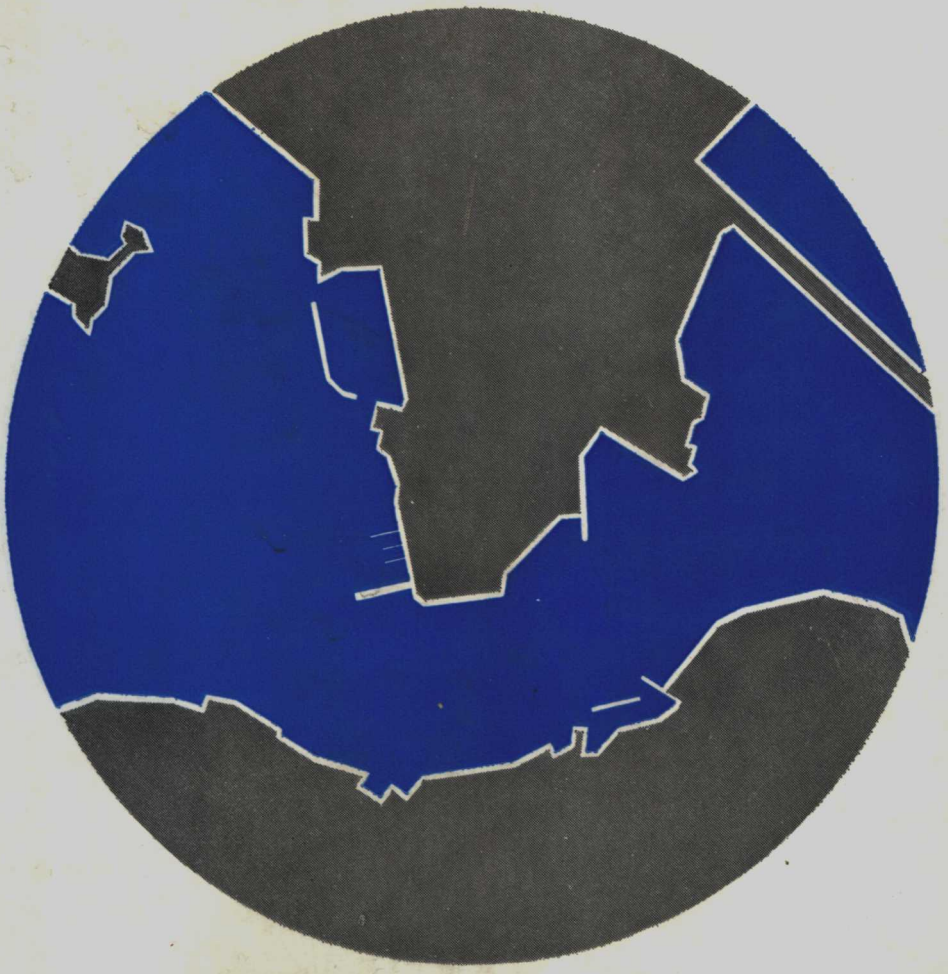
T. N. CHIU

THE PORT OF HONG KONG

A survey of its development



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INTRODUCTION

THE development of a port is not a function of local circumstances alone. Economic and social progress in the area it serves, the rise and fall of rivals and the development of world shipping are all important factors to which a port readily responds.

This is specially true of Hong Kong where, until very recently, there has been little local attraction for trade besides stability and security. It is almost completely devoid of natural resources other than the sheltered, deep-water harbour. All the major advances or setbacks in the evolution of the port have been the results of changes in its external relationships.

From the very beginning, the port inherited the foreign trade of South China with Europe that had been carried on for nearly two centuries. To understand the origin of the port, it is necessary to go beyond the date of its foundation to discover how far it owes its existence to geographical factors and how far to historic accident. Ever since it was founded, the port has been subject to repercussions from events within China proper. Scarcely a decade has passed without new developments, the consequence of rebellion, civil war, invasion, blockade, depression, famine or flood.

In this attempt to explain the development of the port, emphasis is laid only on those events in the port's history that throw the strongest light upon the present scene. For clarity of discussion, the span of the port's development is best divided into five periods:

(1) 1841–98 the establishment of confidence and the foundations of entrepôt trade;
(2) 1899–1940 the development of the China trade up to the outbreak of the Pacific War;
(3) 1941–6 the destruction and rehabilitation of the port;
(4) 1946–50 reconstruction and industrialization;
(5) 1951–70 modernization.

These periods correspond with major changes in external influences on the port. There is no real break in the evolutionary process except for the Pacific War period when the normal function of the port was

brought to a sudden halt. The revival of the port at the close of the War was hardly less sudden. Since the War, however, economic and political influences have changed more rapidly, and, in consequence, periods characterized by any one direction of growth have been of shorter duration.

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CHAPTER ONE

THE PHYSICAL SETTING

In assessing the influence of the physical setting on the development of the port of Hong Kong, it is important to bear in mind the fact that the port is a recent creation which has not been developed primarily by indigenous people to meet local demands. Hong Kong, before it became a British colony, was not the point where transport by water and by land met. For the accommodation of sailing-ships, the harbour was no more advantageous than the riverine ports of Canton, Whampoa and Macao. Situated in the upper reaches of the Pearl River estuary, Canton and Whampoa were some ninety miles inland from Hong Kong, and at the confluence of three waterways: the Si Kiang, the Pei Kiang and the Tung Kiang (the West, North and East Rivers). With easy access to their hinterland developed through centuries of internal trade, these riverine ports were opened by the Chinese for overseas trade long before Hong Kong's emergence as a port.

The land surrounding Hong Kong harbour was neither productive nor supported a substantial population, while the many inlets and channels among islands and peninsulas became haunts for pirates.[1] The land approach to the port was barred by ranges of hills which were formidable to the primitive means of land transport. However, with the establishment of foreign rule and the application of new techniques and methods of communication, the deep-water shelter of Hong Kong harbour acquired new significance, and Hong Kong eventually intercepted the trade of the Chinese ports. From the point of view of its founders, Hong Kong stood at the junction of routes followed by two different types of maritime carrier: those confined to the China Seas on the one hand, and those that were inter-ocean on the other. Being the only deep-water harbour between Singapore and Shanghai, its capacity to supersede Canton and Whampoa as a transhipment port became evident as the size of ships and the volume of overseas trade grew (Fig. 1).

Hong Kong is geologically and structurally part of the Southeastern Uplands of China which embrace southern Chekiang, the whole of Fukien and much of eastern Kwangtung.[2] This upland region is a remnant of the southern part of the old Cathaysian continent, and

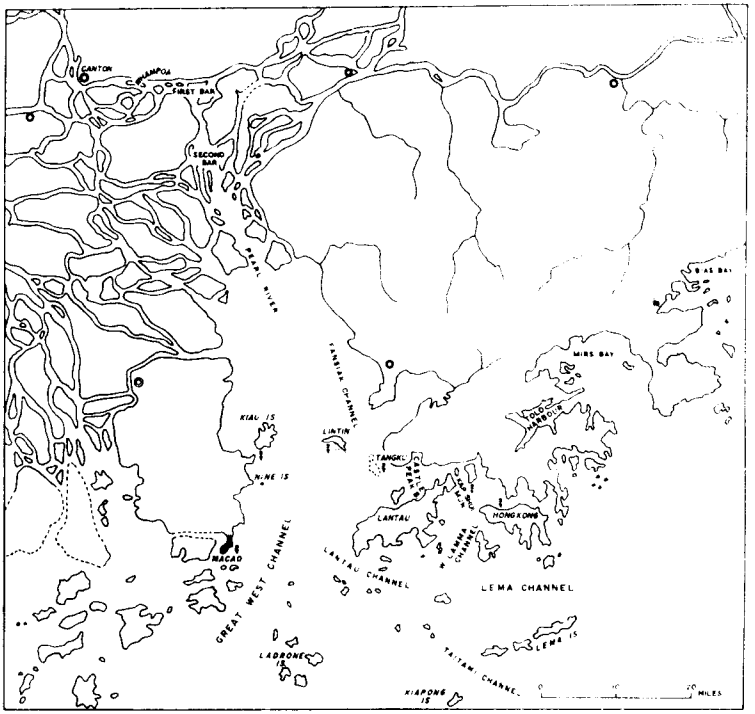

Figure 1. Anchorages for foreign ships in the Pearl River estuary before 1841.

possesses a well-marked structural pattern of north-east trending ranges running parallel to the broken coast. Situated at the southern limit of this ancient massif, Hong Kong exhibits this trend in the long, narrow inlet at Tolo Harbour and in a main anticlinal fold, both of which run in a south-west to north-east direction, from Lantau Island across the centre of the New Territories. This trend finds no expression in the Hong Kong harbour (Victoria) area but its associated ranges cut across the landward link of the port with its hinterland. With the exception of the group of low hills in the Kowloon peninsula, slopes rise steeply from the coast to over 1,500 feet. The orientation of inland routes from the port is controlled by high passes. Apart from these the only connection is by tunnel through more than a mile of solid rock or by circuitous coastal roads. The difficulty of approach to the port by land is one of the reasons for the widespread use of junks and river steamers in the

entrepôt trade with the hinterland, a factor which naturally places even more stringent demands on the water site.

The harbour is the centre of a granite cupola which was emplaced with an east-west trend into acid volcanic rocks. Differential erosion on the volcanic and granitic rocks, and on varying structures, grain sizes and textures in the granite, produced the characteristic scarp-like concave slope facing the harbour and the foothills of the Kowloon peninsula and Kwun Tong.[3] Rocky outcrops have been found arranged in a ring around the granite cupola at the foot of the scarp slopes and, in many cases, these establish the limit to urban sprawl. Further away from the hill slopes, and in the centre of the harbour, the land consists of completely weathered granite *in situ*. 'Generally the area below 120 m. (400 ft.) on the north of the harbour is deeply weathered . . . to well over 100 ft. on the low hills. . . . On Hong Kong Island similar conditions exist, the steep hill slopes providing craggy outcrops of rock while low hills are deeply weathered.'[4] The ready availability of fill from the excavation of these weathered materials has facilitated the reclamation of land from the harbour.

The major and final episode in the evolution of Hong Kong harbour was the result of eustatic changes which occurred in the Pleistocene period. Several changes of sea level have left their marks in the form of raised beaches, raised wave-cut platforms and accordant hilltops. From the basin structure of the harbour area it can be seen that the degree of submergence determined the proportion between land space and water space. Confined within an almost complete ring of ridges, which offer both a shelter and a barrier, the one can expand only at the expense of the other. Archaeological finds on raised beaches in and around the harbour area[5] indicate that as recently as late Neolithic times the sea level was from ten to thirteen feet above the present level. A change of this magnitude was sufficient to expose large areas once under shallow water at Tai Kok Tsui, Kowloon Bay and Happy Valley. These areas were the sites of extensive reclamation early in the history of the port's development. This movement also meant that a large part of the harbour was rendered inaccessible to shipping, and reduced the usefulness of the western approach to the harbour.

Hong Kong's seventeen square miles of land sheltered water have been praised as providing one of the world's finest harbours.[6] Hemmed in between the mountainous island of Hong Kong and the Kowloon ranges of hills (Fig. 2), the harbour extends for eight miles in an approximately east-west direction, with widths varying between one and three miles.

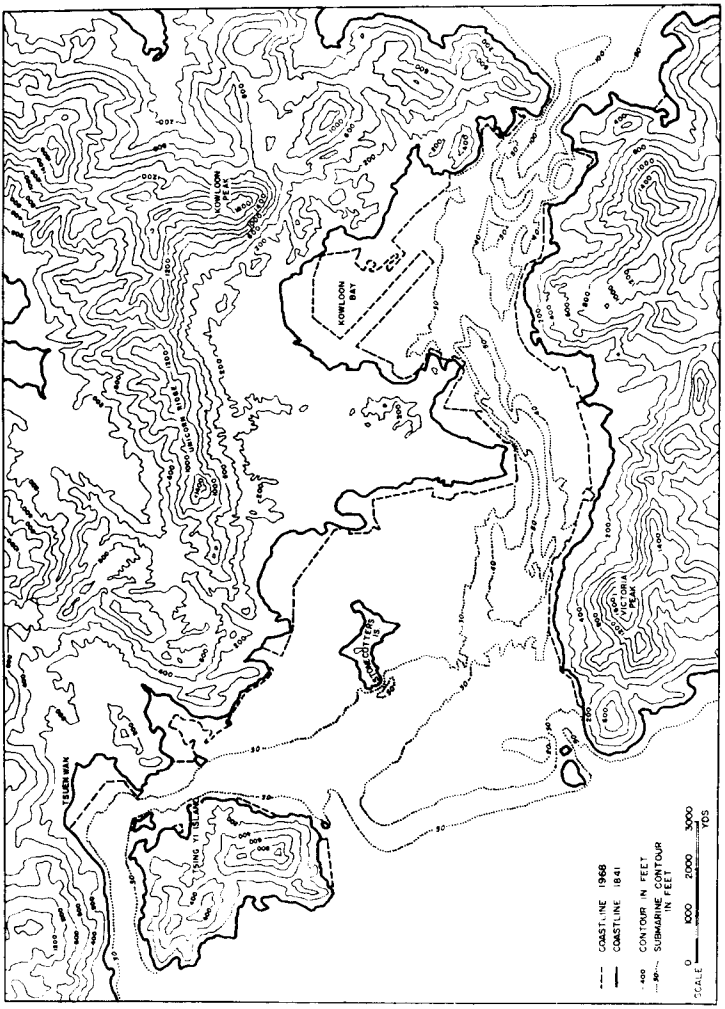

Figure 2. Relief map of the Hong Kong harbour area.

The narrowest part lies in the centre, where the Kowloon peninsula stretches southwards in a series of low hills to within one and a quarter miles of the Island, dividing the harbour into two roughly equal halves. By breaking across the eight-mile stretch of water, the peninsula provides further shelter for the western half of the harbour. As the prevailing winds in Hong Kong are easterly, it is evident why the western side of the Kowloon peninsula is the site of the port proper, despite the fact that the eastern half has the deeper water (Fig. 2). The Kowloon peninsula also adds considerably to the length of the protected coastline, giving more space for the development of quays and landing-places. The submergence that formed the harbour gave rise to many branching inlets and bays in the immediate vicinity, notable among which are Aberdeen, Tolo Harbour and Junk Bay. These have functioned separately as shelters for the fleet of harbour-service craft and fishing junks, for laid-up vessels, and for ships too large to enter the harbour. The harbour of Hong Kong, as defined by the water space between the eastern and the western harbour limits (Fig. 19), is thus not the only area in which Hong Kong, as a port, functions: a considerable amount of traffic is handled in smaller outer harbours such as Aberdeen, Stanley, Cheung Chau, Tai O, Deep Bay, Sham Tseng, Tsuen Wan and Sai Kung. These are, however, of local importance only.

There are two entrances to the harbour: Lei Yue Mun to the east and Sulphur Channel to the west. The Lei Yue Mun entrance is over 130 feet deep, but only a quarter of a mile wide; it is used by most ocean-going vessels entering or clearing the harbour. Sulphur Channel is equally narrow but, although it has a depth of more than seventy feet, until recently it was used only by vessels drawing less than twenty-four feet, because of the presence in its approaches of a bar, with a minimum depth of four fathoms. North of Sulphur Channel, the wide opening to the western half of Hong Kong harbour is commonly used by lighter craft. The advantage of this open-passage type of harbour, over the cul-de-sac that is common in harbours formed by coastal submergence, lies in its freedom from silting and from unusually high tidal waves or swells in times of exceptional weather conditions.

With the exception of some shallows at the re-entrants on the coastline, such as in Kowloon Bay, Hung Hom Bay and between Stonecutters Island and the mainland, the depth of water in the harbour is generally over thirty feet (Fig. 2). The eastern half of the harbour and the main channel running through the centre afford forty feet of draught. Dredging is not required in the harbour except in the immediate vicinity of the

south-west tip of the Kowloon peninsula where the largest passenger liners to visit the port are berthed. A large area of the harbour has been dredged, however, with the main object of taking out the sand, which is in great demand for building purposes. The location of these dredging works depends on the presence of the right sort of material under the floor of the harbour and does not necessarily coincide with the shoals.

The areas of shallow water immediately off the coast offer an advantage rather than an impediment to the development of the port. This is largely due to the fact that the spacious water site is not matched by an adequate land site and, in the years since port development started, more than three square miles of shallow water in the harbour have been reclaimed, to provide valuable land. Moreover, anchorages and shelters for small craft, of which the harbour contains a large number, are to be found in these shallow waters.

The approaches to the harbour are by deep channels which, although studded with groups of hilly islands, provide ample room for vessels to reach the harbour without a pilot. Vessels normally direct their course to the Lema Channel, to the south of Hong Kong Island, whence they approach the harbour by an easterly or a westerly route, depending on their size and their berth in the harbour. For ships coming in from the south-west, the Lema Channel is reached by passing between the islands of Ladrone and Kaipong, while for those coming in from the south, it is reached by the Taitami Channel between Kaipong and Lema Islands. The westerly route to the harbour is by the West Lamma Channel, which is over three and a half miles wide. The easterly route is by the Tathong Channel which has a minimum depth of six and a half fathoms, but unlike the western route it is confined by a number of islands and headlands. Rocky reefs, the most prominent among which are the Tathong Rock and Ngai Ying Pai, further restrict the width of the channel, which may be considered absolutely safe for all classes of vessels to a width of half a mile. Owing to greater exposure to easterly winds and its narrower channel, the eastern route is equipped with a series of navigational aids including lighthouses, light-buoys, radar beacons and fog signals. The rocky promontories facing the approach channels are also coated with white cement wash to give easily distinguishable landmarks to vessels.

In order to appreciate the advantage which the deep water in the approach channels and roadsteads offers shipping, the changes in the water-level caused by tides need to be considered. Hong Kong harbour

has 'a tidal regime of both mixed semi-diurnal tides and diurnal tides:'[7] that is, for some days of the year, the two daily high tides and the two low tides are all of different heights, yet on a number of days in the year, only one high tide and one low tide are observable. This has been explained as the phenomenon in which the lower high tide merges with, or cancels out, the higher low tide. The range of the tides is less than eight and a half feet, and for most days of the year a range of only five feet is experienced in the harbour. This tidal range has little effect on the navigability of the waters in and around the harbour, which can be entered or cleared at any hour of the day. There are few problems in berthing ships at quays and piers or at moorings in the centre of the harbour. The provision of landing-places for lighters and other harbour craft has been made relatively easy; in most cases it amounts to little more than building a seawall when the land is reclaimed. Abnormal tides are extremely rare in the harbour although they have caused the greatest hazard to shipping and to the port.[8]

Deviation from the normal range is from one foot below the predicted tide level to several feet above it. The effects of exceptionally low tides are felt only by the few users of the harbour for whom a critical minimum draught exists. These tides have been known for example, to delay the launching of ships. On the other hand, exceptionally high tides have caused flooding along the waterfront and, because these are generally accompanied by typhoons, they have caused loss of life and great damage to property. Storm surges or tidal waves, which consist of a rise of water coincident with the approach of a typhoon, are brought about by reduced atmospheric pressure combined with the piling-up of water by the wind. They rarely exceed five feet in open seas, but in confined waters shoaling may add considerably to their height. If the surges coincide with the highest normal high tides in the harbour, the result is devastating. 'The maximum surge height (recorded minus predicted tide) in Hong Kong harbour was about six and a half feet, which could have raised the water-level to fifteen feet above the Chart Datum if it had coincided with a maximum possible predicted tide of eight and a half feet.'[9] Tidal surges do not, however, usually reach such heights. Out of the thirteen storms between 1906 and 1957 for which tidal data are available, seven produced maximum surges of less than four feet, and only two of more than six feet. The configuration of the harbour and its coastal contours have contributed much to reduce the dangers of such surges. The constricted entrance on the east, from which direction most of the high winds and heavy seas reach the harbour, the divergence of

the coastline immediately inside the entrance, and the wide-open western approaches to the harbour are therefore all important features of the water site.

As Hong Kong harbour lies at the mouth of the Pearl River and as it is open at both the eastern and the western ends, it forms one of the channels through which tidal streams of the Pearl River pass. Observations on tidal movements made by Hulse[10] provide a picture of tidal streams which is reproduced in Figure 3. A large proportion of the ships using the port berth at moorings in the middle of the harbour. The effect of the daily reversal of flow directions is such that these ships tend to swing at their moorings in the direction of the tidal flow, but not at the same rate. Moorings have thus to be so spaced that two ships berthed at adjoining buoys can never strike each other. It is evident that this practice of anchoring midstream is most space-consuming and one that would be impracticable in a less spacious water site.

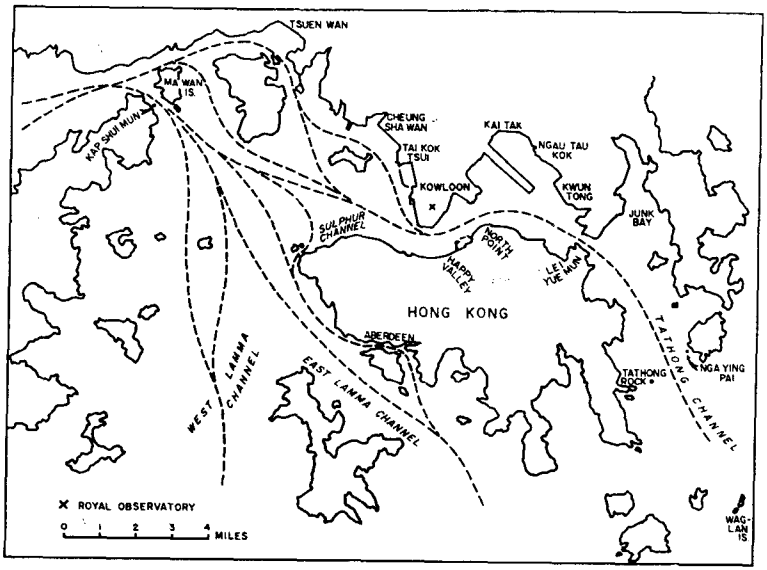

Figure 3. Tidal streams in Hong Kong harbour (after Hulse, 1960).

Tidal currents are strongest at the two constrictions, namely Lei Yue Mun and Kap Shui Mun, where the average flow runs at two to three knots and four to five knots respectively. Other spots in the harbour where