Studies on the Population of China, 1368-1954* (Cambridge: Harvard University Press, 1967), pp. 25 if.

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15. As to the freezing of the *ting* quota, see Ping-ti Ho, *Studies on the Population of China*, pp. 25, 210-211.
16. *Ko-ma-lan t'ing-chih*, p. 391.
17. *T'ai-wan sheng t'ung-chih kao*, p. 150.
18. *Ibid.*, pp. 150-151. It is also possible that the low growth rate is correlated with the unbalanced sex ratio.
19. *Ko-ma-lan t'ing-chih*, pp. 65-68.
20. *Ibid.*, pp. 65-73.
21. *Ibid.*, p. 332.
22. *Ibid.*, p. 393.
23. *Ibid.*, p. 198; *T'ai-wan sheng t'ung-chih kao*, pp. 272, 277.
24. Chou Sheng-jen, "Ch'ing-tai T'ai-wan mi-chia-chih" [Rice prices in Taiwan during the Ch'ing period], *T'ai-wan yin-hang chi-k'an* 15(4)(1964):296, 305-306.
25. *Ibid.*, p. 305.
26. *T'ai-wan sheng t'ung-chih* [Gazetteer of Taiwan province] (Taipei: n.p., 1968), vol. 1, pp. 75-76.
27. *Ibid.*, pp. 78-79.
28. Chou, "Ch'ing-tai T'ai-wan," p. 306.
29. *Ko-ma-lan t'ing-chih*, pp. 88-89.
30. *T'ai-wan sheng t'ung-chih*, p. 80.
31. *Ko-ma-lan chih-lueh*, pp. 116-117.
32. Chou, "Ch'ing-tai T'ai-wan," pp. 197, 307.
33. Adrienne Ch'ing and Ramon H. Myers, "Agricultural Development under Japanese Colonial Rule," *Journal of Asian Studies* 23(1964):555 ff.
34. Taiwan sotoku kanbo chosaka, *Sotokufu Tokeisho*, No. 9 [Statistics of the Governor-General's office, no. 9] (Taihoku:1907), p. 494.
35. Edgar B. Wickberg, "Late Nineteenth Century Land Tenure in North Taiwan," in *Taiwan: Studies in Chinese Local History*, ed. Leonard H. D. Gordon (New York: Columbia University Press, 1970), p. 79.

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36. Ibid., pp. 80-81. It should be noted, however, that although the practice of double ownership in Taiwan was related to land reclamation, it had been a customary practice in other areas of the mainland. See Evelyn S. Rawski, *Agricultural Change and the Peasant Economy of South China* (Cambridge: Harvard University Press, 1972), pp. 20-21.
37. *Ko-ma-lan t'ing-chih*, p. 70.
38. Ibid., p. 366.
39. *I-lan hsien-chih*, vol. 1, pp. 10-11.
40. *Sotokufu Tokeisho*, No. 5(1906), p. 377.
41. *Ko-ma-lan t'ing-chih*, pp. 330, 372.
42. *I-lan hsien-chih*, vol. 4, pp. 6-8.
43. Ibid., pp. 9-10.
44. *Ko-ma-lan t'ing-chih*, p. 388. The event was recorded by Tung Pu-nien, a subprefect who served in I-lan between 1831 and 1838.
45. Maurice Freedman, *Chinese Lineage and Society* (New York: Humanities Press, 1966), pp. 162 ff.
46. Jack M. Potter, "Land and Lineage in Traditional China," in *Family and Kinship in Chinese Society*, ed. Maurice Freedman (Stanford: Stanford University Press, 1970), pp. 136 ff.
47. Burton Pasternak, "The Role of the Frontier in Chinese Lineage Development," *Journal of Asian Studies* 28(1969):551-561.
48. *I-lan hsien-chih*, vol. 1, pp. 26 ff. The figures are for 1933.
49. Chiu Shu-chin, "Ssu-chieh-ts'un min-tsu tiao-ch'a" [An investigation of the people of Ssu-chieh-ts'un], *T'ai-wan feng-wu* 20(1)(1970):44-45.
50. *Lin-shih-chu-chih* [Genealogy of the Lin clan] (Taipei: Hsin-yuan-tung, 1957), pp. A-159ff.

***Frontier Social Organization and Social Disorder in Ch'ing Taiwan***

1. *T'ai-wan hsien-chih* [Taiwan *hsien* gazetteer], T'ai-wan wen-hsien ts'ung-k'an, no. 103 (Taipei: T'ai-wan yin-hang, 1969), p. 59.
2. Lan Ting-yuan, *Tung-cheng chi* [Collected essays on the eastern expedition], T'ai-wan wen-hsien ts'ung-k'an, no. 12 (Taipei: T'ai-wan yin-hang, 1958), pp. 110, 291.
3. *Shih-tsung shih-lu* [Veritable records of Emperor Shih-tsung], 61.32; *Yung-cheng shu-p'i tsou-che hsuan-chi* [Selections from memorials to Emperor Yung-cheng with his comments], T'ai-wan wen-hsien ts'ung-k'an, no. 300 (Taipei: T'ai-wan yin-hang, 1972), p. 143.
4. Alvin W. Gouldner, "The Norm of Reciprocity: A Preliminary Statement," *American Sociological Review* 25(1960):161-178; "Reciprocity and Autonomy in Functional Theory," in *System, Change, and Conflict: A Reader on Contemporary Sociological Theory and the Debate over Functionalism*, ed. N. J. Demerath, III, and Richard A. Peterson (New York: Free Press, 1967), pp. 150-153.
5. *Chu-lo hsien-chih* [Chu-lo *hsien* gazetteer], T'ai-wan wen-hsien ts'ung-k'an, no. 141 (Taipei: T'ai-wan yin-hang, 1962), p. 145.
6. *Ibid.*, p. 148.
7. Sakura Magozo, *Ta-fu zakki* [Miscellaneous notes on Taiwanese customs], T'ai-wan wen-hsien ts'ung-k'an, no. 107 (Taipei: T'ai-wan yin-hang, 1961), p. 20.
8. *Ch'ung-hsiu T'ai-wan hsien-chih* [Revised history of Taiwan *hsien*], T'ai-wan wen-hsien ts'ung-k'an, no. 113 (Taipei: T'ai-wan yin-hang, 1961), p. 402.
9. Huang Shu-ching, *T'ai-hai shih-ch'a lu* [Records of a circuit censor in Taiwan], T'ai-wan wen-hsien ts'ung-k'an, no. 4 (Taipei: T'ai-wan yin-hang, 1957), p. 116; *Chang-hua hsien-chih* [Changhua *hsien* gazetteer], T'ai-wan wen-hsien ts'ung-k'an, no. 156 (Taipei: T'ai-wan yin-hang, 1962), p. 303.

10. *T'ai-wan hsien-chih*, pp. 234-236; *Chu-lo hsien-chih*, p. 147.
11. Lo Erh-kang, *T'ien-ti-hui wen-hsien lu* [Collection of documents concerning the Heaven and Earth Society] (Shanghai: Cheng-chung Shu-chu, 1947), pp. 87, 89.
12. *T'ai-wan hsien-chih*, pp. 58-59.
13. *T'ai-wan hui-lu* [Collections of various archives concerning Taiwan], *T'ai-wan wen-hsien ts'ung-k'an*, no. 178 (Taipei: T'ai-wan yin-hang, 1963), p. 2.
14. George Thomas Staunton (trans.), *Ta Tsing Leu Lee* (London: T. Cadell and W. Davies, 1810), p. 547.
15. Hsu Tsung-kan, *Ssu-wei-hsin-chai wen-pien* [Collected writings of Hsu Tsung-kan], *T'ai-wan wen-hsien ts'ung-k'an*, no. 67 (Taipei: T'ai-wan yin-hang, 1960), p. 112.
16. "Taiwan no gikyodai" [Taiwan sworn brothers], *Taiwan kanshu kiji* [Studies in Taiwanese history and customs] 2(3)(1902):210-213; Tai Kio, "Keiroku shu" [Soliloquy], *Minzoku Taiwan* [Folklore of Taiwan] 3(1)(1943):12-13.
17. *Chu-lo hsien-chih*, p. 147.
18. Suzuki Kiyochiro, *Taiwan kyukan kankonsosai to nenju gyoji* [Ceremonial occasions and annual events in Taiwan] (Taihoku: n.p., 1934), pp. 413-414.
19. This confirms S. N. Eisenstadt's hypothesis: "Age-homogeneous groups tend to arise in those societies in which the allocation of role facilities and rewards is not based on membership in kinship." See *From Generation to Generation* (Glencoe, Ill.: Free Press, 1956), p. 54.
20. *Yung-cheng shu-p'i tsou-che-hsuan-chi*, p. 168.
21. *T'ai-wan hsien-chih*, pp. 234-236.
22. *Kao-tsung shih-lu* [Veritable records of Emperor Kao-tsung], 1171.13a-b, 16b; 1183.15a-b; *T'ai-wan hui-lu*, vol. 6, p. 270, and vol. 10, p. 27.

23. *Ch'in-ting p'ing-ting T'ai-wan chi-lueh* [Imperial verified accounts of pacifying Lin Shuang-wen's rebellion in Taiwan], *T'ai-wan wen-hsien ts'ung-k'an*, no. 102 (Taipei: T'ai-wan yin-hang, 1961), p. 962.
24. Kurt H. Wolff (trans.), *The Sociology of George Simmel* (Glencoe, Ill.: Free Press, 1950), p. 373.
25. John L. Gillin, "A Contribution to the Sociology of Sects," *American Journal of Sociology* 16(1910):241.
26. *Taiwan shukyo chosa hokoku* [Report of survey on Taiwanese religion] (Taihoku: 1919), vol. 1, app., pp. 1, 96-100.
27. Okada Yuzuru, "Taiwan hokubu sonraku no okeru saishiken" [Worshiping circles in northern Taiwanese villages], *Minzokugaku kenkyu* [Journal of the Japanese Ethnological Society] 4(1)(1938):16-18.
28. *Kao-tsung shih-lu*, 135.15a.
29. George Leslie Mackay, *From Far Formosa* (New York: Fleming H. Revell Company, 1895), pp. 104-112.
30. Harry J. Lamley, "The Formation of Cities: Initiative and Motivation in Building Three Walled Cities in Taiwan," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 178 ff.
31. *T'ai-wan hui-lu*, vol. 5, p. 2.
32. *Hsuan-tsung shih-lu* [Veritable records of Emperor Hsuan-tsung], 239.27b; Chou K'ai, *Nei-tzu-sung-chai wen-hsuan* [Selections from the collected writings of Chou K'ai], *T'ai-wan wen-hsien ts'ung-k'an*, no. 82 (Taipei: T'ai-wan yin-hang, 1960), p. 36.
33. Hung Min-lin, "Ts'ao-t'un Ch'ieh-lao Hung-hsing i-chih shih" [A history of the migration of the Hung clan to Ch'ieh-lao, Ts'ao-t'un], *T'ai-wan feng-wu* [Taiwan folklore] 15(1)(1965):4.

34. Professor George Barclay's assertion that in Ch'ing Taiwan "much of the disturbance was apparently created by the type of large clan organization found in South China" is unfounded. See *Colonial Development and Population in Taiwan* (Princeton: Princeton University Press, 1954), p. 6.
35. *Ch'in-ting p'ing-ting T'ai-wan chi-lueh*, pp. 859, 994.
36. *Kao-tsung shih-lu*, I478.11b-12a.
37. *Ch'ung-hsiu Feng-shan hsien-chih* [Revised gazetteer of Feng-shan hsien], T'ai-wan wen-hsien ts'ung-k'an, no. 146 (Taipei: T'ai-wan yin-hang, 1962), pp. 255-257; *T'ai-wan nan-pu pei-wen chi-ch'eng* [Collection of stone inscriptions in southern Taiwan], comp. Huang Tien-ch'uan, T'ai-wan wen-hsien ts'ung-k'an, no. 218 (Taipei: T'ai-wan yin-hang, 1966), pp. 232-233. A contemporary description is presented in Burton Pasternak, *Kinship and Community in Two Chinese Villages* (Stanford: Stanford University Press, 1972), pp. 145 ff. See also Myron L. Cohen, *House United, House Divided* (New York: Columbia University Press, 1976), pp. 5-8.
38. Chou K'ai, *Nei-tzu-sung-chai wen-hsuan*, pp. 36-37, 41, 52; *Feng-shan hsien ts'ai-fang-ts'e* [Survey book of Feng-shan hsien], T'ai-wan wen-hsien ts'ung-k'an, no. 73 (Taipei: T'ai-wan yin-hang, 1960), pp. 274-275.
39. Harry Lamley has examined such conflict on the mainland as well as in Taiwan. See "Hsieh-tou: The Pathology of Violence in Southeastern China," *Ch'ing-shih wen-t'i* 3(November 1977):1-39.
40. *Hsuan-tsung shih-lu*, 345.3a-b.
41. For such a differentiation see Marvin W. Mikesell, "Comparative Studies in Frontier History," in *Turner and the Sociology of the Frontier*, ed. Richard Hofstadter and S. M. Lipset (New York: Basic Books, 1968), pp. 153-154.
42. Lin Heng-tao, *T'ai-wan ti li-shih yu min-tsu* [History and folklore of Taiwan] (Taipei: Ch'ing-wen ch'u-pan-she, 1966), pp. 46, 148.

### ***Sequent Occupance and Place Names***

1. Chiao-min Hsieh, *Taiwan-Ilha Formosa: A geography in Perspective* (Washington: Butterworths, 1964), especially "Part Two: The Occupance," pp. 123-200.
2. The place names mentioned in this essay can be located most readily in Chang Ch'i-yun (ed.), *T'ai-wan-sheng ti-t'u-chi* [Atlas of Taiwan] (Yang Ming Shan: National War College, 1963).
3. Joseph E. Spencer, "Chinese Place Names and the Appreciation of Geographic Realities," *Geographical Review* 31(1941):79-94; Herold J. Wiens, "The Geographical and Political Significance of Chinese Place Names," *Geographica* (Journal of the Geographical Society, University of Malaya) 1(1965); Phin-keong Voon, "The Origin of Chinese Place Names," *Geographica* (Journal of the Geographical Society, University of Malaya) 5(1969): 34-47.
4. Lin Heng-tao, "Taiwanese Place Names," *Echo* 5(1975):5. The most important reference on Taiwan's place names is Akiyoshi Abe, *Taiwan chi-mei ken-kyu* [A study of Taiwan's place names](Taihoku: Ban-go ken-kyu-kai, 1937).
5. Spencer, "Chinese Place Names," p. 79.
6. Lin, "Taiwanese Place Names," p. 52.

### ***Walled Cities and Towns in Taiwan***

1. Lewis Mumford, for example, has discussed the significance of the wall in the development of medieval European cities in *The Culture of Cities* (New York: Har-court Brace, 1938), pp. 13-72. Robert E. Dickinson also has emphasized the effect of earlier walls on the layout and internal arrangement of many West European cities in *The West European City* (London: Routledge and Kegan Paul, 1951), pp. 271-272 and *passim*. In the New World, there were also

- walled towns. See Howard J. Nelson, "Walled Cities of the United States," *Annals, Association of American Geographers* 51(1961):1-22.
2. See Chi Li, *The Formation of the Chinese People: An Anthropological Inquiry* (Cambridge: Harvard University Press, 1928), especially chap. 3, "The Evolution of the We-Group: Its Size as Measured by the City Points"; Benjamin E. Wallacker et al. (eds.), *Chinese Walled Cities: A Collection of Maps from Shina Jōkaku no Gaiyō, 1940* (Hong Kong: Chinese University Press, 1979). See also the following studies by Sen-dou Chang: "Some Aspects of the Urban Geography of the Chinese Hsien Capital," *Annals, Association of American Geographers* 51(1961):23-45; "Some Observations on the Morphology of Chinese Walled Cities," *Annals, Association of American Geographers* 60(1970):63-91; "The Morphology of Walled Capitals," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 75-100.
  3. Harry J. Lamley, "The Formation of Cities: Initiative and Motivation in Building Three Walled Cities in Taiwan," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 155-209.
  4. Lin Hao, *P'eng-hu t'ing-chih* [P'eng-hu t'ing gazetteer] (1892; reprint ed., Taipei: T'ai-wan yin-hang, 1958), p. 37.
  5. Kao Kung-ch'ien, *T'ai-wan fu-chih* [Taiwan fu gazetteer] (1694; reprint ed., Taipei: T'ai-wan yin-hang, 1960), p. 28.
  6. Chiang Tao-chang, "P'eng-hu ku-ch'eng k'ao" [Walled towns on the Pescadores], *Ta-lu tsa-chih* [Continent magazine] 32(1)(1966):16-20.
  7. James W. Davidson, *The Island of Formosa* (London: Macmillan, 1903), p. 12 and *passim*.
  8. This quotation is extracted from *'t Verwaerloosde Formosa*, a Dutch account of the Chinese conquest of Formosa which appeared in 1675. A partial translation appears in William

- Campbell (ed.), *Formosa under the Dutch: Descriptions from Contemporary Records* (London: Kegan Paul, Trench, Trubner & Co., 1903), p. 385.
9. A well-illustrated discussion of these and other landmarks in Tainan appears in *Echo* 5(8)(September 1975).
  10. Ch'en Pei-kuei, *Tan-shui t'ing-chih* [Tan-shui t'ing gazetteer] (1871; reprint ed., Taipei: T'ai-wan yin-hang, 1956), p. 101.
  11. Ch'en Meng-lin, *Chu-lo hsien-chih* [Chu-lo hsien gazetteer] (1717; reprint ed., Taipei: T'ai-wan yin-hang, 1958), p. 40.
  12. Chiang Tao-chang, "T'ai-wan te ku-ch'eng: i-ko li-shih ti-li-hsueh te yen-chiu" [Walled towns of Taiwan: a study in historical geography], *Ti-li-hsueh yen-chiu* [Geographical studies]1(1966):59-60.
  13. Wang Ying-ts'eng, *Feng-shan hsien-chih* [Feng-shan hsien gazetteer] (1764; reprint ed., Taipei: T'ai-wan yin-hang, 1957), p. 30.
  14. Chi Li has written that "of all the Eastern Asiatic peoples, the earliest Han-Chinese were the most active wall-builders. Within China Proper, wherever the city wall is found, it indicates the presence of the Han-Chinese already in a settled condition. The expansion of the wall-building activity in historical times is, therefore, a safe barometer showing the expansion of the historical Han-Chinese." See Li, *Formation of the Chinese People*, p. 57.
  15. Yu Yung-ho, *P'i-hai chi-yu* [Journey of small sea travels] (1732; reprint ed., Taipei: T'ai-wan yin-hang, 1959), p. 32; Huang Shu-ching, *T'ai-hai shih-ch'a lu* [Records of a circuit censor in Taiwan] (Taipei: T'ai-wan yin-hang, 1957).
  16. Factors involved in such discussions are sketched by Lamley, "The Formation of Cities," pp. 182-186.
  17. For the seat of Feng-shan *hsien*, two walled towns were built. The first was erected at Hsing-lung-chuang (now known as Tso-ying) in 1722, the second at P'i-t'ou (now

- known as Feng-shan) in 1854. For the first walled town, see Yao Ying, *Tung-ch'a chi-lueh* [Records on Taiwan] (1829; reprint ed., Taipei: T'ai-wan yin-hang, 1957), pp. 5-7.
18. Ch'en, *Chu-lo hsien-chih*, p. 40; and Wei Ching-chung, *Fu-chien t'ung-chih T'ai-wan fu* [Gazetteer of Fukien Province: T'ai-wan-fu] (Reproduction of excerpts of the 1871 edition of *Gazetteer of Fukien Province*; Taipei: T'ai-wan yin-hang, 1960), pp. 94-95.
  19. Ch'en Kuo-ying et al., *T'ai-wan ts'ai-feng ts'e* [A collection of field reports on Taiwan] (Reproduction of reports completed in 1830; Taipei: T'ai-wan yin-hang, 1959), pp. 23-25.
  20. Chou Hsi, *Chang-hua hsien-chih* [Chang-hua hsien gazetteer] (1829; reprint ed., Taipei: T'ai-wan yin-hang, 1957), p. 43.
  21. Wei, *Fu-chien t'ung-chih*, p. 93.
  22. Ch'en, *Tan-shui t'ing-chih*, p. 44.
  23. Tung Cheng-kuan, *Ko-ma-lan t'ing-chih* [Ko-ma-lan t'ing gazetteer] (1852; reprint ed., Taipei: T'ai-wan yin-hang, 1957), pp. 32-33.
  24. Ch'en, *Tan-shui t'ing-chih*, p. 43.
  25. *Ibid.*, p. 44.
  26. This is the second walled town erected for the seat of Feng-shan *hsien*. See Hsieh Wen-ch'en, *Kao-hsiung hsien-chih k'ao: yen-ke chih* [Draft gazetteer of Kao-hsiung *hsien*: historical development] (Feng-shan: Feng-shan *hsien* wen-hsien wei-yuan-hui, 1958), pp. 28-29. See also Yao Ying, *Tung-ch'a chi-lueh*.
  27. Yoshiro Tomita, "Yen-shui," *Nan-ying wen-hsien* [Historical records of T'ai-nan](1954):50.
  28. Ch'en, *Tan-shui t'ing-chih*, pp. 43-44.
  29. Akiyoshi Abe, "Chiu-i o yosu-ru Taiwan no chi-meï kai" [Meaning of Taiwan place names], *Taiwan jihō* [Taiwan times], February 1936, p. 49.

30. Shen Mou-yin, *Miao-li hsien-chih* [Miao-li *hsien* gazetteer] (1893; reprint ed., Miao-li: Miao-li *hsien* wen-hsien wei-yuan-hui, 1953), p. 29.
31. Chiang Tao-chang, "Shih-pa shih-chi chi shih-chiu shih-chi T'ai-wan ying-chien ti ku-ch'eng" [Taiwan's walled towns built during the eighteenth and nineteenth centuries], *Nanyang University Journal* 1(1967):193.
32. Ch'en, *Tan-shui t'ing-chih*, p. 44.
33. Shen, *Miao-li hsien-chih*, p. 28.
34. *Hsin-chu hsien ts'ai-fang ts'e* [A collection of field reports on Hsin-chu] (1894; reprinted., Taipei: T'ai-wan yin-hang, 1962), p. 15.
35. Lien Heng, *T'ai-wan t'ung-shih* [A history of Taiwan] (Taipei: Chung-hua ts'ung-shu wei-yuan-hui, 1958), p. 61. See also Ch'en, *Tan-shui t'ing-chih*, p. 44; and Chiang Tao-chang, "T'ai-pei *hsien* Pan-ch'iao chih li-shih ti fa-chan" [Historical development of the town of Pan-ch'iao], *Ta-lu tsa-chih* [Continent magazine] 29(9)(1964):299-302.
36. The wall of Ta-k'o-k'an was built by the Chang-chou people led by Lin P'ing-hou probably in 1809 when there was fighting between the Chang-chou and Ch'u'an-chou communities. See Lien, *T'ai-wan t'ung-shih*, pp. 56 and 699-700. See also Huang Shih-ch'iao, "T'ai-wan ming-sheng Ta-ch'i k'en-t'o ti shih-hua" [A history of Ta-ch'i], *T'ai-wan wen-hsien* 24(4)(1973):39.
37. Akiyoshi Abe, *Tai-wan chi-mei ken-kyu* [A study of Taiwan place names] (Taihoku: Ban-go ken-kyu-kai, 1937), p. 164.
38. T'u Chi-shan, *Heng-ch'un hsien-chih* [Heng-ch'un *hsien* gazetteer] (1894; reprint ed., Taipei: T'ai-wan sheng wen-hsien wei-yuan-hui, 1951), p. 94.
39. Ch'en, *Tan-shui t'ing-chih*, pp. 88-89.
40. Chiang, "T'ai-wan te ku-ch'eng," pp. 76-77.
41. T'u, *Heng-ch'un hsien-chih*, p. 21.
42. Lien, *T'ai-wan t'ung-shih*, p. 364.
43. *Ibid.*, p. 363.

44. Lin, *P'eng-hu t'ing-chih*, p. 37.
45. Lien, *T'ai-wan t'ung-shih*, pp. 361-362. See also Clifton W. Pannell, *T'ai-chung, T'ai-wan: Structure and Function*, University of Chicago, Department of Geography, Research Series no. 144 (Chicago: 1973), pp. 32-40.
46. See Ch'en Shih-lieh, "Chu-ch'eng ching-i-t'ing chi" [A tablet inscription exemplifying the public spirit with reference to the completion of Chu-shan Ch'eng], in Liu Chih-wan (comp.), *T'ai-wan chung-pu pei-wen chi-ch'eng* [A collection of tablet inscriptions with reference to central Taiwan] (Taipei: T'ai-wan yin-hang, 1962), pp. 61-62. This inscription was originally completed in 1887.
47. Ni Tsan-chih, *Yun-lin hsien ts'ai-fang ts'e* [A collection of field reports on Yun-lin] (1894; reprint ed., Taipei: T'ai-wan yin-hang, 1959), vol. 1, p. 1. See also Lien, *T'ai-wan t'ung-shih*, p. 362.
48. An examination of local interaction is found in Laurence M. Hauptman and Ronald G. Knapp, "Dutch-Aboriginal Interaction in New Netherland and Formosa: An Historical Geography of Empire," *Proceedings of the American Philo-sophical Society* 121(2)(April 1977):166-182.
49. Chang, "Morphology of Walled Capitals," p. 85, and "Some Aspects of the Urban Geography," pp. 31-33.
50. A town wall having a circumference of 600 *chang* or about 2,150 meters is considered a major walled town. All except T'ao-yuan were *fu*, *hsien*, or *t'ing* capitals. The rest are called secondary walled towns.
51. Of the fourteen major walled towns on the island of Taiwan, Chu-shan and Feng-shan (Hsing-lung-chuang), which were replaced by Tou-liu and Feng-shan (P'i-t'ou) respectively, were eliminated from the analysis. The mean distance between nearest neighbors of the remaining twelve major walled towns on the lowlands of northern, central, and southern Taiwan is 35 kilometers; that is,  $\bar{r}_a = 35$ . As the total area of these lowlands below 500 meters is about

- 17,000 square kilometers,  $\bar{r}_e = 1/(2\sqrt{12/17,000}) = 18.82$ . Therefore  $R = \bar{r}_d/\bar{r}_e = 35/18.82 = 1.86$ . For a good concise treatment of nearest-neighbor analysis, see D. E. Pinder and M. E. Witherick, "The Principles, Practice and Pitfalls of Nearest-neighbour Analysis," *Geography* 57(1972):277-288.
52. Lan Ting-yuan, *P'ing-T'ai chi-lueh* [Records on the Taiwan campaign] (1723; reprint ed., Taipei: T'ai-wan yin-hang, 1958), p. 53.
53. The construction of the wall at Chu-ch'ien, the capital of Tan-shui t'ing, was, for example, financed entirely by contributions from local government officials and private citizens. A total of 155,400 taels of silver was collected, of which 147,491 taels was spent on construction of the wall. See *Tan-shui t'ing chu-ch'eng an-chuan* [Archives of the construction of wall at the capital of Tan-shui t'ing] (Taipei: T'ai-wan yin-hang, 1963), p. 92 and passim.
54. Lamley, "The Formation of Cities," p. 163, map 3.
55. Shen, *Miao-lihsien-chih*, p. 28.
56. Chang, "Some Observations on the Morphology," pp. 70-71.
57. Much has been written which relates preference of square shape to early Chinese cosmological notions. Joseph Needham summarizes this alleged preference, noting that it is "connected no doubt with the ancient and widespread idea that the heavens were round while the earth was square.... The unsophisticated early Chou cosmology surely visualized the heavens as round because the starry sky seems to the observer like a hollow spherical dome rotating continuously about him in a circular manner. The parallel idea that the earth was square surely arose from the simplest way of dividing the azimuth, into the four cardinal points." See Joseph Needham, *Science and Civilization in China*, vol. 4, pt. 3 (Cambridge: Cambridge University Press, 1971), p. 73. An extensive treatment of the cosmological symbolism of the ancient Chinese city is provided by Paul

- Wheatley, *The Pivot of the Four Quarters* (Chicago: Aldine, 1971). See also Arthur F. Wright, "The Cosmology of the Chinese City," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 33-73.
58. Chiang, "T'ai-wan te ku-ch'eng," p. 67.
  59. Chang, "Morphology of Walled Capitals," p. 89.
  60. Chiang, "T'ai-wan te ku-ch'eng," p. 72.
  61. G. William Skinner, "Marketing and Social Structure in Rural China, Part I," *Journal of Asian Studies* 24(1964):9.
  62. The distance between *hsien* capitals of the North China plain or of the middle Yangtze valley was about 50 or 60 kilometers. See Chang, "Some Aspects of the Urban Geography," p. 42.
  63. Hsieh Chin-luan, *Hsu-hsiu T'ai-wan hsien chih* [T'ai-wan *hsien* gazetteer, revised] (1821; reprinted., Taipei: T'ai-wan yin-hang, 1962), pp. 4-5, 9-10.
  64. Lien, *T'ai-wan t'ung-shih*, pp. 196-209.
  65. *Ibid.*, pp. 218-221.
  66. Chang, "Some Observations on the Morphology," pp. 82-84.
  67. The impact of city walls on urban landscape is probably universal. In Western Europe, for example, the layout of a medieval town plan was adjusted to the shape of its wall and the location of the gates. Subsequently, the boulevards followed the lines of demolished walls. See Dickinson, *The West European City*, pp. 271-272 and *passim*.

### ***Lu-kang: A City and Its Trading System***

1. My fieldwork in Lu-kang from April 1967 through October 1968 was supported by the Foreign Area Fellowship Program. For further information on Lu-kang, see: Donald R. DeGlopper, "Doing Business in Lukang," *Economic Organization in Chinese Society*, ed. W. E. Willmott (Stanford: Stanford University Press, 1972); "City on the Sands: Social

- Structure in a Nineteenth Century Chinese City," unpublished doctoral dissertation, Cornell University, 1973; "Ritual and Religion in Lukang," *Religion and Ritual in Chinese Society*, ed. Arthur P. Wolf (Stanford: Stanford University Press, 1974); and "Social Structure in a Nineteenth-Century Taiwanese Port City," *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977).
2. See Mark Elvin, *The Pattern of the Chinese Past* (Stanford: Stanford University Press, 1973), pp. 207 ff.
  3. See G. William Skinner, "Mobility Strategies in Late Imperial China: A Regional Systems Analysis," *Regional Analysis*, vol. 1, ed. Carol A. Smith (New York: Academic Press, 1976), pp. 349-350.
  4. Laurence G. Thompson, "The Junk Passage across the Taiwan Straits: Two Early Chinese Accounts," *Harvard Journal of Asiatic Studies* 28(1968):170-194.
  5. See W. A. Pickering, *Pioneering in Formosa* (London: Hurst and Blackett, 1898).
  6. Thompson, "The Junk Passage."
  7. "Formosa: Its Situation and Extent," *Chinese Repository* 2(1834):420.
  8. *China Sea Pilot*, vol. 3 (London: H.M.S.O., 1937), p. 174.
  9. Ch'en Cheng-hsiang, *Taiwan: An Economic and Social Geography* (Taipei: Fu-min Geographical Institute of Economic Development, 1963), p. 95.
  10. Pickering, *Pioneering in Formosa*.
  11. James W. Davidson, *The Island of Formosa* (New York: Macmillan, 1903), p. 236.
  12. For a description and appreciation of the Taiwanese seagoing bamboo raft, see G. R. G. Worcester, *Sail and Sweep in China* (London: H.M.S.O., 1966), pp. 93-96.
  13. A. R. Colquhoun and J. H. Stewart-Lockhart, "A Sketch of Formosa," *China Review* 13(3)(1885):199.

## Notes

14. Yosaburo Takekoshi, *Japanese Rule in Formosa*, trans. George Braithwaite (London: Longmans, Green, 1907), pp. 253, 259.
15. G. William Skinner, "Marketing and Social Structure in Rural China," pts. 1-3 *Journal of Asian Studies* 24(1-3)(1964-1965), and "Cities and the Hierarchy of Local Systems," *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), pp. 275-352.
16. Skinner, "Cities and the Hierarchy of Local Systems," p. 293.
17. See Harry J. Lamley, "The Taiwan Literati and Early Japanese Rule," unpublished doctoral dissertation, University of Washington, 1964, pp. 28-29.
18. *Chu-lo hsien-chih* [Chu-lo hsien gazetteer] (1717; reprint ed., Taipei: T'ai-wan yin-hang, 1962), chap. 7, p. 122.
19. *Ibid.*, chap. 1, p. 13.
20. See Wang Sung-hsing, "Pa Pao Chun yu T'ai-wan chung-pu te k'ai-fa" [The Pa-pao canal and the development of central Taiwan], *T'ai-wan wen-hsien* 26(4) and 27(1)(1975-1976):42-49.
21. Huang Tu-ching, *T'ai-hai shih ch'a lu* [Record of an envoy's raft journey in the Taiwan Sea], as quoted in Chang Ping-nan, "Lu-kang k'ai kang shih" [History of the opening of Lu-kang as a legal port], *T'ai-wan wen-hsien* 19(1)(1968):2.
22. *Chang-hua hsien-chih* [Chang-hua hsien gazetteer] (1832; reprint ed., Taipei: T'ai-wan yin-hang, 1957), p. 68.
23. As quoted in Chang, "Lu-kang k'ai kang shih."
24. *Chang-hua hsien-chih*, chap. 1.
25. Lords Commissioners of the Admiralty, *China Sea Directory* (London: Admiralty, 1884), vol. 3, pp. 287-288.
26. Taiwan (Sotokufu), Rinji Taiwan kyukan chosaki, dai niibu, *Dai Niibu chosa keizai shiryō hokoku* [Report on economic conditions] (Tokyo: Sotokufu, 1905), vol. 2, p. 169.

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27. See Chou Hsien-wen *Ch'ing-tai T'ai-wan ching-chi shih* [Economic history of Taiwan during the Ch'ing dynasty] (Taipei: T'ai-wan yin-hang, 1957), p. 58.
28. Chou, *Ch'ing-tai T'ai-wan*; Thompson, "The Junk Passage."
29. Chou, *Ch'ing-tai T'ai-wan*.
30. As quoted in Chang, "Lu-kang k'ai kang shih."
31. Chou, *Ch'ing-tai T'ai-wan*, p. 60.
32. *Chang-hua hsien-chih*, chap. 3, p. 415.
33. *Ibid.*, p. 406.
34. For more detail on Lu-kang's elite and its relations with the resident officials, see my chapter in Skinner, *The City in Late Imperial China*, and my 1973 dissertation.
35. The petition can be found in Lien Heng, *T'ai-wan t'ung-shih* [A general history of Taiwan] (1920-1921; reprint ed., Taipei: T'ai-wan yin-hang, 1955), vol. 1, p. 107. Liu Ming-ch'uan's response is described in William Speidel, "Liu Ming-ch'uan in Taiwan: 1884-1891," unpublished doctoral dissertation, Yale University, 1967, pp. 119-120.
36. *Dai Niibu chosa keizai shiryō hokoku*, vol. 1, p. 581.
37. *Chang-hua hsien-chih*, chap. 1, pp. 21-25; chap. 3, p. 290.
38. Hugh Lindsay, *A Voyage to the Northern Ports of China in the Ship Lord Amherst* (London: B. Fellowes, 1834), p. 13.
39. *Ibid.*, p. 272.
40. "Formosa," *Chinese Repository* 7 (January 1838):418.
41. Chang, "Lu-kang k'ai kang shih," pp. 10, 12; Charles Gutzlaff, "Journal of a Residence in Siam and of a Voyage along the Coast of China to Mantchou Tar-tary," *Chinese Repository* 1 (1832):418.
42. J. D. Clark, *Formosa* (Shanghai: n.p., 1896), pp. 81, 134-135.
43. Colquhoun and Stewart-Lockhart, "A Sketch of Formosa," pp. 189, 193.
44. Clark, *Formosa*, pp. 52-53.
45. Chang, "Lu-kang k'ai kang shih," p. 12. No source cited.
46. *Dai Niibu chosa keizai shiryō hokoku*, vol. 2, p. 322.

47. Taiwan Sotokufu, *Chosaka tokeishu* [Annual statistical summary], 1903, 1905, 1911. Also *Taiwan boeki nempyo* [Annual returns of the trade of Taiwan], 1922, 1925, 1934.
48. *Taiwan boeki nempyo*, 1922, 1925.
49. Chang, "Lu-kang k'ai kang shih."
50. *Dai Niibu chosa keizai shiryō hokoku*, vol. 1, pp. 583-596; vol. 2, pp. 169-177.
51. Skinner, "Cities and the Hierarchy of Local Systems," pp. 286-287; "Introduction: Urban Social Structure in Ch'ing China," in *The City in Late Imperial China*, ed. G. William Skinner (Stanford: Stanford University Press, 1977), p. 525.
52. *Chosaka tokeishu*, 1903, pp. 706-707.
53. Skinner, "Mobility Strategies in Late Imperial China."
54. Chen Ta, *Emigrant Communities in South China* (Shanghai: Kelly and Walsh, 1939).
55. Ibid. See also James L. Watson, *Emigration and the Chinese Lineage* (Berkeley: University of California Press, 1975).
56. DeGlopper, "Ritual and Religion in Lukang," p. 68.
57. Robert Redfield, *The Little Community* (Chicago: University of Chicago Press, 1956), p. 149.

### ***The Development and Structure of Transportation Networks in Taiwan: 1600-1972***

A shorter version of this chapter was presented at the 73rd annual meeting of the Association of American Geographers in Salt Lake City, 25 April 1977.

1. For an elaboration, see G. Fromm (ed.), *Transport Investment and Economic Development* (Washington: Brookings Institution, 1972).
2. A synopsis of research in transportation geography is contained in James O. Wheeler, "Introduction: Societal and Policy Perspectives in Transportation Geography," *Economic Geography* 49(April 1973):ii, 181-184.

3. Ibid. See also James O. Wheeler, "An Overview of Research in Transportation Geography," *East Lakes Geographer* 7(December 1971):3-21.
4. In addition to the annual Taiwan Statistical Abstracts published by the provincial government, a number of other government agencies, including the Ministry of Communication, publish annual statistics and informational summaries.
5. Samuel P. S. Ho has provided a comprehensive examination of the economic and noneconomic dimensions of Taiwan's development in *Economic Development of Taiwan, 1860-1970* (New Haven: Yale University, 1978).
6. Taiwan Provincial Cultural Affairs Committee, *T'ai-wan-sheng t'ung-chih* [Gazetteer of Taiwan province] (Taipei: T'ai-wan-sheng ch'u-pan-she, 1969), p. 96.
7. Ch'ien I, "T'ai-wan chih kung-lu chien-she" [Construction of highways on Taiwan], *T'ai-wan chih chiao-tung* [Taiwan transportation], T'ai-wan yen-chiu ts'ung-k'an, no. 63 (Taipei: T'ai-wan yin-hang, 1958), p. 99; *T'ai-wan chiao-t'ung shih* [History of transportation development in Taiwan], T'ai-wan yen-chiu ts'ung-k'an, no. 37 (Taipei: T'ai-wan yin-hang, 1955), p. 72.
8. *T'ai-wan-sheng t'ung-chih*, p. 22.
9. Ch'ien I, "T'ai-wan chih kung-lu chien-she," p. 100.
10. *T'ai-wan-sheng t'ung-chih*, p. 23.
11. Ch'ien I, "T'ai-wan chih kung-lu chien-she," p. 100.
12. *T'ai-wan chiao-t'ung shih*, p. 55. This is the source for most of the details of lines built during the Japanese period.
13. George W. Barclay, *Colonial Development and Population in Taiwan* (Princeton: Princeton University Press, 1954).
14. *T'ai-wan-sheng t'ung-chih*, p. 31.
15. Department of Information, Taiwan Provincial Government, *Kuang-fu erh-wu nien* [25th restoration anniversary] (Taichung: Taiwan Provincial Government Press, 1970), sec. 12, p. 7.

16. *Chung-yang jih-pao* [Central daily news] (Taipei), 26 November 1973, p. 3.
17. Ronald Abler, John S. Adams, and Peter Gould, *Spatial Organization: The Geographer's View of the World* (Englewood Cliffs: Prentice-Hall, 1971), p. 193; Edward J. Taaffe and Howard L. Gauthier, *Geography of Transportation* (Englewood Cliffs: Prentice-Hall, 1973), p. 34; Michael E. Eliot-Hurst (ed.), *Transportation Geography: Comments and Readings* (New York: McGraw-Hill, 1974), p. 288.
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19. *Ibid.*, p. 29.
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21. *Taiwan (Formosa) Civil Affairs Handbook* (Washington: Office of the Chief of Naval Operations, Navy Department, 1944), p. 96.
22. The two sections of the North-South Railway are counted as one line.
23. *Chung-yang jih-pao* [Central daily news] (Taipei), 28 January 1974, p. 2; *T'ao-wan-sheng t'ung-chih*, pp. 138, 144.
24. Nuhad J. Kanaan, "Structure and Requirements of the Transport Network of Syria," *Papers and Proceedings of the Regional Science Association*, 7(1961):20.
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26. Duane F. Marble, "Computation of Node Accessibility Indices (As Defined by Shimbel and Katz) for Transport Networks Containing up to 64 Nodes," computer program. Department of Geography, Northwestern University, June 1970.
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28. The major urban centers on the Longitudinal Highway mentioned in *T'ai-wan-sheng t'ung-chih* were Keelung (Chilung), Taipei, Hsin-chu, Taichung, Tainan, Kaohsiung, and P'ing-tung; all were included in the network of 1925. If the origin and destination of a new highway were on the Longitudinal Highway, such as Chung-li and Feng-yuan for the Chung-li/Feng-yuan Highway, they were included in the network of 1925. If the origin and destination of a new highway were not on the Longitudinal Highway, they were included in the year that the highway was completed and they were connected to the Longitudinal Highway.
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### ***Push Car Railways and Taiwan's Development***

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  3. James O. Wheeler and Clifton W. Pannell, "A Teaching Model of Network Diffusion: The Taiwan Example," *Journal of Geography* 72(1973):21-31.
  4. Chou Hsien-wen, *Ch'ing-tai T'ai-wan ching-chi-shih* [An economic history of Taiwan during the Ch'ing dynasty] (Taipei: T'ai-wan yin-hang, 1957), p. 64.
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6. Chang Han-yu, "Jih-chu shih-tai T'ai-wan ching-chi chih yen-pien" [Changes in Taiwan's economy during the period of Japanese rule], *T'ai-wan ching-chi-shih, erh-chi* [Economic history of Taiwan, no. 2] (Taipei: T'ai-wan yin-hang, 1955), P. 77.
  7. The scope of the governor's efforts has been examined by Samuel C. Chu in "Liu Ming-ch'uan and Modernization of Taiwan," *Journal of Asian Studies* 23(1963):37-53. Additional pertinent information is provided by William M. Speidel, "The Administrative and Fiscal Reform of Liu Ming-ch'uan in Taiwan, 1884-1891: Foundations for Self-strengthening," *Journal of Asian Studies* 35(1976):441-459.
  8. Yosaburo Takekoshi, *Japanese Rule in Formosa*, trans. George Braithwaite (New York: Longmans, Green, 1907), p. 253.
  9. Chang and Myers, "Japanese Colonial Development Policy," p. 434.
  10. For an examination of the many factors which promoted agricultural development on the island, see Ramon H. Myers and Adrienne Ching, "Agricultural Development in Taiwan under Japanese Colonial Rule," *Journal of Asian Studies* 23(1964):555-570. The effect of these developments on rural life is examined in Ramon H. Myers, "Taiwan's Agrarian Economy under Japanese Rule," *Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong* 7(December 1974):451-475.
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  12. James W. Davidson, *The Island of Formosa* (London: Macmillan, 1903), pp. 290-370.
  13. The most thorough description of the ricksha is "The Ricsha in Shanghai and Peking," *Chinese Economic Monthly* 22(May 1925):34-40.

## Notes

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16. *T'ai-wan-sheng wu-shih-yi nien lai t'ung-chi t'i-yao* [Fifty-one years of statistics for Taiwan province] (Taipei: T'ai-wan sheng cheng-fu, 1946), p. 1154.
17. Basil Hall Chamberlain and W. B. Mason, *A Handbook for Travellers in Japan including the Whole Empire from Yezo to Formosa* (London: John Murray, 1903), pp. 550-552.
18. Takekoshi, *Japanese Rule in Formosa*, p. 254.
19. *T'ai-wan-sheng wu-shih-yi nien lai t'ung-chi*, p. 1180.
20. Tseng, *T'ai-wan chiao-t'ung shih*, pp. 66-67.
21. For an examination of the settlement process on the T'ao-yuan plain see Ronald G. Knapp, "Chinese Frontier Settlement in Taiwan," *Annals, Association of American Geographers* 66(March 1976):43-59.
22. Davidson, *Island of Formosa*, p. 394. Davidson provides a comprehensive account of the tea industry on pp. 371-396 and the camphor industry on pp. 396-443.
23. Ch'en Cheng-hsiang, *T'ai-wan chih tu-shih yu hsiang-chieh* [Cities and rural towns of Taiwan] (Taipei: Institute of Agricultural Geography, 1953), pp. 14-15.
24. *Toencho shi* [A history of Toen district] (Taihoku: n.p., 1906), p. 109.
25. The historical patterns of water control are examined in Knapp, "Chinese Frontier Settlement," pp. 52-53.
26. *T'ai-wan-chih shui-li wen-t'i* [The water conservancy question in Taiwan], T'ai-wan yen-chiu ts'ung-k'an, no. 4 (Taipei: T'ai-wan yin-hang, 1950), pp. 18-19.
27. Takeuchi Jogyo, "Taiwan, Toen daichi no suiri no hattatsu to tochi rigo" [Irrigation development and land use on the T'ao-yuan tableland in Taiwan], *Chirigaku-hyoron* [Geographical review of Japan] 44(October 1971):665-684.

28. Ch'en Cheng-hsiang: *T'ai-wan-ti-chih* [Geography of Taiwan] (Taipei: Fu-min Geographical Institute of Economic Development, 1959), pp. 1120-1122.
29. *T'ao-yuan hsien chih, chuan szu, ching-chi chih, hsia* [T'ao-yuan hsien gazetteer, vol. 4, economics] (T'ao-yuan: hsien wen-hsien wei-yuan-hui, 1966), pp. 25-27.
30. *T'ai-wan-sheng wu-shih-yi nien lai t'ung-chi*, p. 1189.
31. Similar comparisons of transport costs on the mainland for bulk goods over short distances were reported by J. Lossing Buck. Expressed in silver dollars per ton mile, his figures were 44 cents for animal-drawn carts, 73 cents for the wheelbarrow, and \$1.24 for a runner using a shoulder pole. At the other extreme were steam railways with a rate as low as 9 cents per ton mile. See J. Lossing Buck, *Land Utilization in China* (Nanking: University of Nanking, 1937), pp. 353-354.
32. *Taiwan (Formosa), Taichu Province, Civil Affairs Handbook* (Washington: Office of the Chief of Naval Operations, Navy Department, 1944), p. 70.

### ***Sugar: The Sweetener in Taiwan's Development***

This is an expanded version of a paper presented at the 73rd annual meeting of the Association of American Geographers in Salt Lake City, 25 April 1977.

1. As quoted in William Campbell, *Formosa under the Dutch: Descriptions from Contemporary Records* (London: Kegan Paul, Trench, Trubner & Co., 1903), p. 36.
2. The suitability of any area for a particular crop is, of course, a complex matter that goes beyond rainfall, temperatures, and soil conditions. Chang's study comparing sugar cane cultivation in Hawaii and Taiwan demonstrates this fact well. His conclusion is that Taiwan's physical environment for sugar cane is not as good as it should be and has de-

- terminated to a considerable extent the level of technology in the industry. See Jen-hu Chang, "Sugar Cane in Hawaii and Taiwan: Contrasts in Ecology, Technology, and Economics," *Economic Geography* 46(1970):39-52.
3. James W. Davidson, *The Island of Formosa* (London: Macmillan, 1903), p. 445.
  4. Tai Koki Ki, *Chugoku kansho togyo no tenkai* [Development of the sugar cane industry in China] (Tokyo: Ajiya keizai kenkyojo, 1969), p. 150, as quoted in Ramon H. Myers, "Taiwan under Ch'ing Imperial Rule, 1684-1895: The Traditional Economy," *Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong* 5(1972):386.
  5. Davidson, *Island of Formosa*, p. 445.
  6. Ch'en Cheng-hsiang, *Taiwan: An Economic and Social Geography*, Fu-min Geographical Institute of Economic Development, Research Report 96 (Taipei: 1963), p. 302.
  7. George Candidius, "A Short Account of the Island of Formosa in the Indies, Situate Near the Coast of China; and of the Manners, Customs, Religions of the Inhabitants," in Awnsham Churchill (comp.), *A Collection of Voyages and Travels, Some First Printed from Original Manuscripts* (London: 1704), pp. 472-473.
  8. Davidson, *Island of Formosa*, p. 445.
  9. Ch'en, *Taiwan*, p. 302.
  10. Davidson, *Island of Formosa*, p. 445.
  11. *Ibid.*, pp. 445-446.
  12. *Ibid.*, p. 445.
  13. *Ibid.*, p. 447. Davidson's figures are in general agreement with Myers, "Taiwan under Ch'ing Imperial Rule," p. 387.
  14. *Ibid.*
  15. Davidson, *Island of Formosa*, pp. 446-448.
  16. Davidson includes verbatim an essay by W. Wykeman Myers, from his British Consular Report of 1890, that describes in detail the operation of the industry, from initial

- planting to milling and marketing of the sugar, at the close of the Ch'ing period on Taiwan. See Davidson, *Island of Formosa*, pp. 449-451.
17. Yosaburo Takekoshi, *Japanese Rule in Formosa*, trans. George Braithwaite (London: Longmans, Green, 1907), p. 243.
  18. Andrew J. Grajdanzev, *Formosa Today: An Analysis of the Economic Development and Strategic Importance of Japan's Tropical Colony* (New York: Institute of Pacific Relations, 1942), p. 58; Takekoshi, *Japanese Rule in Formosa*, p. 242.
  19. George H. Kerr, *Formosa: Licensed Revolution and the Home Rule Movement, 1895-1945* (Honolulu: University Press of Hawaii, 1974), p. 91.
  20. Chou Hsien-wen, *Jih-chu shih-tai T'ai-wan ching-chi shih* [An economic history of Taiwan during the Japanese occupation](Taipei: T'ai-wan yin-hang, 1958), p. 41.
  21. Takekoshi, *Japanese Rule in Formosa*, p. 244.
  22. *Ibid.*, p. 245.
  23. Kerr, *Formosa, Licensed Revolution*, pp. 100-101.
  24. Ch'en, *Taiwan*, pp. 313-314.
  25. Kerr, *Formosa: Licensed Revolution*, p. 100.
  26. Ch'en, *Taiwan*, p. 308.
  27. See George H. Kerr, *Formosa Betrayed* (New York: Houghton Mifflin, 1965), for a vivid description of this period in Taiwan's history.
  28. Ch'en, *Taiwan*, p. 308.
  29. See *T'ai-t'ang san-shih nien fa-chan shih* [A history of the Taiwan Sugar Corporation's thirty years of development] (Taipei: Taiwan Sugar Corporation, 1976).
  30. Ch'en, *Taiwan*, p. 312.
  31. Grajdanzev, *Formosa Today*, pp. 62 ff.
  32. Kerr, *Formosa: Licensed Revolution*, p. 101.
  33. *Ibid.*, p. 87.
  34. Ch'en, *Taiwan*, p. 315.
  35. *Ibid.*, pp. 315-316.

36. Much of the following is drawn from Jack F. Williams, "The Conflict between Peasant and Public Interest in a Developing Country: A Case Study of the Taiwan Sugar Corporation, 1950-1970," unpublished doctoral dissertation, University of Hawaii, 1973. See also Hsu Wen-fu, "An Economic Evaluation of Sugar Pricing and Its Influence on Sugar Cane Supply in Taiwan," unpublished doctoral dissertation, Pennsylvania State University, 1966; Fan Chwei Lin, "Determination of Sugar Supply Functions in Taiwan," unpublished doctoral dissertation, University of Hawaii, 1967; Hsieh Sann Chung. "Rice and Sugarcane Competition on Paddy Land in Central Taiwan," unpublished doctoral dissertation, University of Minnesota, 1957; Chang Te-tsui (ed.), *T'ai-wan sha-t'ang pao-cheng chia-ke chih yen-chiu* [A study of the guaranteed price of sugar in Taiwan] (Taipei: Taiwan Sugar Corporation and Chinese Rural Economic Association, 1967).
37. This policy is explored in great detail by Hsu, "An Economic Evaluation of Sugar Pricing."
38. Ibid.
39. The actual harvesting and transporting of cane from farm to mill is carried out under the direction of private contractors and the TSC to ensure that the cane arrives in good condition.
40. Lin Yung-min, "The Sugar Sharing System in Taiwan," *Taiwan Sugar* 19 (1972):57.
41. Hsieh Juiun-hsiung, "The Domestic Sugar Market in Taiwan," *Taiwan Sugar* 19(1972):49.
42. Yu Ying-piao, "The Future Responsibility of the Taiwan Sugar Cane Growers Association," *Taiwan Sugar* 17(1970):9.
43. Yuan Meng-hung, "The Taiwan Sugar Corporation's Diversification Program," *Taiwan Sugar* 17(1970):46.
44. Williams, "The Conflict between Peasant and Public Interest."
45. Davidson, *Island of Formosa*, p. 446.

46. Kerr, *Formosa: Licensed Revolution*, p. 101.
47. Jack F. Williams, "A Review of TSC's Land Reclamation Program," *Taiwan Sugar* 18(1971):85-90.
48. See, for example, the following studies by Christopher L. Salter: "Non-Utilized Potential in Economic Development: A Geonomic Study of Taiwan's East Coast Canned Pineapple Industry," *Industry of Free China* 20(1962):1-24; "Mountain Regions as Agricultural Frontiers: Preliminary Considerations," *Industry of Free China* 22(May 1964):9-24; "A Decade of Development on Taiwan's Final Agricultural Frontier," *Industry of Free China* 22(August 1964):22-39.
49. Jack F. Williams, "The Taiwan Sugar Corporation's Chiayi Tidal Lands Project: An Illustration of the Problems of Land Reclamation," *Sugar y Azucar* 71(1976):22-27 (English); 84-90 (Spanish).
50. Yuan, "The Sugar Corporation's Diversification Program."
51. Jack F. Williams, "Joint Operations Program for Contract Cane Farmers," *Taiwan Sugar* 18(1971):102-108; see also Wang Li-lai, Tso Teng-wen, and Jung Hui-hui, *T'ai-wan ti erh-tse t'u-ti kai-ke* [Taiwan's second land reform] (Taiwan: Ministry of Interior, 1970).
52. *FAO Agricultural Commodity Projections*, 1973, p. 173.

# Glossary of Chinese Terms

<i>chang</i>	丈
<i>chen</i>	鎮
<i>ch'eng</i>	城
<i>chia</i>	甲
<i>chiao</i>	郊
<i>chieh</i>	街
<i>chieh-shou</i>	結首
<i>chih</i>	支
<i>chih-chao</i>	執照
<i>chin</i>	斤
<i>chin-shih</i>	進士
<i>chou</i>	州
<i>chuang</i>	莊
<i>chui-yuan-t'ang</i>	追遠堂
<i>fan</i>	番
<i>fan-tsu</i>	番租
<i>fang</i>	房
<i>fen</i>	分
<i>fu</i>	府
<i>hsia-chiao</i>	下郊
<i>hsiang</i>	鄉
<i>hsiao-tsu</i>	小租
<i>hsiao-tsu-hu</i>	小租戶
<i>hsieh-tou</i>	械鬥
<i>hsien</i>	縣
<i>hsien-hsia-shih</i>	縣下市
<i>hsien-keng tien-hu</i>	先耗佃戶
<i>hung mao</i>	紅毛
<i>i-min</i>	義民
<i>i-t'ien liang-chu</i>	一田兩主

Glossary of Chinese Terms

- k'au-t'ien t'ien* 靠天田  
*k'en-chao* 墾照  
*k'en-shou* 墾首  
*keng-ting* 耕丁  
*ku* 股  
*kuan-tu shang-pan* 官督商辦  
*liang* 兩  
*liu-min* 流民  
*liu-tui* 六隊  
*pao-chia* 保甲  
*p'eng-lai* 蓬萊  
*pi* 埤  
*san-chiao* 三郊  
*shih* 石  
*shuai* 帥  
*shui-li* 水利  
*t'ai-ch'e* 臺車  
*ta-tsu* 大租  
*ta-tsu-hu* 大租戶  
*t'ien-ku* 田骨  
*t'ien-p'i* 田皮  
*t'ien-ti-hui* 天地會  
*ting* 丁  
*t'ing* 廳  
*ting-chiao* 頂郊  
*ts'o* 厝  
*ts'un* 村  
*t'u-ch'eng* 土城  
*t'u-niu* 土牛  
*t'un-t'ien* 屯田  
*t'ung-hsiang* 同鄉  
*t'ung-hsing* 同姓  
*tung-yang chen-lu* 東洋針路  
*Wang-t'ien* 王田  
*wei-wai ling-hu* 圍外零戶  
*wu* 屋  
*ye-chu* 業主  
*yeh-hu* 業戶