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OUR COUNTRY'S SOUTH SEA ARCHIPELAGOES

by Ch'en Tung-k'ang

- Communist China -

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- COMMUNIST CHINA -

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## Chapter 1

### Our Country's South Sea Archipelagoes

The moment we open the map of the People's Republic of China, we can see that our great country not only covers a vast land area, but also a wide ocean. South of our mainland is the largest of our four seas -- the South Sea. As it is located south of our mainland, it is called the South Sea, or the South China Sea.

The South Sea is a vast and deep sea adjacent to land. The winding coast line extends to a length of approximately 2,900 kilometers. Its north borders on the three provinces of Kwangtung, Fukien, and Taiwan. The line from Chen-hai-chiao in the Amoy Bay to Chu-shui-ch'i-k'ou in Taiwan across the Taiwan Strait divides it from the East China Sea. It extends south to the Chia-li-man-tan Island, southwest to Viet Nam and the Malayan Peninsula, and east to the Philippines. Its north-south length is more than 2,300 kilometers, covering an area of approximately 3.4 million square kilometers. In the north, near the coast, there are long belt-like stretches of land (shallow shoals); south of Taiwan and the Hainan Island, the shoals become deeper and deeper, reaching down to 5,400 meters.

Taking a steamship from Canton, we can navigate this vast sea and see the most fascinating seascape. We will see many many islands and islets like diamonds inlaid on the blue water. The four groups of islands and reefs in the South Sea belonging to our country can be grouped into the Tung-sha, Hsi-sha, Chung-sha, and Nan-sha Islands ac-

ording to their distribution. As a whole, they are known as the South Sea Archipelagoes. Ever since ancient times, these islands and islets in the South Sea have been the territory of our country.

The South Sea Archipelagoes are composed of more than 170 islands, shoals, and reefs. They cover a wide area, measuring about 1,800 kilometers north-south and 900 kilometers east-west. The Tung-sha Islands are closest to the mainland, about 260 kilometers south of Swatow. They are composed of the Tung-sha Island and two hidden shoals and are the northernmost group in the South Sea Archipelagoes. From the map, we can see that they are situated between Taiwan and the Hainan Island. The group in the west is called the Hsi-sha Islands. It is located to the southeast of the Hainan Island, about 330 kilometers from the famous fishing bay of the Hainan Island, the Yu-lin Bay. It is composed of a large group of islands, islets, shoals, and reefs. The middle group of islands in the South Sea is called the Chung-sha Islands, located to the southeast of the Hsi-sha Islands, and composed entirely of unexposed coral reefs. The southernmost group is the Nan-sha Islands, with the greatest number of islands and islets and the largest area. The Tseng-mu Shoal is situated in the southern part of this group of islands; it is the southernmost territory of our country, and its northern border is about 2,000 kilometers from our mainland. The distance between the Tseng-mu Shoal and Canton is greater than that between Canton and Peiping. The climate of the Nan-sha Islands is equatorial, and it is summer all year round.

As it is in the southernmost part of our country, it is often called the "South Pole" of China.

The South Sea is a tropic sea, with its special natural features. Its marine resources are very rich, abundant with tropical fish, such as the chin-ch'iang fish, gurnards, and big yellow fish. It is one of our important fishing areas. The many islands produce large volumes of bird droppings, phosphorus, and other excellent fertilizers and delicious tropical fruits. From its geographical position, the South Sea is situated in the important intersection of the shipping routes between the Pacific and the Indian Oceans and between Asia and Australia, and it is the center of communication of Southern Asia, Southwest Asia, Africa, Europe, and Australia. It is also the center of Southeast Asia and connects our country with Viet Nam, the Philippines, Malaya, and Indonesia. We have established light houses and other nautical signs to direct navigation. The many islands in the South Sea constitute the outposts of our sea defense in the south. They are important in navigation, fishing, and national defense.

The South Sea Archipelagoes are warm and rainy all year round, and trees and plants flourish in all seasons. Regardless of the size of the island, it is always covered <sup>with</sup> shrubberies and tropical fruit trees. The cocoanut forests are outstanding, extremely resistant to ocean winds and waves.

In ancient times, our ancestors called these islands "thousand-li stone ponds" and "ten-thousand-li sand bars." They were the head-

quarters of generations of our fishermen from the Kwangtung and Fukien coasts. The industrious fishermen, after toiling for a whole day, would anchor their boats under the stars in a nearby island for the night.

The South Sea Archipelagoes were discovered by our people a long time ago. They appeared on our map in 1730. They form a part of the beautiful mountains and rivers of our country, and are sacred and indivisible.

## Chapter 2

### The Formation of the South Sea Archipelagoes

Do you know how the many islands, shoals, and reefs were formed? It is a great miracle of Nature. Natural scientists have long discovered the secret therein. The creators of this miracle were not huge animals of the sea, but billions and billions of beautiful tiny polyps. How did these tiny polyps turn into an island?

In the vast tropical South Sea, myriads of beautiful, colorful, and dazzling tiny polyps live, bright red, purple, milk white, and many other colors. The polyp has a body of only a few millimeters long. It is small and soft, found only in tropical oceans. It is gregarious and lives in a colony. The structure of the body of the polyp is like a two-section rubber tube put together, with eight diaphragms within. The mouth at the upper part usually has eight tentacles around it which serve as the tool to catch food. The hollow space inside the body is the digestive organ. Its structure can only be seen under the microscope. Congregating together, the polyps look like shrubby bushes. Thus, they build many coral islands and reefs in the vast ocean.

The tiny polyp is a delicate animal among the marine animals and needs a special environment. It lives in clear tropical ocean, with the appropriate salt content and away from large river outlets. The temperature of the ocean water is also important. It must be 18° C or above, for otherwise the polyp will not survive. The tem-



perature difference between the seasons must not be too great. In deep water, due to the low temperature and great pressure, the polyps will not survive. It fares best in shallow ocean within a depth of 40 meters. According to observation, anywhere in the tropic ocean where the depth is beyond 60 meters, no coral is found.

The ideal environment for the polyps is along the equator, far from any river outlet, in shallow sea where the bottom is rocky. Due to the instability of the crust of the earth, the South Sea, along the edge of the Southeastern Asian continent, has undergone volcanic activities many times, forming innumerable protruding rocky areas in the bottom. There are few large rivers pouring into it from the islands and peninsulas around it. The salt content is normal. Hence, it possesses various favorable conditions and furnishes the ideal environment to the tiny polyps.

What is amazing is how these tiny polyps build the large coral reefs and islands. The feat is the result of the collective effort of the polyps, and the great miracle of Nature is created by them together.

At the beginning, the many gregarious polyps grow on sandstones at the bottom of the ocean and become a type of static animal. Clustered together, the tiny polyps look like shrubs or stately trees. Some of them branch out into different directions, while others look like mushrooms or beehives (often processed into jewelries and art objects). When the sea is calm and the water clear, they can be seen 20

or 30 feet below the surface. If you like to swim, with water goggles, you can enjoy the beautiful and amazing sights at the bottom of the sea. These tiny gregarious polyps ceaselessly grow upward and expand rapidly.

After acquiring food from the ocean and digesting it, the myriads of tiny polyps secrete a sort of calcareous substance, which becomes the external skeleton -- the coral stone. The dead polyps, when covered with mud and sand and the shells of other marine life, after hundreds or thousands of years, or an even longer period, become the fairly large coral reef. Why is there such a great variation of time? The environment affects the propagation and growth of the polyps. According to many investigations, the growth of one meter of the coral reef requires between 35 and 300 years. However, even when it takes 300 years to grow one meter, from the geological angle, it is still fairly rapid.

Polyps cannot survive out of the sea water; therefore, the coral reef cannot grow higher than the surface of low tide. It is always under the surface of the sea, forming a wide flat platform. On its top, the waves carry the polyp skeletons, sand, and sea shells to the center part, forming the coral island. Hence, the area of the coral island is always small, often computed only in square meters. The Yung-hsing island, the largest in the South Sea Archipelagoes, is only of an area of 1,851,000 square meters (1.851 square kilometer). In other words, its area is not quite two square kilometers. On the

On the other hand, the coral reef of the Kung-t'ao Coral Island is considerably larger. The area of the reef is often several to tens of times bigger than the island. The people call the reef of the Kung-t'ao Coral Island the reef base.

Coral islands formed by alluvion alone are limited in height, at an elevation of only one to two meters. However, with the rising of the crust of the earth, the height of coral islands is greatly increased. Islands of ten meters or more above sea level are found in the South Sea Archipelagoes. There are three large protruding areas in the South Sea. Growing thereon, the small polyps form many reefs, and some of them grow further into islands on top of the reef bases. In the most recent geological age, the crust of the earth in the bottom of the South Sea has undergone a gradual upsurge, benefiting even more the formation of coral islands.

The study of the structural formation of coral islands and reefs is significant in geological history. Whenever any coral reef limestone is discovered in a specific area, it shows that, in the sediment period, the area was once a warm ocean with normal salt contents. If a coral island stands high above the sea level and the thickness of the coral reef surpasses the maximum depth (60 meters) for the survival of the polyps, it shows that there has been a change in either the top surface or the bottom of the ocean.

Though the polyps are the principal components of the coral island, many calcium secreting coralline, perforata, and to-k'ung-hsi are all important participants. In addition, many other kinds of animal life living on the coral reef, such as the starfish, sea-urchins, crabs, and fish, help with its formation.

Now we know how the South Sea Archipelagoes were formed. Each of the hundred and more islands, islets, shoals, and reefs has its own name. According to their relationship with the surface of the water, they can be divided into islands, shoals, hidden reefs, hidden shoals, and hidden banks.

All coral reefs located more deeply underwater with a wide platform surface are called hidden banks. When the hidden bank grows upward and becomes closer to the surface, it is called the hidden shoal. New coral reefs close to the water surface but still submerged are called hidden reefs. Those barely above water covered with a thin layer of sand are called shoals, and they are often inundated in big storms. After many years of depositing, the shoals grow out of the water surface and become islands. The island is covered with a layer of fine sand, formed by the efflorescence of dead polyps and shellfish; therefore, it contains much calcareous substance. Due to the proximity to the ocean, the salt content in the soil is fairly high, creating thus certain difficulties in drilling wells for water.

In the long process of the discovery and development of the South Sea Archipelagoes by our people, the large and small islands,

shoals, and reefs were named according to the foregoing classifications. We are familiar with the Tung-sha Island, the Yung-hsing Island, the Chung-chien Island, the Shih Island, and the T'ai-p'ing Island among the islands, the An-po Shoal, the Yang-hsin Shoal, and the Tun-ch'ien Shoal among the shoals, the Yu-chu Reef, the Chu-pi Reef, the Tan-wan Reef, the K'ung-ming Reef, and the Hsien-o Reef among the hidden reefs, the Hai-chiu Shoal, the Po-chuang Shoal, the Chin-tun Shoal, the Shen-hsien Shoal, the Hung-shih Shoal, and the Tseng-mu Shoal among the hidden shoals, and the Pei-wei Bank, the Nan-wei Bank, the Chan-han Bank, the Hai-ma Bank, and the Hsien-hou Bank among the hidden banks.

Though there are more than 170 islands, shoals, and reefs in the South Sea, our middle and elementary school instruction and current affairs propaganda maps cannot show them in detail by symbols; usually only points or coral reef symbols are used to show the several principal islands.

Chapter 3

### The Rich and Beautiful Treasure Islands

The marine resources of the South Sea Archipelagoes are extremely abundant. These islands are the important bases for our fishing industry and for the development of the South Sea resources. Hence, their economic values are great.

The South Sea is a tropic sea adjacent to land. Except for the northeastern part near the Taiwan Strait, the water temperature is rather high, with small variations between winter and summer. The temperature of the surface water near Hong Kong, for example, averages around  $16^{\circ}$  C in February, the coldest month, and around  $28^{\circ}$  C in August, the hottest month, a difference of only around  $12^{\circ}$  in the year. As for the southernmost portion of the South Sea, the surface water temperature averages around  $28^{\circ}$  C all year round. The water temperature of the South Sea makes it possible for fish to propagate and grow in all seasons. The clear blue water abounds with planktons and there are numerous islands and shoals and reefs, furnishing the food and the resting places for the fish. On the coral reefs there are many kinds of reef-dwelling fish. Their bright and beautiful colors against the reefs serve as protective coloring. Their body is generally flat and thin; so that they can swim through cracks freely. Therefore, the South Sea has the most varieties of fish among our ocean fishing industry. According to available data, we have approximately 1,500 varieties of salt water fish, and, out of that, 700 varieties come from

the South Sea. The varieties of fish from the South Sea with a comparatively high economic value number about 40. This fact is closely related to the favorable natural conditions.

The marine resources of the South Sea can be divided into five types: fish, shrimps, crabs, molluscs, and shells. The principal varieties of fish are chin-ch'iang fish, gurnards, yellow fish, hair-tail fish, roaches, huo fish, pomfrets, and sharks, those of shrimps lobsters, large yellow prawns, mud shrimps, and grass shrimps, those of crabs kua-kao crabs, ju crabs, and chien, those of molluscs ink-fish, loaches, and cuttlefish, and those of shells oysters, snails, clams, jen-ch'ung, and small clams.

From the map, we can see that the South Sea Archipelagoes cover the area between latitudes  $21^{\circ}$  to  $4^{\circ}$ , at the Tseng-mu Shoal, mostly in the tropics. You may think that the weather must be hot and humid, but it is not so. The temperature of February, the coldest month, averages  $25.6^{\circ}$  C, and that of August, the hottest month,  $28^{\circ}$  to  $30^{\circ}$  C. Due to the influence of the ocean, the temperature difference between winter and summer is small and the summer climate, though high, is not unbearably hot. The climate is that of the ocean controlled by monsoons all year round, and it is one of the areas with the best climate in our country.

The monsoons exert a great influence on the South Sea Archipelagoes. The northeast monsoon blows in the winter between October and March, strong and sustained, and the southwest monsoon blows in the

summer between May and October, weak and intermittent.

Our famous navigator of the Ming Dynasty, Cheng Ho, sailed the "West Sea" seven times between 1404 and 1433. He and the fishermen of the South Sea were familiar with the monsoons and ocean currents and had no difficulty travelling the South Sea. When the northeast monsoon blows, the fishermen will raise their sails and proceed to the South Sea to fish, and when the southwest monsoon blows, they will return with their catch. Between March and May, the sea is comparatively calm, and it is a good time for fishing. However, fishing is possible in all seasons except during typhoons.

The marine products of the South Sea in large volumes consist of the chin-ch'iang fish, gurnards, roaches, oriole fish, shales, shuang eels, sea-cucumbers, sea turtles, and porpoises. Other products, such as large mothers-of-pearl, agar-agar, hai-jen weed, kylin weed, sponges, conches, and various kinds of shells, are also abundant. The chin-ch'iang fish is one of the principal products in highsea fishing. In the end of spring and during the summer, the chin-ch'iang fish is seen everywhere. The roach, which is abundant, is tender and delicious, the larger ones reaching a weight of around ten catties. The sea-cucumber, valued by our people as a delicacy and nutritious, is produced in great quantities in the South Sea.

On the beach, the sea turtle is frequently seen. The large ones measure more than one meter and weigh 400 catties. Both the meat and the eggs are edible, and the shell can be made into the valuable



medicinal turtle gelatin. The shell of the tortoise, which is similar to the turtle, is beautiful and jade like, but easier to carve than jade. It is the best material for picture and eyeglass frames.

The agar-agar can be made into the ch'iung gelatin. It is not only a medicine and the important raw material for paper making and textile industry, but also an excellent food. The world famous hai-jen weed, also known as the partridge weed, is also a raw material for making medicine to treat tape-worms.

The large volumes of shells and conches are excellent for jewelries and buttons.

On the islands, one will find thick layers of bird droppings. Bird droppings are one of the special products of the South Sea and serve as an excellent natural fertilizer. The layers of bird droppings are from the chien birds.

There are millions of chien birds in the South Sea. In the day time, tens of thousands of them fly over the water to catch fish, and by night they return to the islands.

The life of the chien bird is very methodical. The fishermen often use them as guide to fish in the day time and to locate an island for shelter at night. Hence, the fishermen call them the "navigator birds."

A long time ago, the people of our country had collected and studied the large deposit and wide distribution of bird droppings in the South Sea Archipelagoes. According to analysis, the phosphorus

content is between 11% and 27%, making an excellent slow-acting fertilizer and highly effective for grain and industrial crops. After applying such fertilizer, the output is generally increased by 10% to 20%, and yet the cost is lower than chemical fertilizer. It is a low cost good grade fertilizer, and serves as a good base fertilizer for the red soil areas in the south. After the liberation, the People's Government has established a bird fertilizer company to explore the bird droppings on the South Sea Archipelagoes.

Bird droppings are also a medicinal raw material. Ten cattles of caffeine can be rendered out of 100 cattles of good grade bird droppings, and caffeine is the principal raw material for making aspirins and cardiacs.

## Chapter 4

### The Tung-sha Islands (The Pratas)

Now, let us sail through the South Sea Archipelagoes.

Leaving Swatow of Kwangtung, the boat heads south. After 260 kilometers of waves and birds, we now see the lone island in the vast ocean. This is the Tung-sha Island. The same route is often followed by the fishermen of Kwangtung to fish and collect all kinds of marine products.

The Tung-sha Islands are a group of islands formed by the Tung-sha Island and the two hidden coral reefs. The two hidden reefs are named the Nan-wei Reef and the Pei-wei Reef. As the Tung-sha Island is shaped like a new moon, the fishermen call it the "New Moon Island." The platform below the water where the Tung-sha Island is located is not very big.

Why is the Tung-sha Island shaped like a new moon? It is connected with the environment of the polyps. As the food and oxygen are abundant near the reefs, the polyps not only grow and propagate rapidly, but the external calcareous skeleton becomes big and solid. The higher the reef grows upward, the more apparent becomes the circular structure. Hence, the typical "atoll" was formed on the reef base of the Tung-sha Island. The island is the eastern part of the atoll exposed above the water. A reef lake of a medium size is found in the west.

There is a water route in both the north and the south sides of

the Tung-sha Island leading to the reef lake. The depth of the lake varies between several to more than ten meters. Many areas of the bottom are covered with fine sand. The surface is fairly calm, and the lake furnishes a good anchoring place for the fishing boats from Kwangtung and Fukien. It is the only anchoring place in the northern part of the South Sea.

The length of the Tung-sha Island is about five or six kilometers, the width about two kilometers, and the elevation several meters. If we walk around the island, we can see that the beaches are of white sand. Beyond the sandy beaches are blue waters and behind green forests. When viewed from afar, the beaches are like a snow-white belt surrounding the island.

The beaches are loose and soft and full of pretty corals and shells. This is a low and flat sea island, with tropical forests and tall grass. The coconut forests along the beaches present a green and attractive tropical scene.

There is a ta-wang temple on the Tung-sha Island, with coconut trees planted around it. In the northeast, there is a fishing village built by the fishermen from Swatow and Ch'ao-chou of Kwangtung. The island is comparatively near these areas on the mainland; hence, it becomes the area of activities of the coastal fishermen.

The Tung-sha is one of the "treasure islands" of the South Sea, and its resources are abundant, including marine products, bird droppings, and tropical fruits. The oak tree found on the island reaches

a height of more than ten feet. Its marine resources are extremely important. Besides the sea turtle, inkfish, sea-cucumber, sea-urchin, and shellfish, the hai-jen weed, a special product, is world famous.

The han-jen weed is a sea-weed found along the beaches of the Tung-sha Island. It grows as fast as it is picked. There are not very many areas where this weed is found, and the Tung-sha Island is a famous producing area in the northern hemisphere.

The Tung-sha Island also produces large quantities of clock snails (chung-luo). The shell is bright, lustrous, thick and hard, and of different shapes. It is good for making into buttons. The flesh is delicious, either eaten fresh or salted for export. In the past, the annual output was about 50,000 tons.

The Tung-sha Island is located at the intersection of several important shipping routes of the South Sea. Long ago, our country established an observatory, a radio station, and a light house on the island to direct navigation and report on the weather for the benefit of ships.

Sailing northwestward 90 something kilometers from the Tung-sha Island, we will reach the Nan-wei and the Pei-wei Reefs. Both are hidden reefs, close to each other and with a flat surface. Many colorful corals, fish, and shrimps live on them.

## Chapter 5

The Hsi-sha Islands  
(The Paracels)

Sailing southwestward after leaving the Tung-sha Islands, we advance on the Hsi-sha Islands. From afar, the Hsi-sha Islands are like a bouquet of green flowers on the blue sea.

Unlike the Tung-sha Islands which has only one island, the Hsi-sha Islands consist of 28 islands. It can again be subdivided into two groups -- the Hsuan-te Islands in the northeast and the Yung-lo Islands in the southwest.

All the islands in the Hsi-sha group abound with ma-feng t'ung trees. This tree belongs to the marvel-of-Peru family, also known as the white frost-resisting blossom tree. The lumber is loose and brittle, but the leaves can be used as hog feed. It is reported that the ma-feng t'ung leaves of the Hsi-sha Islands are sufficient for several tens of thousands of hogs. All the islands possess tropical vegetation and innumerable varieties of plants. The trees in the San-ya and Yu-lin areas in Hainan Island can all be found here. The "san-ya" tree is a tall tree, reaching a height of 30 to 40 feet. The coir palm is the tallest, some of them reaching 100 feet, serving as a landmark of the island. In addition, there are also the castor tree (the castor plant in the tropics grows big as a tree), the pineapple tree, the cocoanut tree, and the papaya. The fallen leaves and twigs turn the soil dark brown, extremely soft and fertile.

The Hsi-sha Islands are also the paradise of sea birds and known for the bird droppings. The profuse forests become the headquarters for chien birds. In the Hsi-sha Islands, we can also see the extraordinary scene of the "bandit bird" waylaying the chien birds at dusk, making the latter regurgitate their fish, and catching it in mid air.

On many of the islands, the bird droppings are about one meter thick, mainly from the white-belly chien birds. The white-belly chien bird is as large as a duck, found in tropical islands, and prefers to fly and roost in large colonies. The egg is slightly smaller than the duck egg and brown-spotted. The young bird is pure white, but the adult completely black, with only the belly white. The bill is green and the feet red. It is a colorful bird. Besides the chien birds, there are also the salanganes, sea gulls, and butterflies. The salangane builds its nest in the cracks of rocks by secreting a sponge-like gelatinous substance, which becomes the bird's nest. According to scientists who have worked in the Hsi-sha Islands, poisonous snakes, scorpions, mosquitoes, ants, and flies are seldom found in the islands.

The Hsi-sha Islands constitute one of our richest fishing areas. Thousands of fishing boats and steamers sail here from the Hainan Island, Chan-chiang, and Yang-chiang during the fishing season to congregate at the Hsi-sha Islands for all kinds of fish and other marine products, such as sailfish, rays, tiger sharks, stickbacked

globe fish, roaches, ma-chiao fish, sardines, gurnards, mackerels, inkfish, flying fish, shrimps, crabs, sea snails, and large clams. Valuable products such as the plum-blossom ginseng (mei-hua-sen) weighs five to six catties and the large lobster weighs more than four catties and measures more than one foot. The sea clam called chu-ch'u is unusually big; the shell and flesh together weigh more than 400 catties, and the diameter of the shell is one meter long, sufficient for two bathtubs when split.

Fishing at the Hsi-sha Islands is most interesting. The moment the line is cast, a whole group of fish will appear. More than 100 catties can be caught in a few hours.

Each year, from April to June, large numbers of sea turtles come with the warm current from the southwest to lay eggs at the Hsi-sha Islands. There are many turtles on the beach. All one has to do to catch them is to turn them upside down. Fishermen catch several thousands of turtles every year here. The turtle lays its eggs on the beach in the night or at dawn. When in season, one person can catch 20 to 30 turtles in one night.

Turtle eggs are about the size of table tennis balls. A turtle can lay 160 to 170 eggs each time. It will dig a deep hole on the beach, lay the eggs, and bury them. The eggs are hatched in the heat of the sand, and in about 50 days, the baby turtles are hatched.

Besides catching large numbers of female turtles on the



beach, the people also organize forces to catch both female and male turtles in the sea by nets. Those expert in swimming can also dive down into the water to do so.

The Yung-hsing Island is the largest in the Hsuan-te Island group and in the entire South Sea Archipelagoes. Nearly oval, it is 1,900 meters long and 1,300 meters wide, covers an area of 1,851,000 square meters, and rises ten meters above the sea. The Shih Island is only 730 meters northeast of the Yung-hsing Island. Its area is small, only 78,000 square meters. As both islands are on the same reef base, one can walk from one to the other at low tide. Though small, the Shih Island is one of the highest in the South Sea Archipelagoes. It is 12.4 meters above sea level. At its northwest corner where the elevation is ten meters, there is a layer of yellow sand about five centimeters thick, which proves that the crust of the earth once surged upward.

The Shen-hang and Kuang-chin Islands in the Yung-ho Island group are also located on the same reef base. The Shen-hang Island is in the east, with an area of 432,500 square meters. There is a small lake on the island. The Kuang-chin Island is in the west, with an area of 76,250 square meters. The coral reef between the two islands are several meters below water. Fishing boats from the Hainan Island and other areas often anchor here.

The trip from Yu-lin Bay of the Hainan Island to the Hsi-sha Islands requires about ten days by sailboat, but only one day by steamer.

## Chapter 6

### The Chung-sha Islands

Leaving the Hsi-sha Islands and sailing southeastward about 100 kilometers, we arrive at the Chung-sha Islands.

On the vast ocean of the Chung-sha Islands, we see nothing but the waves. The fact is that none of the coral reefs of this area is exposed above water.

On the map, we can see many hidden coral reefs here. They distribute from the northeast to the southwest, forming roughly an oval, from latitude  $15^{\circ} 24'$  N to latitude  $16^{\circ} 15'$  N, and from longitude  $114^{\circ} 57'$  E to  $113^{\circ} 40'$  E, and covering  $51'$  of latitude and  $1^{\circ} 17'$  of longitude. The longest distance is 140 kilometers and the widest 60 kilometers, slightly smaller than the Hsi-sha Islands.

The hidden coral reefs of the Chung-sha Islands average about 20 meters below the sea surface, the shallowest being 10 meters. There is no danger to navigation. When our steamer draws closer to this group of reefs, we can see that the ocean water is light green, rather than blue, due to the coral reefs not far below. In bad weather, the waves will churn and spray, and one cannot see the clear green of the sea water.

The Chung-sha Islands are in fact a large underwater atoll, with the shallowest area in the northeast about ten meters from the surface. We can foresee that so many years later, if the crust of the earth does not move, this group of hidden reefs will become a

"danger zone" to navigation. If the crust of the earth rises, the protruding parts of the hidden reefs will rapidly turn into islands.

[The following text is extremely faint and illegible due to low contrast and scan quality. It appears to be a multi-paragraph document.]

## Chapter 7

### The Nan-sha Islands (The Spratlys)

Leaving the Chung-sha Islands and continuing south, we draw closer and closer to the equator and begin to feel the heat. However, with the gentle ocean breeze, it is not intolerable, and it is even cool in the mornings and evenings.

We have been sailing on the ocean for two days and two nights. We see the vast ocean and the sea gulls and the flying fish jumping out of the water three or four meters high. This happens to be the fishing season, and we run into many fishing boats from the Hainan Island and the Luichow Peninsula.

On the third day, the equatorial Nan-sha Islands appear before our eyes, welcoming the visitors from far away.

The Nan-sha Islands are the southernmost and most widely scattered group of islands in the South Sea Archipelagoes. The map shows that this group of islands cover a wide area, from longitudes  $117^{\circ} 50'$  E to  $109^{\circ} 30'$  E and from latitudes  $3^{\circ} 52'$  N to  $11^{\circ} 20'$  N. Its area is larger than any of the three previous groups.

The islands in the western part of the group look across the ocean at the southern portion of Viet Nam, the islands in the eastern and southeastern parts neighbor on the Philippines and the Chia-li-man-tan Island, and those in the southwest face Malaya and Singapore across the ocean.

The coral islands and reefs of the Nan-sha Islands are closely distributed. Many areas have not been surveyed, and they are the "danger zones" in navigation. Now, we have learned that the Nan-sha Islands have 15 islands, 3 shoals, and 74 hidden reefs and hidden banks, totalling 94. In addition, there are also several hidden shoals. The sizes of the islands are small, and the elevation is generally low, not more than ten meters.

The "danger zones" are mostly situated in the middle part of the Nan-sha Islands. The Nan-sha Islands can be subdivided into the east, south, and west groups. Among the three groups, the islands in the west group contain most hidden reefs.

With latitude  $10^{\circ}$  N as the dividing line, the west group can again be subdivided into the north and south sections. The north section includes the Cheng-ho Reef Group, the Chung-yeh Island, the Nan-yueh Island, and the Shuang-tzu Reef. The south section includes the Yin-ch'ing Reef Group, the Nan-wei Island, and the Wan-an Bank.

The Cheng-ho Reef Group is the most important atoll in the north and the largest in the South Sea Archipelagoes. It was known as the "T'uan-sha Islands" in ancient times, and also as the "T'i-chia Bank." It includes the T'ai-p'ing Island, the Hung-hsiu Island, the An-ta Reef, the Nan-hsun Reef, and the Tun-ch'ien Shoal, all on one large atoll. The atoll measures 55 kilometers from the east to the west and 15 kilometers from the north to the south. The depth of the lagoon in the middle is between 9 and 11 meters. The water is compa-

ratively calm and it is a good fishing area.

The T'ai-p'ing Island is the largest coral island in the Nan-sha Islands. It is located in the northwest corner of the Cheng-ho Reef Group, and its northern edge is more than 900 kilometers from the Yu-lin Bay of the Hainan Island. It is shaped like a shuttle, slightly pointed in the southwest and rounded in the northeast, also known as the Ch'ang Island. The length of the island is 1,350 meters, the width 350 meters, the circumference 2,800 meters, and the area about 432,000 square meters. The terrain is low and flat, the highest elevation being only 4.18 meters. On the limestone cliff of the coral reef, a layer of loose white sand formed by corals and all kinds of shells is spread, at a thickness of about three meters. The very top is covered with a bird dropping layer about .7 to 1 meter thick. The island abounds with cocoanut trees, papayas, and bananas. The depth of the reef base around the island is less than one meter at low tide, making it impossible even for small boats to anchor. Hence, the anchoring condition of the island is rather inferior.

Among the islands and reefs south of latitude  $10^{\circ}$  N, the Nan-wei Island is the most important. It is located more than 300 kilometers southwest of the T'ai-p'ing Island. Its area is 148,000 square meters and elevation 2.8 meters. This island is small and low, but the anchoring condition is extremely good. The atoll in its northeast has a navigation line of about 14 meters deep, and big boats can reach the shore of the island directly. As the outlet of the navigation line

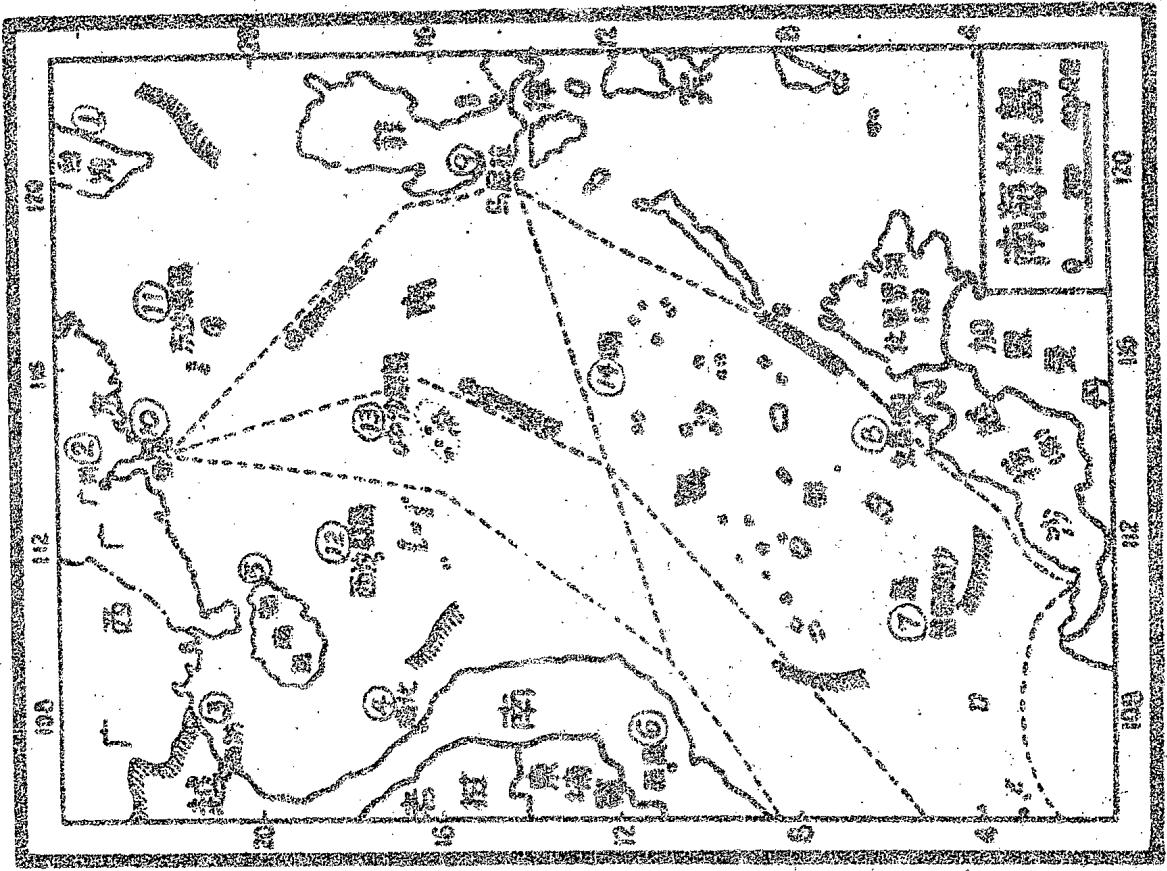
faces north, it is not greatly affected by typhoons and it is a good place for boats to weather storms. The shipping routes between Canton and Jakarta and between Singapore and Hongkong and Manila all pass by the west of the island. Hence, its position becomes even more important.

The reefs south of the "danger zone" are mostly in the hidden reef, hidden shoal, and hidden bank stage, except for parts of the Tan-wan Reef and Huang-lu Reef which are exposed above water at heights of between one and three meters. The Tseng-mu Shoal is a coral reef in the south section, about two or three meters below water.

The coastal shipping in the eastern portion of the South Sea passes by the east of the "danger zone" (called the Pa-la-wang shipping route). The east group has dangerous reefs such as the Hai-ma Bank, the Chien-ch'ang Shoal, and the Pan-yueh Shoal. The seamen tell their position by the color of the water and the shape of the waves.

The marine products of the Nan-sha Islands are abundant and the fishing area wide, long serving as the area of activities of our fishermen. The water is warm and the spring flood early. When in season, tens of thousands of fishermen congregate to fish. They come with the northeast monsoon and return with the southwest monsoon.

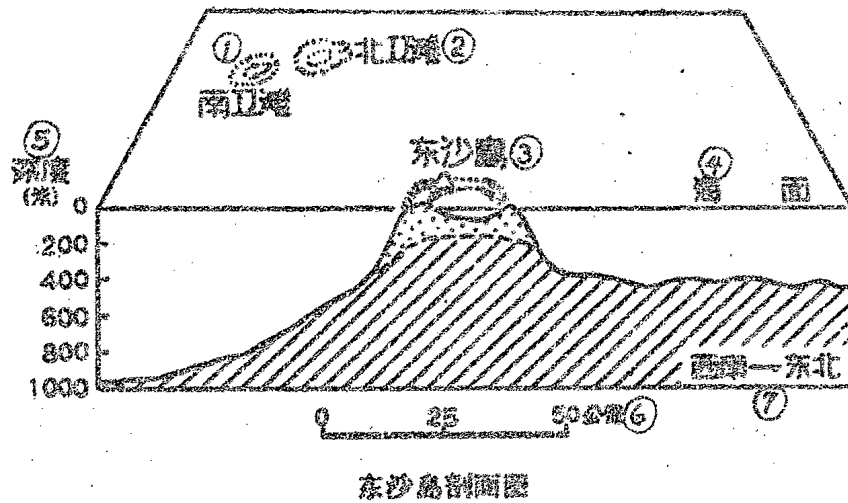
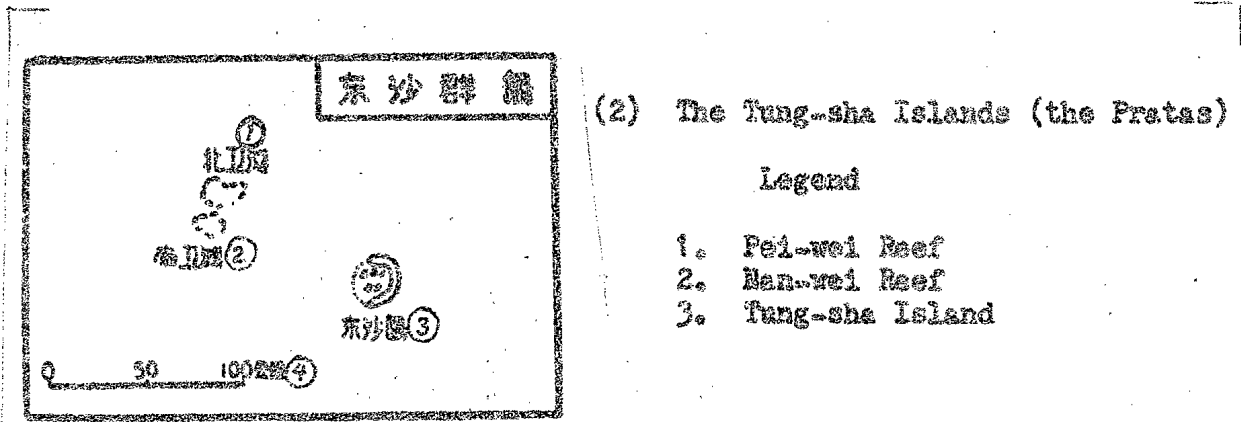
Maps (1) The South Sea Archipelagoes (just before title page)



Legend

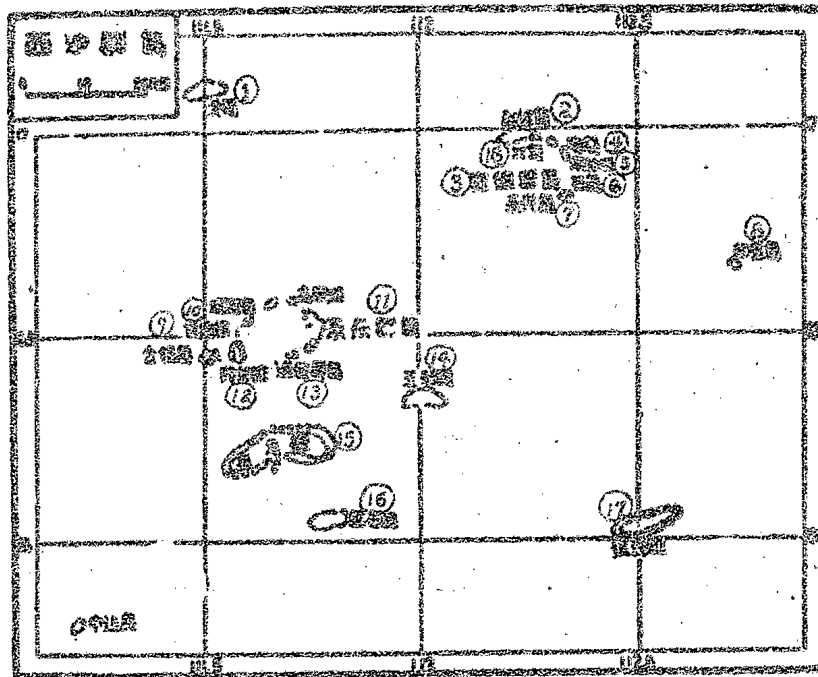
1. Taiwan
2. Canton
3. Hai Phong
4. Shan-hua
5. Hainan Island
6. Saigon
7. Tsung-an Shoal
8. Wan-ta'ai (Br.) (Brunel?)
9. Manila
10. Hongkong
11. Tung-sha Islands (The Pratas)
12. Hai-sha Islands (The Prataels)
13. Chung-sha Islands
14. Nan-sha Islands (the Spratlys)





(3) Cross-Section of the Tung-sha Island

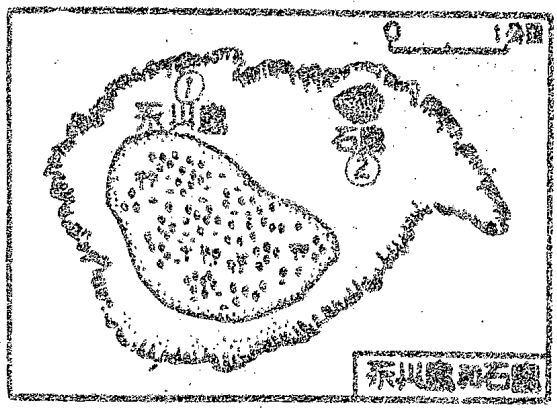
- Legend
1. Nan-wei Reef
  2. Pei-wei Reef
  3. Tung-sha Island
  4. Sea level
  5. Depth (meters)
  6. Kilometers
  7. Southwest -- Northeast



(4) The Hsi-sha Islands (the Paracels)

Legend

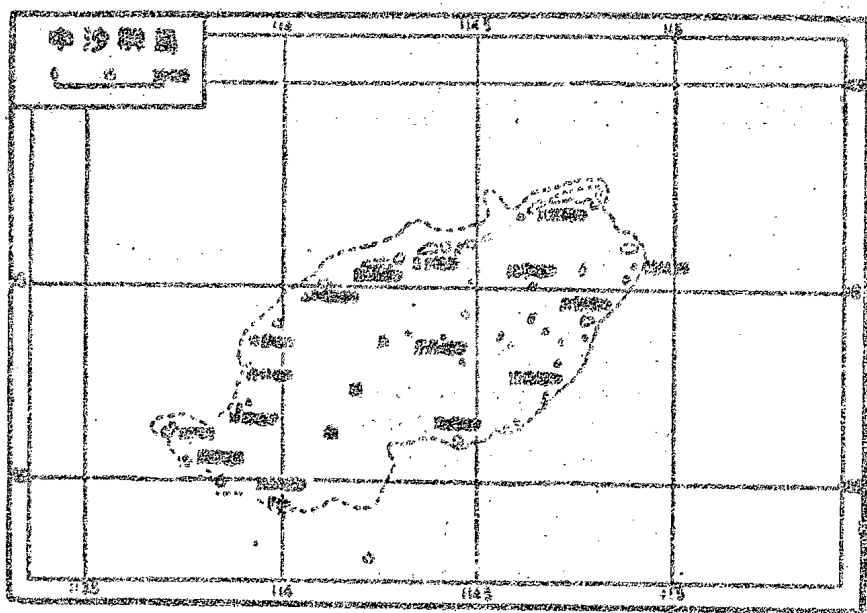
1. Pei Reef
2. Chao-shu Island
3. Hsuan-ts Islands Group
4. Nan Island
5. Nan Shoal
6. Shih Island
7. Yung-hsing Island
8. Ho-wu Island
9. Chin-yin Island
10. Kan-ch'uan Island
11. Yung-lo Island Group
12. Ling-yang Reef
13. Tao-ch'ien Island Group
14. Yu-chu Reef
15. Hua-kuang Reef
16. P'an-shih Islet
17. P'eng-po Reef
18. Fei Island



(5) The Yung-hsing and Shih Islands

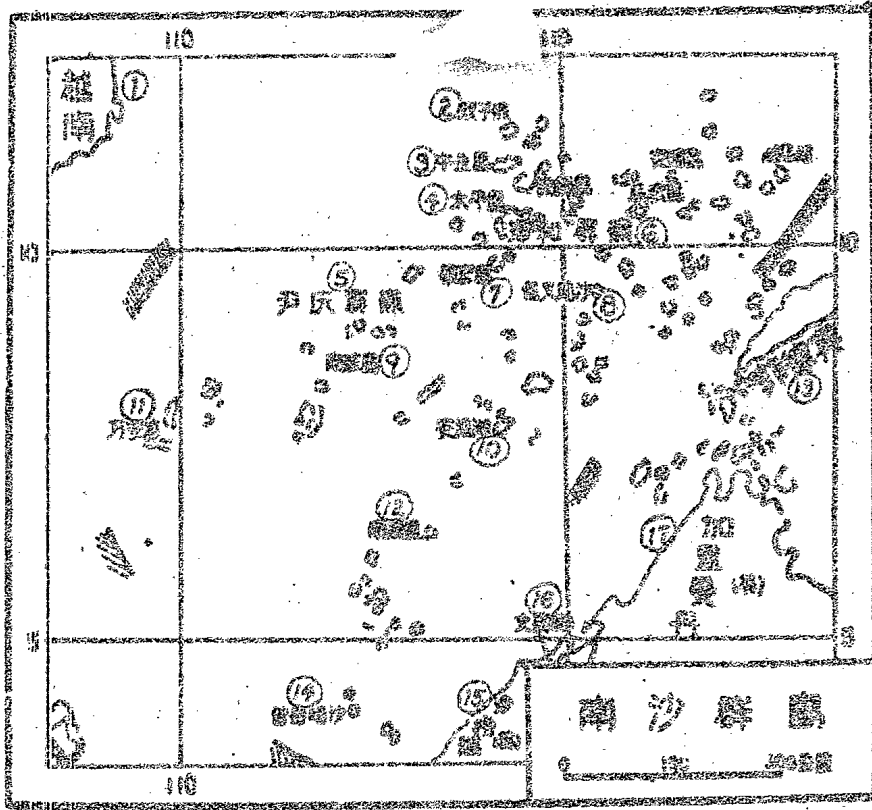
Legend

- 1. Yung-hsing Island
- 2. Shih Island



(6) The Chung-sha Islands

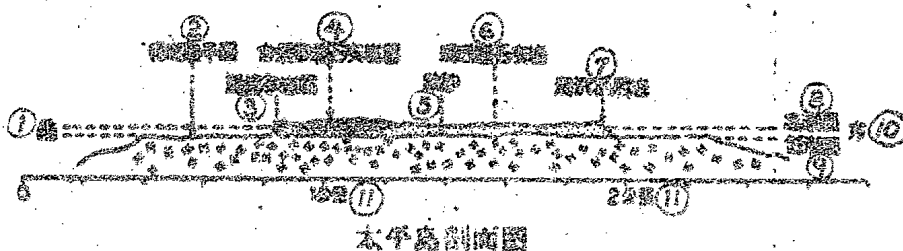
Legend (illegible)



(7) The Nan-she Islands (the Spratlys)

Legend

- |                           |                         |
|---------------------------|-------------------------|
| 1. Viet Nam               | 2. Shuang-tsu Reef      |
| 3. Chung-yeh Island       | 4. T'ai-p'ing Island    |
| 5. Yin-ch'ing Island      | 6. Cheng-ho Reef Group  |
| 7. Ching-hung Island      | 8. Hsin-i Shoal         |
| 9. Nan-wei Island         | 10. An-tu Bank          |
| 11. Wan-an Bank           | 12. Nan-t'ung Reef      |
| 13. The Philippines       | 14. Tseng-an Shoal      |
| 15. Sarawak               | 16. Wan-ta'ei (Brunei?) |
| 17. Chia-li-san-tan (Br.) |                         |



(5) Cross-Section of the T'ai-p'ing Island

Legend

- |                            |                                       |
|----------------------------|---------------------------------------|
| 1. West                    | 2. Flat surface of coral reef         |
| 3. Beach sandstone stratum | 4. Phosphorus sandy limestone stratum |
| 5. Loess sand              | 6. Coral reef limestone               |
| 7. Beach calcareous rock   | 8. High tide                          |
| 9. Low tide                | 10. East                              |
| 11. Kilometers             |                                       |

Photo Captions

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8. The Sea Turtle	25

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E N D

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